



To: INCITS Technical Committee T10
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Subject: SAT-2 – Additional Power Management support

1. Revision history

Revision 0 (5 November 2007) First revision

2. Related documents

sat2r01a – SCSI / ATA Translation - 2
spc4r11 – SCSI Primary Commands - 4
sbc3r11 – SCSI Block Commands - 3

3. Overview

Not all cases of ATA STANDBY power condition are reported to the SCSI host. This proposal makes reporting of STANDBY power condition more consistent, and adds definitions for enabling, disabling, and reporting APM mode using the SPC defined Power Condition mode page.

This proposal is intended to generate discussion and address issues (in blue) so that a second draft can be developed for presentation. Proposed changes are in red.

8.12.2 TEST UNIT READY command translation

The SATL processes the TEST UNIT READY command as follows:

- 1) If any condition exists that prevents the SATL from issuing commands to the ATA device, the SATL should terminate the TEST UNIT READY command with CHECK CONDITION status with the sense key set to NOT READY with the additional sense code of LOGICAL UNIT NOT READY, CAUSE NOT REPORTABLE;
- 2) If the device is in the stopped state as the result of processing a START STOP UNIT command (see 9.11), then the SATL shall terminate the TEST UNIT READY command with CHECK CONDITION status with the sense key set to NOT READY and the additional sense code of LOGICAL UNIT NOT READY, INITIALIZING COMMAND REQUIRED;
- 3) If the ATA device is performing a self-test in the foreground mode, the SATL shall terminate the command with CHECK CONDITION status, with the sense key set to NOT READY, and the additional sense code set to LOGICAL UNIT NOT READY, SELF-TEST IN PROGRESS;
- 4) If the SATL is processing a FORMAT UNIT command for the emulated device (see 9.2), then the SATL shall terminate the TEST UNIT READY command with CHECK CONDITION status with the sense key set to NOT READY and the additional sense code set to LOGICAL UNIT NOT READY, FORMAT IN PROGRESS;

- 5) If the ATA device supports the Removable Media feature set (i.e., ATA IDENTIFY DEVICE data word 82 bit 2 is set to one), then the SATL shall issue an ATA GET MEDIA STATUS command to the ATA device. If the ATA device completes the command with the NM bit set to one in the Error register, then the SATL shall terminate the TEST UNIT READY command with CHECK CONDITION status with the sense key set to NOT READY and the additional sense code of MEDIUM NOT PRESENT; and
- 6) If the ATA device completed the most recent ATA command with the DF bit set to one in the Status register, then the SATL shall terminate the TEST UNIT READY command with CHECK CONDITION status with the sense key set to HARDWARE ERROR and the additional sense code of LOGICAL UNIT FAILURE.

If none of the conditions defined in items 1 through 6 exist, then the SATL shall issue an ATA CHECK POWER MODE command to the ATA device, and:

- a) If the ATA CHECK POWER MODE command completes with an error, then the SATL shall terminate the TEST UNIT READY command with CHECK CONDITION status with the sense key set to NOT READY, and the additional sense code set to LOGICAL UNIT DOES NOT RESPOND TO SELECTION; or
- b) If the ATA CHECK POWER MODE command completes without error, then the SATL shall complete the TEST UNIT READY command with GOOD status; or
- c) If either APM mode or the STANDBY timer has been enabled, and the ATA CHECK POWER MODE command completes without error and indicates the device is in STANDBY mode, then the SATL shall terminate the TEST UNIT READY command with CHECK CONDITION status with the sense key set to NOT READY, and the additional sense code set to LOGICAL UNIT NOT READY, INITIALIZING COMMAND REQUIRED.

<....>

Section 10.1.9:

The Power Condition mode page allows setting of ATA APM mode, and the ATA STANDBY timer. It also provides information about APM support and current power states.

<Guidance request – should these be 8 bit values passed directly through, or should the 32 bit SCSI values be mapped to the 8 bit ATA fields?>

<Guidance request – since ATA has no separate IDLE TIMER, can we use that field for APM values? Or should we modify SBC to add an APM field to this mode page?>

Table 65+ – Power Condition Control mode page fields

Field	Changeable	Description or reference
PS	n/a	Unspecified (see 3.4.2)
SPF	no	Shall be set to zero.
Page Code	no	Shall be set to 1Ah
Page Length	no	Shall be set to 0Ah
IDLE		When processing a MODE SENSE command, the SATL shall determine if APM mode is enabled from the ATA IDENTIFY DEVICE data word 83, bit 3 and word 86, bit 3. If APM mode is not supported, IDLE shall be returned as zero. If APM mode is supported, IDLE shall be returned as one.
		When processing a MODE SELECT command: If IDLE is set to one and STANDBY is set to zero, then

STANDBY	<p>the SATL shall issue the ATA IDLE command and byte 8 shall be used to set the TPV (count field).</p> <p>If IDLE and STANDBY are both set to one, then the SATL shall alter APM mode by issuing an ATA SET FEATURES command. If byte 4 contains a non-zero value, the ATA SET FEATURES – Enable/disable advanced power management (i.e., subcommand 05h) command shall be used and byte 4 shall be used to set the power management level (count field); bytes 5-7 shall be zero. If byte 4 contains a zero, the ATA SET FEATURES – Disable advanced power management (i.e., subcommand 85h) command shall be used. When processing a MODE SENSE command, the SATL shall determine if APM mode is enabled from the ATA IDENTIFY DEVICE data word 83, bit 3 and word 86, bit 3. If APM mode is not supported, STANDBY shall be returned as zero. If APM mode is supported but currently disabled, STANDBY shall be returned as zero. If APM mode is supported and currently enabled, STANDBY shall be returned as one.</p>
IDLE CONDITION TIMER	<p>When processing a MODE SELECT command: If STANDBY is set to one and IDLE is set to zero, then the SATL shall issue the ATA STANDBY command and byte 8 shall be used to set the TPV (count field).</p> <p>If IDLE and STANDBY are both set to one see IDLE for description of SATL actions.</p> <p>When processing a MODE SENSE command, the SATL shall determine if APM mode is enabled from the ATA IDENTIFY DEVICE data word 83, bit 3 and word 86, bit 3. If APM mode is enabled, the SATL shall return the value of IDENTIFY DEVICE data word 91 in byte 4 and, issue the ATA CHECK POWER MODE command and return the value from the count field in byte 5. Bytes 6-7 shall be zero.</p>
STANDBY CONDITION TIMER	<p>When processing a MODE SELECT command, if IDLE and STANDBY are both set to one, a non-zero value in byte 4 shall be used to set the power management level (count field) when the ATA SET FEATURES – Enable/disable advanced power management (i.e., subcommand 05h) is issued. If IDLE and STANDBY are both set to one, and byte 4 contains a zero, then the ATA SET FEATURES – Disable advanced power management (i.e., subcommand 85h) shall be used. When processing a MODE SENSE command: Bytes 8-11 shall return zero.</p> <p><<Guidance request: Is there a way to get the STANDBY timer value and return it here?>></p> <p>When processing a MODE SELECT command: If STANDBY is set to one and IDLE is set to zero, byte 8 shall be used to set the Timer period value (TPV)</p>

(aka count field); bytes 9-11 shall be zero.