



To: INCITS Technical Committee T10
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Subject: SBC-3 – START STOP UNIT command additions

1. Revision history

Revision 0 (10 March 2008) First revision

Revision 1 (13 March 2008) Second revision

Incorporate comments from Raleigh March T10 meeting.

2. Related documents

sat2r01a – SCSI / ATA Translation - 2

sbc3r11 – SCSI Block Commands – 3

3. Overview

The ATA reduced power method of unloading heads should be translatable from SBC through SAT to the ATA device. This proposal creates a common method for SCSI and SAT to use to request that a disk park/unload its heads to reduce power utilization.

This proposal has been produced with input from:

HP

Author's comments/questions are in **blue text**, spec changes are in **red**.

5.19 START STOP UNIT command

5.19.0 START STOP UNIT command

The START STOP UNIT command (see table 59) requests that the device server change the power condition of the logical unit (see 4.16) or load or eject the medium. This includes specifying that the device server enable or disable the direct-access block device for medium access operations by controlling power conditions and timers.

If the NOFLUSH 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 NOFLUSH bit is set to one, then cached logical blocks should not be written to the medium prior to entering into any power condition that prevents accessing the medium.

If any deferred downloaded code has been received as a result of a WRITE BUFFER command (see SPC-4), then that deferred downloaded code shall replace the current operational code.

Table 59 — START STOP UNIT command

| Bit Byte | 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 | | | | Reserved | NOFLUSH | LOEJ | START |
| 5 | CONTROL | | | | | | | |

The OPERATION CODE field is defined in SPC-4 and shall be set to the value defined in table 59.

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.

5.19.1 POWER CONDITION MODIFIER field

The POWER CONDITION MODIFIER field specifies additional information about the requested power condition as defined in table 59x.

Table 59x – POWER CONDITION MODIFIER field

| <u>POWER CONDITION field</u> | <u>POWER CONDITION MODIFIER field</u> | <u>Description</u> |
|---|---|--|
| <u>All values that are not reserved</u> | <u>00h</u> | <u>Reserved</u> |
| <u>2h (i.e., IDLE)</u> | <u>01h</u> | <u>Request the device server to increase the tolerance of the direct access block device to external physical forces (e.g., cause devices that have movable read/write heads, to move those heads to a safe position).</u> |
| | <u>02h</u> | <u>Request the device server to increase the tolerance of the direct access block device to external physical forces (e.g., cause devices that have movable read/write heads, to move those heads to a safe</u> |

| | | |
|--|-------------------------------|---|
| | | <u>position) and use less power than POWER CONDITION MODIFIER field set to 01h (e.g., cause devices that have rotating media to rotate at a lower RPM).</u> |
| | <u>All other combinations</u> | <u>Reserved</u> |

5.19.2 – Power Condition field

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 60. If this field is supported and is set to a value other than 0h, then the START and LOEJ bits shall be ignored.

Table 60 — POWER CONDITION field

| Code | Name | Description |
|---------|-----------------|---|
| 0h | START_VALID | Process the START and LOEJ bits. |
| 1h | ACTIVE | Place the device into the active power condition. |
| 2h | IDLE | Place the device into the idle power condition. |
| 3h | STANDBY | Place 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 logical unit shall change power conditions only after receipt of another START STOP UNIT command or a logical unit reset;~~
- ~~eb)~~ the device server shall disable the idle condition timer if it is active (see SPC-4) and disable the standby condition timer if it is active (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 the idle condition timer if it is active (see SPC-4) and disable the standby condition timer if it is active (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 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 CDB.

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

5.19.3 LOEJ bit

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.

5.19.4 START bit

If the START bit is set to zero, then the logical unit shall transition to the stopped power condition, disable the idle condition timer if it is active (see SPC-4), and disable the standby condition timer if it is active (see SPC-4). If the START bit set to one, then the logical unit shall transition to the active power condition, enable the idle condition timer if it is active, and enable the standby condition timer if it is active.

5.19.5 Control Byte

The contents of the CONTROL byte are defined in SAM-4.