

**TO:** T10 Membership  
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**Revision 0:**

- Initial rough draft.

This proposal is offered as a sample of the commands and data that would be exchanged between an automation application client and an ADC device server to configure the data transfer device for operation.

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## **Annex A**

(Informative)

### **Example of DTD Configuration**

#### **A.1 Introduction**

When a data transfer device (DTD) is first powered on, the automation application client will typically discover the DTD and then modify its configuration prior to enabling its primary port(s). This ensures that the configuration is correct when the RMC device server is first accessed by application clients. Typical configuration information to be set in the drive includes:

- Target ID (SCSI ID or Fibre Channel Loop Identifier)
- Other transport-specific configuration items
- World wide names and other identifiers
- Enabling or disabling of bridging

This annex presents a recommended sequence of commands for setting the DTD's configuration, and points out specific items to be configured.

#### **A.2 Command Sequence**

The recommended sequence of commands for the automation application client to issue to the DTD is shown in Table A.1.

**Table A.1 – Configuration command sequence**

<b>Command</b>	<b>LUN Addressed</b>	<b>Purpose</b>
REPORT LUNS	0	Discover logical units supported by DTD
INQUIRY	Each reported LUN	Determine type of each device server
TEST UNIT READY	ADC LUN	Clear Unit Attention conditions
MODE SENSE (10)	ADC LUN	Obtain current mode parameter values
MODE SENSE (10)	ADC LUN	Obtain changeable mode parameter mask

MODE SELECT (10)	ADC LUN	Set saved mode parameter values
MODE SELECT (10)	ADC LUN	Set non-saved mode parameter values

The REPORT LUNS command is mandatory in ADC to facilitate this discovery process, avoiding scanning of an arbitrary range of LUNs.

The parameter values are set in two phases because the saved parameters are typically different from the parameters that are current when the RMC device server is in use. In particular, each DTD Primary Port descriptor contains a port enable (PE) field. This field is usually set to zero in the saved descriptor so that the primary port(s) will be disabled when the DTD is powered on. This prevents application clients from accessing its device servers before the ports are configured.

The final MODE SELECT (10) will set the PE field to one to enable the port. The save pages (SP) field is not set in this CDB so that the saved PE field will remain zero.

The ten-byte forms of the MODE SENSE and MODE SELECT commands should be used because they are mandatory and will be available on all DTDs. The six-byte forms are optional and thus may not be supported.

### A.3 Obtaining mode parameters

Once the automation application client has determined which logical unit has the ADC device server, it can then begin to determine the characteristics of the DTD. Automation firmware should make no assumptions about the type of media handled by the drive, the number and types of primary ports, identifiers reported by it, etc.

To obtain the current values of the relevant parameters, the automation application client should issue a MODE SENSE (10) command with the page control (PC) field set to Current Values (00b). The data received must then be parsed to determine which parameters are supported.

The remainder of this clause provides an example of the mode data which may be returned by an ADC device server. Comments are included about which

#### A.3.1 Mode parameter header and block descriptor

Bit Byte	7	6	5	4	3	2	1	0
0	MODE DATA LENGTH							
1	MEDIUM TYPE (00h)							
2	DEVICE-SPECIFIC PARAMETER (00h)							
3	BLOCK DESCRIPTOR LENGTH (08h)							
4	DENSITY CODE (00h)							
5	(MSB)							
6	NUMBER OF BLOCKS (000000h)							
7	(LSB)							
8	Reserved							
9	(MSB)							
10	BLOCK LENGTH (000000h)							
11	(LSB)							

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Editor's Note: Should number of blocks and block length be 0, as shown above? This is not mentioned in ADC.

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### A.3.2 Node descriptor subpage

If the automation device wishes to change the world wide node name, then it should set the WORLD WIDE NODE NAME field to the new value and set the MNN field to 11b. For other choices, see Table 24.

12	PS	SPF (1b)	PAGE CODE (0Eh)				
13	SUBPAGE CODE (01h – Node descriptor subpage)						
14	(MSB)	PAGE LENGTH (0Ch)					(LSB)
15							
16	Reserved					MNN (xxb)	
17	Reserved						
18	Reserved						
19	Reserved						
20	(MSB)						(LSB)
	WORLD WIDE NODE NAME						
27							(LSB)

### A.3.3 Service Delivery Port descriptor subpage

The example here is for a DTD having two Fibre Channel ports, so the subpage contains two Service Delivery Port descriptors. There should be no changeable information in the sub page header.

28	PS	SPF (1b)	PAGE CODE (0Eh)												
29	SUBPAGE CODE (02h – service delivery port descriptor subpage)														
30	(MSB)		PAGE LENGTH (20h)												
31														(LSB)	

### A.3.4 Port A port descriptor

The automation application client may wish to change a number of fields in each port descriptor.

32	RELATIVE TARGET PORT (00h)							
33	PORT TYPE (00h – Fibre Channel)							
34	(MSB)	ADDITIONAL DESCRIPTOR LENGTH (0Ch)					(LSB)	
35								
36	P2P	TOPLOCK	RHA	LIV	MPN	Rsvd	PE	
37	Reserved				SPDLOCK	SPEED		
38	Reserved							
39	Rsvd	FC-AL LOOP ID						
40	(MSB)	PORT NAME						(LSB)

47	(LSB)
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### A.3.5 Port B port descriptor

48	RELATIVE TARGET PORT (01h)						
49	PORT TYPE (00h – Fibre Channel)						
50	(MSB)	ADDITIONAL DESCRIPTOR LENGTH (0Ch)					(LSB)
51							
52	P2P	TOPLOCK	RHA	LIV	MPN	Rsvd	PE
53	Reserved				SPDLOCK	SPEED	
54	Reserved						
55	Rsvd	FC-AL LOOP ID					
56	(MSB)						
	PORT NAME						
63	(LSB)						

### A.3.6 Logical unit descriptor subpage

If it is supported, the logical unit descriptor subpage will contain at least one device descriptor. In this example, all three device descriptors are present.

64	PS	SPF (1b)	PAGE CODE (0Eh)	
65	SUBPAGE CODE (03h – logical unit descriptor subpage)			
66	(MSB)	PAGE LENGTH (2Ch)		
67				

### A.3.7 RMC device descriptor

If the automation device wishes the RMC device server to appear on its primary interface ports, it must set the LOGICAL UNIT NUMBER field to the desired value and set the ENABLE field to one. Otherwise, it must set the ENABLE field to zero. Typically, the LUN will be 0000h and ENABLE will be 1. During normal operation, the OFFLINE bit will be 0.

This example is for a Stream (tape) device, so the DEVICE TYPE field contains 01h.

68	LOGICAL UNIT INDEX (00h)							
69	DEVICE TYPE (01h – Stream device)							
70	(MSB)	ADDITIONAL DESCRIPTOR LENGTH (16h)						(LSB)
71								
72	(MSB)	LOGICAL UNIT NUMBER (0000h)						(LSB)
73								
74	MLUN		Reserved				OFFLINE	ENABLE
75	Reserved		AUH	SUHO	AMO	AUTOLOAD MODE		
76	FUE	DRMODE	Reserved				DENOVN	WP
77	CURRENT DENSITY							

78	SELECT WRITE DENSITY
79	Reserved
80	Reserved
81	Reserved
82	Reserved
83	Reserved

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Editor's Note: I believe that the additional descriptor length describes the number of bytes that follow the LUN field. In other words, the length does **not** include the two bytes of the LUN. Is this right?

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### A.3.8 Identification descriptors

Identification descriptors are part of the RMC device descriptor. This DTD reports only the T10 vendor identifier for Fubarica. The eight-byte IDENTIFIER field can be changed to the desired string.

84	PROTOCOL IDENTIFIER (0h)			CODE SET (2h)
85	PIV	Rsvd	ASSOCIATION (0h)	IDENTIFIER TYPE (1h)
86	Reserved			
87	IDENTIFIER LENGTH (08h)			
88	IDENTIFIER ("FUBARICA")			
95				

### A.3.9 Medium Changer device descriptor

If the data transfer device supports ADI bridging (*insert reference*), then the mode data will include a Medium Changer device descriptor. If automation wishes to enable bridging, it must set the LOGICAL UNIT NUMBER field to the desired value and set the ENABLE field to one. Otherwise, it must set the ENABLE field to zero.

If multiple logical units are enabled for reporting on the primary ports, then the drive must ensure that their logical unit numbers are different. If the LUN field in the RMC descriptor is the same as that for another logical unit, then it is recommended that the drive report an invalid field in the parameter data, with sense data indicating the LUN field in a descriptor other than that for the RMC logical unit.

96	LOGICAL UNIT INDEX (01h)		
97	DEVICE TYPE (12h – Medium Changer device)		
98	(MSB)	ADDITIONAL DESCRIPTOR LENGTH (0002h)	
99			(LSB)
100	(MSB)	LOGICAL UNIT NUMBER	
101			(LSB)
102	Reserved		ENABLE
103	Reserved		

### A.3.10 Automation Drive device descriptor

If the automation device wishes the ADC device server to appear on the primary ports, it must set the LOGICAL UNIT NUMBER field to the desired value and set the ENABLE field to one. Otherwise, it must set the ENABLE field to zero.

104	LOGICAL UNIT INDEX (02h)		
105	DEVICE TYPE (08h – Automation Drive device)		
106	(MSB)	ADDITIONAL DESCRIPTOR LENGTH (0002h)	
107			
108	(MSB)	LOGICAL UNIT NUMBER	
109			
110	Reserved		ENABLE
111	Reserved		

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Editor's Note: Is this detailed presentation of the mode parameters useful, or is a higher-level discussion sufficient?

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### A.4 Determining changeable parameters

To obtain a mask denoting the changeable parameters, the automation application client should issue a MODE SENSE (10) command with the page control (PC) field set to Changeable Values (01b).

While obtaining the mask is not the only way to determine which parameters are changeable, the alternative is to attempt to change parameters and have the device server reject the command for invalid parameter data. This may be less efficient than using the mask.

It is recommended that if mode parameters are modified, then the parameter data written back be in exactly the organization of the data, rather than dropping unchanged parameters, re-ordering parameters, etc. This avoids the complexity of re-calculating descriptor lengths.

### A.5 Saving mode parameters

Different data transfer devices may allow saving of different parameters. It is recommended that at a minimum the PORT ENABLE (PE) bit for each primary port be saveable. If these bits are set to 0 and saved, it will permit the automation application client to configure the DTD before it can be accessed through its primary ports.

This first MODE SELECT (10) will not be necessary if there is no need to change any of the parameters.

### A.6 Enabling ports

The second MODE SELECT (10) command will typically enable the DTD's primary ports. It is done with the save pages (SP) field set to zero.

If the automation uses the OFFLINE field of the RMC logical unit descriptor to leave the device offline after ports are enabled, then an additional MODE SELECT (10) will be necessary to bring the device on line.

