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Subj: SPC-4 SBC-3 Adding more low power options
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Overview

The existing Power Condition Mode Page Allows for two low power modes (IDLE and STANDBY). This proposal increases the number of low power modes to four and adds a recovery time parameter for each of the low power modes.

Elements included in this proposal are:
a) additions to the Power Condition mode page to add two more idle modes and add a recovery time parameter for each power mode;
b) additions to START STOP command to immediately enter the new idle power modes;
c) addition to the power condition model to allow REQUEST SENSE to return new ASC values for the new idle modes;
d) define 4 new ASC values; and
e) add new log parameters to count transitions to low power modes.

SPC-4 changes:

[Note: Changes may be required to clause 5.9 to add two more power conditions. My preference is just to handle IDLE2 and IDLE3 as lower power mode of IDLE and not create separate states for them. This means we don't have to change the power condition model.]

7.4.12 Power Condition mode page

The Power Condition mode page provides an application client with methods to control the power condition of a logical unit (see 5.9). These methods include:
a) Specifying that the logical unit transition to a power condition without delay; and
b) ~~Activating~~ enabling and ~~setting~~ initializing any of ~~idle condition and standby~~ the power condition timers to specify that the logical unit wait for a period of inactivity before transitioning to a specified power condition.

The mode page policy (see 6.9) for this mode page shall be shared.

When a device server receives a command while in a power condition based on a setting in the Power Condition mode page, the logical unit shall transition to the power condition that allows the command to be processed. If ~~either the idle condition timer or the standby~~ any power condition timer has been ~~set~~ enabled, then they shall be ~~reset~~ halted on receipt of the command. On completion of the command, the enabled timer(s) shall be initialized and started.

The power conditions shall be ordered from least power savings (and shortest recovery time) to most power savings (and longest recovery time) as follows: idle, idle2, idle3, and standby.

Logical units that contain cache memory shall write all cached data to the medium for the logical unit (e.g.,as a logical unit does in response to a SYNCHRONIZE CACHE command as described in SBC-2) prior to entering into any power condition that prevents accessing the media (e.g., before a hard drive stops its spindle motor during transition to the standby power condition).

The logical unit shall use the values in the Power Condition mode page to control its power condition after a power on or a hard reset until a START STOP UNIT command setting a power condition is received.

Table 319 defines the Power Condition mode page.

Table 319 -- Power Condition Mode Page

Byte \ Bit	7	6	5	4	3	2	1	0
0	PS	SPF(0b)	Page Code (1Ah)					
1	Page Length							
2	Reserved							
3	Reserved				IDLE3	IDLE2	IDLE	STANDBY
4	IDLE CONDITION TIMER							
5								
6								
7								
8	STANDBY CONDITION TIMER							
9								
10								
11								
12	IDLE2 CONDITION TIMER							
13								
14								
15								
16	IDLE3 CONDITION TIMER							
17								
18								
19								
20	RESERVED							
21								
22								
23								
24	IDLE CONDITION RECOVERY TIME							
25								
26	STANDBY CONDITION RECOVERY TIME							
27								
28	IDLE2 CONDITION RECOVERY TIME							
29								
30	IDLE3 CONDITION RECOVERY TIME							
31								
32	RESERVED							
40								

The PS bit, SPF bit, PAGE CODE field, and PAGE LENGTH field are described in 7.4.5.

The IDLE, IDLE2, IDLE3, and STANDBY bits specify which timers are ~~active~~ enabled.

If the IDLE bit is set to one ~~and the STANDBY bit is set to zero,~~ then the idle condition timer is ~~active~~ enabled and the device server shall transition to the idle power condition when the time specified by the idle condition timer ~~is zero~~ has elapsed.

If the IDLE bit is set to zero, then the device server shall ignore the idle condition timer.

If the STANDBY bit is set to one ~~and the IDLE bit is set to zero,~~ then the standby condition timer is ~~active~~ enabled and the device server shall transition to the standby power condition when the time specified by the standby condition timer ~~is zero~~ has elapsed.

If the STANDBY bit is set to zero, then the device server shall ignore the standby condition timer.

If the IDLE2 bit is set to one then the idle2 condition timer is enabled and the device server shall transition to the idle2 power condition when the time specified by the idle2 condition timer has elapsed.

If the IDLE2 bit is set to zero, then the device server shall ignore the idle2 condition timer.

If the IDLE3 bit is set to one then the idle3 condition timer is enabled and the device server shall transition to the idle3 power condition when the time specified by the idle3 condition timer has elapsed.

If the IDLE3 bit is set to zero, then the device server shall ignore the idle3 condition timer.

If ~~both~~ more than one of the IDLE, IDLE2, IDLE3, and STANDBY bits are set to one, then ~~both~~ all of the enabled timers are active and run concurrently. When each timer is zero, the device server shall transition to the power condition associated with that timer. Timer expirations shall only cause the device server to transition from higher power conditions to lower power conditions (e.g., if the standby timer is set to a smaller interval than the idle2 timer, the device server shall remain in the standby condition when the idle2 timer expires). ~~the idle condition timer is zero the device server shall transition to the idle power condition. When the standby condition timer is zero the device server shall transition to the standby power condition. If the standby condition timer is zero before the idle condition timer is zero, then the logical unit shall transition to the standby power condition.~~

The value in the IDLE CONDITION TIMER field specifies the inactivity time in 100 millisecond increments that the logical unit shall wait before transitioning to the idle power condition when the IDLE bit is set to one. The idle condition timer is expired when:

a) The IDLE CONDITION TIMER field is set to zero; or
b) The ~~number of milliseconds~~ time specified by the value in the IDLE CONDITION TIMER field times 100 milliseconds has elapsed since the last activity (e.g., processing a command that requires the active power condition or performing a self test).

The value in the STANDBY CONDITION TIMER field specifies the inactivity time in 100 millisecond increments that the logical unit shall wait before transitioning to the standby power condition when the STANDBY bit is set to one. The standby condition timer is expired when:

a) The STANDBY CONDITION TIMER field is set to zero; or
b) The ~~number of milliseconds~~ time specified by the value in the STANDBY CONDITION TIMER field times 100 milliseconds has elapsed since the last activity (e.g., processing any command or performing a self test).

The value in the IDLE2 CONDITION TIMER field specifies the inactivity time in 100 millisecond increments that the logical unit shall wait before transitioning to the idle2 power condition when the IDLE2 bit is set to one. The idle2 condition timer is expired when:

a) The IDLE2 CONDITION TIMER field is set to zero; or

b) The time specified by the value in the IDLE2 CONDITION TIMER field times 100 milliseconds has elapsed since the last activity (e.g., processing a command that requires the active power condition or performing a self test).

The value in the IDLE3 CONDITION TIMER field specifies the inactivity time in 100 millisecond increments that the logical unit shall wait before transitioning to the idle3 power condition when the IDLE3 bit is set to one. The idle3 condition timer is expired when:

a) The IDLE3 CONDITION TIMER field is set to zero; or
b) The time specified by the value in the IDLE3 CONDITION TIMER field times 100 milliseconds has elapsed since the last activity (e.g., processing a command that requires the active power condition or performing a self test).

The IDLE CONDITION RECOVERY TIME field specifies the maximum time in 100 millisecond increments that the logical unit shall take to transition from the idle power condition to the active power condition. This time doesn't include processing time for the command that caused this transition to occur. A value of zero indicates that the recovery time is not specified.

The STANDBY CONDITION RECOVERY TIME field specifies the maximum time in 100 millisecond increments that the logical unit shall take to transition from the standby power condition to the active power condition. This time doesn't include processing time for the command that caused this transition to occur. A value of zero indicates that the recovery time is not specified.

The IDLE2 CONDITION RECOVERY TIME field specifies the maximum time in 100 millisecond increments that the logical unit shall take to transition from the idle2 power condition to the active power condition. This time doesn't include processing time for the command that caused this transition to occur. A value of zero indicates that the recovery time is not specified.

The IDLE3 CONDITION RECOVERY TIME field specifies the maximum time in 100 millisecond increments that the logical unit shall take to transition from the idle3 power condition to the active power condition. This time doesn't include processing time for the command that caused this transition to occur. A value of zero indicates that the recovery time is not specified.

SBC-3 changes:

5.19 START STOP UNIT command

Table 60 – START STOP UNIT command

Byte \ Bit	7	6	5	4	3	2	1	0
0	OPERATION CODE (1Bh)							
1	Reserved							IMMED
2	Reserved							
3	Reserved				POWER CONDITION MODIFIER			
4	POWER CONDITION				Resvd	N_FLUSH	LOEJ	START
5	CONTROL							

The OPERATION CODE field is defined in SPC-4 and shall be set to the value defined in table 60.

If the immediate (IMMED) bit is set to zero, then the device server shall return status after the operation is completed. If the IMMED bit set to one, then the device server shall return status as soon as the CDB has been validated.

The POWER CONDITION MODIFIER field defined in table 61 is used to specify additional information about the power condition specified in the POWER CONDITION field.

Table 61 – POWER CONDITION MODIFIER field

POWER CONDITION field value	Code	Description
All values that are not reserved	0h	~~Reserved~~ Perform the power condition action specified by the POWER CONDITION field.
02h (i.e., IDLE)	0h	Transition the logical unit into the idle power condition.
	1h	Specifies that the device server shall increase the tolerance of the direct access block device to external physical forces (e.g., causes a device that has movable read/write heads to move those heads to a safe position).
	2h	Specifies that the device server shall increase the tolerance of the direct access block device to external physical forces (e.g., causes a device that has movable read/write heads to move those heads to a safe position) and should cause the device to use less power than when this field is set to 1h (e.g., cause a device that has rotating media to rotate the media at a lower RPM).
	3h	Transition the logical unit into the idle2 power condition.
	4h	Transition the logical unit into the idle3 power condition.
All other combinations		Reserved

The POWER CONDITION field is used to specify that the logical unit be placed into a power condition or to adjust a timer as defined in table 62. If this field is supported and is set to a value other than 0h, then the START and LOEJ bits shall be ignored.

Table 62 – POWER CONDITION field

Code	Name	Description
0h	START_VALID	Process the START and LOEJ bits.
1h	ACTIVE	~~Place~~ Transition the device into the active power condition.
2h	IDLE	~~Place~~ Transition the device into the idle power condition.
3h	STANDBY	~~Place~~ Transition the device into the standby power condition.
4h	Reserved	Reserved
5h	Obsolete	Obsolete
6h	Reserved	Reserved
7h	LU_CONTROL	Transfer control of power conditions to the logical unit.
8h – 9h	Reserved	Reserved
Ah	FORCE_IDLE_0	Force the idle condition timer to zero.
Bh	FORCE_STANDBY_0	Force the standby condition timer to zero.
Ch - Fh	Reserved	Reserved

If the START STOP UNIT command is processed with the POWER CONDITION field set to ACTIVE, IDLE, or STANDBY, then:

a) the logical unit shall transition to the specified power condition; and
b) the device server shall disable all of the idle condition ~~timer if it is active~~ timers that are enabled (see SPC-4) and disable the standby condition timer if it is ~~active~~ enabled (see SPC-4) until another START STOP UNIT command is processed that returns control of the power condition to the logical unit, or a logical unit reset occurs.

If the START STOP UNIT command is processed with the POWER CONDITION field set to LU_CONTROL, then the device server shall ~~enable~~ activate all the idle condition ~~timer if it is active~~ timers that are enabled (see SPC-4) and ~~disable~~ activate the standby condition timer if it is ~~active~~ enabled (see SPC-4).

If the START STOP UNIT command is processed with the POWER CONDITION field set to FORCE_IDLE_0 or FORCE_STANDBY_0, then the device server shall:

a) force the specified timer to zero, cause the logical unit to transition to the specified power condition, and return control of the power condition to the device server; or
b) terminate a START STOP UNIT command that selects a timer that is not supported by the device server or a timer that is not active. The device server shall terminate the command with CHECK CONDITION status with the sense key set to ILLEGAL REQUEST and the additional sense code set to INVALID FIELD IN CDB.

It is not an error to specify that the logical unit transition to its current power condition.

If the NO_FLUSH bit is set to zero, then logical units that contain cache shall write all cached logical blocks to the medium (e.g., as they would do in response to a SYNCHRONIZE CACHE command (see 5.20 and 5.21) with the SYNC_NV bit set to zero, the LOGICAL BLOCK ADDRESS field set to zero, and the NUMBER OF LOGICAL BLOCKS field set to zero) prior to entering into any power condition that prevents accessing the medium (e.g., before the rotating media spindle motor is stopped during transition to the stopped power condition). If the NO_FLUSH bit is set to one, then cached logical blocks should not be written to the medium by the logical unit prior to entering into any power condition that prevents accessing the medium.

If the load eject (LOEJ) bit is set to zero, then the logical unit shall take no action regarding loading or ejecting the medium. If the LOEJ bit is set to one, then the logical unit shall unload the medium if the START bit is set to zero. If the LOEJ bit is set to one, then the logical unit shall load the medium if the START bit is set to one.

If the START bit is set to zero, then the logical unit shall:

a) transition to the stopped power condition;
b) disable all the idle condition ~~timer if it is active~~ timers if they are enabled (see SPC-4); and
c) disable the standby condition timer if it is ~~active~~ enabled (see SPC-4).

If the START bit set to one, then the logical unit shall:

1) transition to the active power condition;
2) ~~enable~~ activate all the idle condition ~~timer if it is active~~ timers if they are enabled; and
3) ~~enable~~ activate the standby condition timer if it is ~~active~~ enabled.

[Note: I changed the abc list to a 123 list. It is important that the transition to active power condition occur before the timers are activated.]

4.16.1 START STOP UNIT and power conditions overview

The START STOP UNIT command (see 5.19) allows an application client to control the power condition of a logical unit. This method includes specifying that the logical unit transition to a power condition.

In addition to the START STOP UNIT command, the power condition of a logical unit may be controlled by the Power Condition mode page (see SPC-4). If both the START STOP UNIT command and the Power Condition mode page methods are being used to control the power condition of the same logical unit, then the power condition specified by any START STOP UNIT command shall override the Power Condition mode page's power control.

There shall be no notification to the application client that a logical unit has transitioned from one power condition to another. The REQUEST SENSE command (see SPC-4) indicates if a logical unit is in the idle power condition or the standby power condition and may indicate if a logical unit is in the stopped power condition.

If the logical unit is in the idle power condition, then the device server shall process a REQUEST SENSE command by:

1) returning parameter data containing sense data with the sense key set to NO SENSE and the additional sense code set to:
   A) LOW POWER CONDITION ON if the reason for entry into the idle power condition is unknown;
   B) IDLE CONDITION ACTIVATED BY TIMER if the logical unit entered the idle power condition due to the idle condition timer (see SPC-4); ~~and~~
   C) IDLE CONDITION ACTIVATED BY COMMAND if the logical unit entered the idle power condition due to a START STOP UNIT command or receipt of a command requiring the idle power condition while it was in the standby power condition;
   D) IDLE2 CONDITION ACTIVATED BY TIMER if the logical unit entered the idle2 power condition due to the idle2 condition timer (see SPC-4);
   E) IDLE2 CONDITION ACTIVATED BY COMMAND if the logical unit entered the idle2 power condition due to a START STOP UNIT command or receipt of a command requiring the idle2 power condition while it was in the standby power condition;
   F) IDLE3 CONDITION ACTIVATED BY TIMER if the logical unit entered the idle3 power condition due to the idle3 condition timer (see SPC-4); or
   G) IDLE3 CONDITION ACTIVATED BY COMMAND if the logical unit entered the idle3 power condition due to a START STOP UNIT command or receipt of a command requiring the idle3 power condition while it was in the standby power condition;

   and
2) completing the REQUEST SENSE command with GOOD status.

If the logical unit is in the standby power condition, then the device server shall process a REQUEST SENSE command by:

1) returning parameter data containing sense data with the sense key set to NO SENSE and the additional sense code set to:
   A) LOW POWER CONDITION ON if the reason for entry into the standby power condition is unknown;
   B) STANDBY CONDITION ACTIVATED BY TIMER if the logical unit entered the standby power condition due to the standby condition timer (see SPC-4); ~~and~~ or
   C) STANDBY CONDITION ACTIVATED BY COMMAND if the logical unit entered the standby power condition due to a START STOP UNIT command;

   and
2) completing the REQUEST SENSE command with GOOD status.

If the logical unit is in the stopped power condition, then the device server shall process a REQUEST SENSE command by:

1) returning parameter data containing sense data with:
   A) the sense key set to NO SENSE and the additional sense code set to NO ADDITIONAL SENSE INFORMATION; or
   B) the sense key set to NOT READY and the additional sense code set to LOGICAL UNIT NOT READY, INITIALIZING COMMAND REQUIRED;

   and
2) completing the REQUEST SENSE command with GOOD status.

No power condition shall affect the supply of any power required for proper operation of a service delivery subsystem.

Added sense codes for Table 40 and Table D.1:

Sense	ASCQ	Description
5Eh	00h DT LPWRO A K	LOW POWER CONDITION ON
5Eh	01h DT LPWRO A K	IDLE CONDITION ACTIVATED BY TIMER
5Eh	02h DT LPWRO A K	STANDBY CONDITION ACTIVATED BY TIMER

5Eh	03h DT LPWRO A K	IDLE CONDITION ACTIVATED BY COMMAND
5Eh	04h DT LPWRO A K	STANDBY CONDITION ACTIVATED BY COMMAND
5Eh	05h DT LPWRO A K	IDLE2 CONDITION ACTIVATED BY TIMER
5Eh	06h DT LPWRO A K	IDLE2 CONDITION ACTIVATED BY COMMAND
5Eh	07h DT LPWRO A K	IDLE3 CONDITION ACTIVATED BY TIMER
5Eh	08h DT LPWRO A K	IDLE3 CONDITION ACTIVATED BY COMMAND

7.2.11 Start-Stop Cycle Counter log page

This subclause defines the Start-Stop Cycle Counter log page (page code 0Eh). A device server that implements the Start-Stop Cycle Counter log page shall implement one or more of the defined parameters. Table 286 shows the Start-Stop Cycle Counter log page with all parameters present.

Table 286 – Start-Stop Cycle Counter log page (part 1 of 2)

Byte \ Bit	7	6	5	4	3	2	1	0
0	DS	SPF(0b)	PAGE CODE (0Eh)					
1	SUBPAGE CODE							
2	(MSB)	PAGE LENGTH (44h)						
3								(LSB)
4	(MSB)	PARAMETER CODE (0001h)						
5	Date of Manufacture							(LSB)
6	DU	Obsolete	TSD	ETC	TMC		FMT&LINKING	
7	PARAMETER LENGTH (06h)							
8	(MSB)	YEAR OF MANUFACTURE (4 ASCII characters)						
11								(LSB)
12	(MSB)	WEEK OF MANUFACTURE (2 ASCII characters)						
13								(LSB)
14	(MSB)	PARAMETER CODE (0002h)						
15	Accounting Date							(LSB)
16	DU	Obsolete	TSD	ETC	TMC		FMT&LINKING	
17	PARAMETER LENGTH (06h)							
18	(MSB)	ACCOUNTING DATE YEAR (4 ASCII characters)						
21								(LSB)
22	(MSB)	ACCOUNTING DATE WEEK (2 ASCII characters)						
23								(LSB)
24	(MSB)	PARAMETER CODE (0003h)						
25	Specified cycle count over device lifetime							(LSB)
26	DU	Obsolete	TSD	ETC	TMC		FMT&LINKING	
27	PARAMETER LENGTH (04h)							
28	(MSB)	SPECIFIED CYCLE COUNT OVER DEVICE LIFETIME						
31	(4 byte binary number)							(LSB)
32	(MSB)	PARAMETER CODE (0004h)						
33	Accumulated start-stop cycles							(LSB)
34	DU	Obsolete	TSD	ETC	TMC		FMT&LINKING	
35	PARAMETER LENGTH (04h)							
36	(MSB)	ACCUMULATED START-STOP CYCLES						
39	(4 byte binary number)							(LSB)

Table 286 – Start-Stop Cycle Counter log page (part 2 of 2)

Byte \ Bit	7	6	5	4	3	2	1	0
40	(MSB)	PARAMETER CODE (0005h)						
41	Specified load-unload count over device lifetime							(LSB)
42	DU	Obsolete	TSD	ETC	TMC		FMT&LINKING	
43	PARAMETER LENGTH (04h)							
44	(MSB)	SPECIFIED LOAD-UNLOAD COUNT OVER DEVICE LIFETIME						
47	(4 byte binary number)							(LSB)
48	(MSB)	PARAMETER CODE (0006h)						
49	Accumulated load-unload cycles							(LSB)
50	DU	Obsolete	TSD	ETC	TMC		FMT&LINKING	
51	PARAMETER LENGTH (04h)							
52	(MSB)	ACCUMULATED LOAD-UNLOAD CYCLES						
55	(4 byte binary number)							(LSB)
56	(MSB)	PARAMETER CODE (0007h)						
57	Accumulated transitions to idle2 state							(LSB)
58	DU	Obsolete	TSD	ETC	TMC		FMT&LINKING	
59	PARAMETER LENGTH (04h)							
60	(MSB)	ACCUMULATED TRANSITIONS TO IDLE2 STATE						
63	(4 byte binary number)							(LSB)
64	(MSB)	PARAMETER CODE (0008h)						
65	Accumulated transitions to idle3 state							(LSB)
66	DU	Obsolete	TSD	ETC	TMC		FMT&LINKING	
67	PARAMETER LENGTH (04h)							
68	(MSB)	ACCUMULATED TRANSITIONS TO IDLE3 STATE						
71	(4 byte binary number)							(LSB)

[Note: Text describing parameters 0001h and 0002h is unchanged and not repeated here.]

The parameter value in the specified cycle count over device lifetime and specified load-unload count over device lifetime log parameters (parameter codes 0003h and 0005h, respectively) shall contain a four-byte binary value that indicates how many stop-start and load-unload cycles may typically be performed over the lifetime of the SCSI target device without degrading the SCSI target device's operation or reliability outside the limits specified by the manufacturer of the SCSI target device. If a LOG SELECT command attempts to change the value of ~~the specified cycle count over device lifetime~~ these log parameters, the 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. For the log parameters in which the parameter code value is 0003h or 0005h, the values of the parameter control bits are defined in table 289.

Table 289 – Parameter control bits for counter parameters (0003h through 0008h)

Bit or field	Value	Description
DU	0b	Value provided by device server
TSD	0b	Device server manages saving of parameter
ETC	0b	No threshold comparison is made on this value
TMC	xx	Ignored ~~when~~ because the ETC bit is set to zero
FMT&LINKING	11b	The parameter is a binary format list parameter

~~The parameter value in the accumulated start-stop cycles log parameter (parameter code 0004h) shall contain a four-byte binary value that indicates how many stop-start cycles the SCSI target device has detected since its date of manufacture. The accumulated start-stop cycles counter is a saturating counter. If a LOG SELECT command attempts to change the value of the accumulated start-stop cycles log parameter, the 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. The time at which the count is incremented during a start-stop cycle is vendor specific.~~

The parameter value for parameter codes 0004h, 0006h, 0007h, and 0008h contain a four-byte binary value that indicates a number of cycles the SCSI target has detected since its date of manufacture. These counters are saturating counters. The count is incremented by one for each complete cycle. The time in the cycle at which the count is incremented is vendor specific. For these log parameters the values of the parameter control bits are defined in table 289. If a LOG SELECT command attempts to change the value of any of these log parameters, the command shall be terminated with CHECK CONDITION status, with sense key set to ILLEGAL REQUEST and additional sense code set to INVALID FIELD IN PARAMETER LIST.

For rotating magnetic storage devices supporting the accumulated start-stop cycles log parameter (parameter code 0004h), a single start-stop cycle is defined as an operational cycle that begins with the disk spindle at rest, continues while the disk accelerates to its normal operational rotational rate, continues during the entire period the disk is rotating, continues as the disk decelerates toward a resting state, and ends when the disk is no longer rotating. For devices without a spindle or with multiple spindles, the definition of a single start-stop cycle is vendor specific. ~~The count is incremented by one for each complete start-stop cycle.~~ No comparison with the value of parameter 0003h shall be performed by the device server. ~~For the log parameter in which the parameter code value is 0004h, the values of the parameter control bits are defined in table 289.~~

For rotating magnetic storage devices supporting the accumulated load-unload cycles log parameter (parameter code 0006h), a single load-unload cycle is defined as an operational cycle that begins with the heads unloaded from the medium, continues while the heads are loaded onto the spinning medium, and ends when the heads are unloaded from the medium. For devices without unloadable heads, this parameter is not applicable. No comparison with the value of parameter 0005h shall be performed by the device server.

For SCSI targets that support the accumulated transitions to idle2 state log parameter (parameter code 0007h), a single idle2 power transition cycle is defined as an operational cycle that begins in active power state, transitions to idle2 power state, and ends with transition back to active power state.

For SCSI targets that support the accumulated transitions to idle3 state log parameter (parameter code 0008h), a single idle3 power transition cycle is defined as an operational cycle that begins in active power state, transitions to idle3 power state, and ends with transition back to active power state.