TO: T10 Membership
FROM: Paul Suhler, Seagate Technology
DATE: 1 July 2002
SUBJECT: ADC Mode Parameters (T10/02-234r1)

0. Changes
Rev. 1: Reorganized mode page and fixed inconsistencies. Removed references to Seagate vendor-unique mode page 22h. Added possible changes to mode page 19h.

1. General
This document proposes possible mode parameters outlined by Rod Wideman, ADIC, in 02-228r0. Suggested discussion points are include in *italics*. This is mostly Fibre Channel-centric and needs to be generalized to other transports, different numbers of ports, etc. It does not present means for performing power management or for changing the device serial number.

Many of these behaviors could be subject to change if the drive detects that it is not installed in a library. For example, it may be desirable for primary interface ports to be enabled in this case, regardless of the setting of the PORT X POWER ON DISABLED fields.

2. Physical Control mode parameters
This section addresses the Physical Behavior category in section 3 of 02-228r0.

2.1   Automatic Load Control
See SPC-3, Control mode page (0Ah), AUTOLOAD MODE field for behavior upon medium insertion. Existing modes are:

Value	Definition
000b	Medium shall be loaded for full access
001b	Medium shall be loaded for medium auxiliary memory access only
010b	Medium shall not be loaded
011b – 111b	Reserved

A new mode should be considered:
- Medium shall not be loaded. After loading, change Autoload Mode to 000b.

Alternatively, this could be done by adding a bit to the LOAD UNLOAD command.

2.2   Automatic Unload Control

There seem to be three options here:

Value	Definition
000b	Medium shall be loaded for full access
001b	Medium shall be unthreaded, with MAM accessible
010b	Medium shall be unloaded
011b – 111b	Reserved

"Unthreaded" is admittedly imprecise, given the variety of technologies.

These modes can be chosen separately for the following events:

- Power cycle with medium in drive
- Loading of an incompatible medium (may include expired cleaning cartridge)
- Firmware download with medium in drive
- Completion of cleaning
- UNLOAD command from primary interface

We need to decide how many of these events can be grouped together. There's probably no need to specify all events independently.

We may wish to take this to the CAP working group for inclusion in the Control mode page (0Ah).

3. Port Control mode parameters

This section addresses the Logical Behavior category in section 4 of 02-228r0. It presents some alternative implementations of the same functionality, first a new mode page and then variations on the Protocol Specific Port Control mode page (19h). It does not present a means for changing the device serial number, which was expectedly controversial.

3.1   New mode page

Bit Byte	7	6	5	4	3	2	1	0
0	PS	RESERVED	PAGE CODE (TBD)					
1	PAGE LENGTH (1Ch)							
2	PORT A DISABLE	PORT B DISABLE	PORT A REQUIRE HARD ADDRESS	PORT B REQUIRE HARD ADDRESS	PORT A POWER ON DISABLED	PORT B POWER ON DISABLED	OVERRIDE WWNS	DISABLE IN-BAND INTERFACE CONTROL
3	RESERVED							
4	MSB							
…			OVERRIDE NODE NAME					
11								LSB
12	MSB							
…			OVERRIDE PORT A NAME					
19								LSB
20	MSB							
…			OVERRIDE PORT B NAME					
27								LSB
28	PORT A ID							
29	PORT B ID							

This organization assumes that eight-byte fields should begin on four-byte boundaries.

Should this be reorganized to allow for more than two ports? E.g., a separate parameter for each port containing ID, port name, and control bits?

If the drive is single port then the Port B fields shall be reserved.

DISABLE IN-BAND INTERFACE CONTROL – When this field is set to 1, the MODE SELECT command cannot be used over the primary (Parallel SCSI or Fibre Channel) interface to change the AUTOLOAD MODE field in the Control mode page (0Ah), the AUTOUNLOAD MODE fields in the *TBD* mode page, or any fields in the Protocol Specific Port Control mode page (19h). This prevents other initiators from modifying drive parameters set by the library. If the library port cable is not attached, then this field is ignored and in-band control is enabled.

OVERRIDE WWNS – When this field is set to 1, the drive shall use the node and port names specified by the OVERRIDE NODE NAME, OVERRIDE PORT A NAME, and OVERRIDE PORT B NAME fields for protocol-specific operations and for EUI-64 and NAA identifier types reported via the Device Identification VPD page (83h). This field controls the behavior of both ports.

Are there any other places that these names need to be used, or can the requirement be worded more generally?

If this value is changed while a port is enabled, then the change shall take effect upon the next transition from port disabled to port enabled.

Do we need to define "port disabled" and "port enabled?"

This assumes that the drive will remember the node and port names assigned in manufacturing. Using a bit to determine whether to use the original names or those set by this command avoids ambiguities that would arise from using a reserved value (e.g., 0) to indicate that the original names should be used. In particular, it prevents one of the names presenting an original value and another presenting an overridden value.

PORT A POWER ON DISABLED and **PORT B POWER ON DISABLED** – If either of these fields contains a 1 at power up, then the corresponding port shall be disabled. If the library port cable is not attached, then these fields are ignored and both ports shall be enabled at powerup.

Is it necessary to specify this separately for each port, or can these be reduced to a single field?

PORT A REQUIRE HARD ADDRESS and **PORT B REQUIRE HARD ADDRESS** – When either of these fields is set to 1, then during LIP the corresponding port shall only attempt to obtain the hard assigned loop identifier specified in the corresponding PORT X ID field. The port shall not attempt to obtain an address during the LISA phase of initialization (see FC-AL-2). If this field is set to 1 and the corresponding PORT ID field is set to an invalid value, then the port shall not participate in LIP.

If the drive's primary interface is not Fibre Channel, then these fields are reserved.

Is it useful to specify RHA separately per port, or do we just want one bit here? If it's not necessary to set this per-port, then it would be less confusing to abolish this bit and rely upon the RHA bit in mode page 19h. That would also remove a Fibre Channel-specific field from a potentially general page.

PORT A DISABLE and **PORT B DISABLE** – When these fields are set to zero the specified port is enabled. When these fields are set to one the specified port is disabled.

Need to specify the effect of disabling a port with one or more active commands.

OVERRIDE NODE NAME – This eight-byte field is used to specify the World Wide Node Name of the drive. This value shall be meaningful if and only if the OVERRIDE WWNS field is one.

OVERRIDE PORT A NAME and **OVERRIDE PORT B NAME** – These eight-byte fields are used to set the World Wide Name for each port. These values shall be meaningful if and only if the OVERRIDE WWNS field is one.

By allowing the library to set the port names completely generally, we avoid specifying a rule for deriving port B's name from Port A's. Any such rule is bound not to be acceptable to everyone.

Need text prohibiting setting the names to a range reserved by the device vendor. Note that if the library and drive were from the same manufacturer, this would prevent setting the names to values in the namespace controlled by the manufacturer. Is this a bad idea?

PORT A ID and **PORT B ID** – For Fibre Channel devices, this field is used to set the hard-assigned loop identifier for the specified port. If the value is invalid (7Eh or 7Fh), then the port shall not participate in

the LIHA phase of LIP. If the port's PORT X REQUIRE HARD ADDRESS bit is also set, then the drive shall not participate in LIP.

For Parallel SCSI devices, this is the SCSI ID and the valid values are [0 .. 15].

Since a port may not obtain the desired assigned loop identifier, the actual value should be reported by the device. Should this be done via new fields in this page or via a log page?

3.2   Extending the existing Fibre Channel Port Control mode page (19h)

An alternative to the new mode page above would be to add these parameters to the existing FC Port Control mode page. It assumes that there would be no problem with reusing byte 4, which is presently reserved. It also uses the existing single RHA bit to control both (all) ports.

Bit Byte	7	6	5	4	3	2	1	0
0	C	RESERVED	PAGE CODE (19h)					
1	PAGE LENGTH (20h)							
2	RESERVED				PROTOCOL IDENTIFIER (FCP = 0h)			
3	DTFD	PLPB	DDIS	DLM	RHA	ALWI	DTIPE	DTOLI
4	RESERVED		PORT A DISABLE	PORT B DISABLE	PORT A POWER ON DISABLED	PORT B POWER ON DISABLED	OVERRIDE WWNS	DISABLE IN-BAND INTERFACE CONTROL
5	RESERVED							
6	RESERVED					RR_TOV UNITS		
7	RESOURCE RECOVERY TIME-OUT VALUE (RR_TOV)							
8	MSB	OVERRIDE NODE NAME						
…								
15								LSB
16	MSB	OVERRIDE PORT A NAME						
…								
23								LSB
24	MSB	OVERRIDE PORT B NAME						
…								
31								LSB
32	PORT A HARD ASSIGNED LOOP IDENTIFIER							
`	PORT B HARD ASSIGNED LOOP IDENTIFIER							

3.3   SCSI Parallel Interface Port Control mode page (19h)
And here is a possible port control mode page for a single-port SPI device which uses world wide names:

Bit Byte	7	6	5	4	3	2	1	0
0	PS	RESERVED	PAGE CODE (19h)					
1	PAGE LENGTH (20h)							
2	RESERVED				PROTOCOL IDENTIFIER (SPI = 1h)			
3	SCSI ID							
4	RESERVED		PORT A DISABLE	RESERVED	PORT A POWER ON DISABLED	RESERVED	OVERRIDE WWNS	DISABLE IN-BAND INTERFACE CONTROL
5	RESERVED							
6	RESERVED							

7	RESERVED		
8	MSB		
…		OVERRIDE NODE NAME	
15			LSB
16	MSB		
…		OVERRIDE PORT A NAME	
23			LSB

Other Parallel SCSI-specific parameters could be specified here.