

To: T10 Technical Committee  
From: Bob Sheffield(robert.l.sheffield@intel.com)  
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Subject: 06-179r0: SAT - Fix Task Management Functions

**Revision history**

Revision 0 (30 March 2006) First revision

**Related documents**

SAT-r08 - SCSI / ATA Translation revision 08  
06-121r0 SAT-r08\_LB\_Comment\_Resolution.pdf

**Overview**

The the comments in SAT subclause 6.3 Task Management Functions were extensive and to some degree conflicting. This proposal outlines a compromise that attempts to address the combined comments.

**Suggested changes**

*Add the following definitions*

**3.1.1 ATA abort retry:** A policy implemented by a SATL whereby the SATL re-issues ATA commands aborted by ATA collateral abort one or more times before generating a UNIT ATTENTION condition or reporting TASK ABORTED status for the SCSI task affected by the ATA command aborted by ATA collateral abort.

**3.1.2 ATA collateral abort:** An ATA command that is aborted as a side effect of a different command being aborted when an ATA device is processing queued commands (i.e., NCQ or TCQ).

**3.1.3 ATA software reset:** A procedure implemented by a SATL to cause a software reset to an ATA device. For a PATA device, the SATL sets the SRST bit to one in the Device Control register, and then set the bit to zero (see ATA/ATAPI-7). For a SATA device the SATL repeatedly sets and then clears the SRST bit in the Shadow Device Control register, with the time between successive setting of the SRST bit no shorter than a defined minimum value, resulting in the SATL transmitting at least two Register FISes to the device (i.e., one with the SRST bit set and a subsequent one with the SRST bit cleared).

**3.1.4 service response:** The device service response or SCSI transport protocol specific service response returned to an application client by the SATL on completion of a SCSI transport protocol service request (see SAM-3).

*Replace subclause 6.3 Task Management Functions with the following text:*

**6.3 Task management functions**

**6.3.1 Task management functions overview**

This subclause describes the translation of SCSI task management functions to ATA or SATA equivalents.

NOTE 1 - Due to architectural differences, some task management functions may not translate to ATA commands or control operations.

**6.3.2 Aborting ATA Commands**

Processing some task management functions requires the SATL to abort one or more ATA commands being processed by an ATA device.

The SATL shall abort a queued ATA command being processed by an ATA device by issuing an ATA NOP command with the subcommand code set to 00h (i.e., NOP) to the ATA device.

### 6.3.3 ABORT TASK

The service request for the ABORT TASK task management function is (see SAM-3):

Service Response = ABORT TASK (IN ( I\_T\_L\_Q Nexus)).

If no ATA commands have yet been issued to the ATA device for the processing of the I\_T\_L\_Q nexus specified in the ABORT TASK task management function, then the SATL shall delete the task for the specified I\_T\_L\_Q nexus from the SATL internal context and respond to the ABORT TASK task management function with a service response of FUNCTION COMPLETE (see SAM-3).

If the ATA device is processing one or more ATA commands that are related to the specified I\_T\_L\_Q nexus, then the SATL shall either

- a) allow the ATA command(s) to complete as follows:
  - 1) wait until the ATA device returns command complete for the ATA command(s);
  - 2) if the completed ATA command completes processing of the specified I\_T\_L\_Q nexus, then return completion status for the I\_T\_L\_Q nexus; and
  - 3) return a service response of FUNCTION COMPLETE for the ABORT TASK task management function.

NOTE 2 - If completion of the ATA command(s) does not complete processing of the I\_T\_L\_Q nexus, the SATL does not return completion status for the I\_T\_L\_Q nexus.

or

- b) abort the ATA command(s) (see 6.3.2) for the specified I\_T\_L\_Q nexus and respond to the ABORT TASK task management function with a service response of FUNCTION COMPLETE.

If aborting the ATA commands related to the specified I\_T\_L\_Q nexus results in one or more other ATA commands being aborted by ATA collateral abort (i.e., the ATA device is processing other ATA commands for another I\_T\_L\_Q nexus in addition to the ATA commands associated with the specified I\_T\_L\_Q nexus), then the SATL shall:

- a) if the SATL supports ATA abort retry, re-issue all ATA commands aborted by ATA collateral abort and continue processing of the affected I\_T\_L\_Q nexuses;
- b) if TASK ABORTED status is enabled (i.e., the TAS bit in the Control mode page is set to one, see 10.1.4), return TASK ABORTED status for each SCSI task for an I\_T nexus other than the I\_T nexus that originated the ABORT TASK task management function that was affected by the ATA command aborted by ATA collateral abort, without establishing a UNIT ATTENTION condition; or
- c) if TASK ABORTED status is disabled (i.e., the TAS bit in the Control mode page is set to zero), then for each I\_T nexus affected by an ATA command aborted,
  - 1) complete processing of all but one of the SCSI tasks without returning a function result; and
  - 2) complete processing of the last SCSI task by returning CHECK CONDITION status with the sense key set to UNIT ATTENTION and additional sense code set to COMMANDS CLEARED BY ANOTHER INITIATOR.

### 6.3.4 ABORT TASK SET

The service request for the ABORT TASK SET task management function (see SAM-3) is:

Service Response = ABORT TASK SET (IN ( I\_T\_L Nexus)).

If the ATA device is not processing ATA commands for SCSI tasks associated with the specified I\_T\_L nexus, then the SATL shall delete all tasks for the specified I\_T\_L nexus from the SATL internal context and respond to the ABORT TASK SET task management function with a service response of FUNCTION COMPLETE.

If the ATA device is processing any ATA commands related to the specified I\_T\_L nexus, then the SATL shall either:

- a) allow the ATA command(s) to complete as follows:
  - 1) wait until the ATA device returns command complete for the ATA command(s);
  - 2) if the completed ATA command completes processing a SCSI task in the task set, return completion status for the SCSI task; and

- 3) after all ATA commands return completion status, return a service response of FUNCTION COMPLETE for the ABORT TASK SET task management function;
- or
- b) abort outstanding ATA command(s) for the specified I\_T\_L nexus, and respond to the ABORT TASK SET task management function with a service response of FUNCTION COMPLETE.

If aborting ATA commands for the specified I\_T\_L nexus results in ATA commands aborted by ATA collateral abort that are related to processing SCSI commands in an I\_T\_L nexus other than the specified I\_T\_L nexus, then:

- a) if the SATL supports ATA abort retry the SATL shall re-issue all ATA commands aborted by ATA collateral abort and continue processing of the affected I\_T\_L\_Q nexuses;
- b) if TASK ABORTED status is enabled (i.e., the TAS bit in the Control mode page is set to one) the SATL shall return TASK ABORTED status for each SCSI task for an I\_T\_L nexus other than the specified I\_T\_L nexus that was affected by ATA commands aborted by ATA collateral abort without establishing a UNIT ATTENTION condition; or
- c) if TASK ABORTED status is disabled (i.e., the TAS bit in the Control mode page is set to zero), for each I\_T\_L nexus other than the specified I\_T\_L nexus that had one or more SCSI tasks affected due to ATA commands aborted by ATA collateral abort, the SATL shall abort all commands for each affected I\_T\_L nexus and establish a UNIT ATTENTION condition with the additional sense code set to COMMANDS CLEARED BY ANOTHER INITIATOR.

### 6.3.5 CLEAR ACA

The service request for the CLEAR ACA task management function (see SAM-3) is:

Service Response = CLEAR ACA (IN ( I\_T\_L Nexus)).

The SATL shall process the CLEAR ACA task management function as defined in SPC-3.

### 6.3.6 CLEAR TASK SET

The service request for the CLEAR TASK SET task management function (see SAM-3) is:

Service Response = CLEAR TASK SET (IN ( I\_T\_L Nexus)).

The SATL shall process the CLEAR TASK SET task management function in accordance with the full task management model (see SAM-3), and in accordance with a single task set that includes SCSI tasks for all I\_T\_L nexuses (i.e., the TST field in the Control mode page is set to 000h, see 10.1.4).

If the ATA device is processing any ATA commands, then the SATL shall either:

- a) allow the ATA command(s) to complete as follows:
    - 1) wait until the ATA device returns command complete for the ATA command(s); and
    - 2) if the completed ATA command completes processing a SCSI task in the task set, return completion status for the SCSI task;
- or
- b) abort all outstanding ATA command(s).

The SATL shall abort all tasks in the task set and respond to the CLEAR TASK SET task management function with a service response of FUNCTION COMPLETE.

If the SATL aborts tasks in the task set for an I\_T\_L nexus other than the specified I\_T\_L nexus, then:

- a) if TASK ABORTED status is enabled (i.e., the TAS bit in the Control mode page is set to one) then, for each SCSI task for an I\_T\_L nexus other than the specified I\_T\_L nexus, the SATL shall terminate the task with TASK ABORTED status ; or
- b) if TASK ABORTED status is disabled (i.e., the TAS bit in the Control mode page is set to zero) then, for each other I\_T\_L nexus, the SATL shall establish a UNIT ATTENTION condition with the additional sense code set to COMMANDS CLEARED BY ANOTHER INITIATOR.

### 6.3.7 LOGICAL UNIT RESET

The service request for the LOGICAL UNIT RESET task management function (see SAM-3) is:

Service Response = LOGICAL UNIT RESET (IN ( I\_T\_L Nexus)).

The SATL shall:

- 1) issue an ATA software reset (see 3.1.xx) or an ATA hard reset (see 3.1.9) to the ATA device associated with the logical unit for the specified I\_T\_L nexus;
- 2) abort all tasks in the task set from the SATL internal context; and
- 3) respond to the LOGICAL UNIT RESET task management function with a service response of FUNCTION COMPLETE.

Any persistent behaviors of the ATA device shall be reestablished by the SATL afterwards, including any behaviors related to saveable mode parameters.

NOTE 3 - If more than one PATA device is present on a PATA bus, issuing an ATA software reset causes both devices to be reset.

### 6.3.8 QUERY TASK

The service request for the QUERY TASK task management function (see SAM-3) is:

Service Response = QUERY TASK (IN ( I\_T\_L\_Q Nexus)).

If the SATL supports the QUERY TASK task management function, the SATL shall return a service response of FUNCTION SUCCEEDED if the specified I\_T\_L\_Q nexus is in the task set, or the SATL shall return a service response of FUNCTION COMPLETE if the specified I\_T\_L\_Q nexus is not in the task set.

If the SATL does not support the QUERY TASK task management function the SATL shall return a service response of FUNCTION REJECTED.

### 6.3.9 Obsolete resets (informative)

The obsolete TARGET RESET (a.k.a., BUS RESET) task management function is sometimes used by a SCSI application client to cause a hard reset (i.e., similar to a power-on condition) for each logical unit of a specified target device. The SATL may process the TARGET RESET task management function by issuing an ATA hard reset (see 3.1.9) to the ATA device(s) associated with the target device.