Maxtor Corporation
500 McCarthy Boulevard

Milpitas, CA 95035 USA

To: **T10 SAS Protocol Working Group**
Contact: **Mark Evans**
          Phone: 408-894-5310
          Email: mark_evans@maxtor.com
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Subject: SAS-1.1, clarification for completion of a START STOP UNIT command

Introduction

There are several places in clause 10.2.8.2 SA_PC (SCSI application layer power condition) state machine where a sentence states something like, if the IMMED bit is set to zero, then the START STOP UNIT command either may or shall not "...complete with GOOD status..." until some transition is complete. I think the intent in each of these was that the START STOP UNIT command "...shall not complete..." until the transition is complete regardless of the status to be returned. The following proposal implements this clarification. This proposal is based on SAS1r05.

10.2.8.2.1 SA_PC state machine overview

The SA_PC (SCSI application layer power condition) state machine describes how the SAS target device processes logical unit power condition state change requests and NOTIFY (ENABLE SPINUP) if it is a SCSI target device.

> NOTE 38 - This state machine is an enhanced version of the logical unit power condition state machines described in SPC-3 and SBC-2.

This state machine consists of the following states:

a) SA_PC_0:Powered_On (see 10.2.8.2.2)(initial state);
b) SA_PC_1:Active (see 10.2.8.2.3);
c) SA_PC_2:Idle (see 10.2.8.2.4);
d) SA_PC_3:Standby (see 10.2.8.2.5);
e) SA_PC_4:Stopped (see 10.2.8.2.6)(specific to SBC-2 logical units);
f) SA_PC_5:Active_Wait (see 10.2.8.2.7)(specific to SAS devices); and
g) SA_PC_6:Idle_Wait (see 10.2.8.2.8)(specific to SAS devices).

This state machine stall start in the SA_PC_0:Powered_On state after power on.

For transitions resulting from the SSP target port receiving based on receipt of a START STOP UNIT command with the IMMED bit is set to one, the device server may complete the command may complete with GOOD status before any operation that occurs as a result of the value in the POWER CONDITIONS field completes.

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10.2.8.2.5.3 Transition SA_PC_3:Standby to SA_PC_5:Active_Wait

This transition shall occur if:

a) a START STOP UNIT command with the START bit set to one is received;
b) a START STOP UNIT command with the POWER CONDITION field set to ACTIVE is received; or

c) a command is received which requires the active power condition.

For transitions resulting from the SSP target port receiving based on a START STOP UNIT command with the IMMED bit set to zero, the device server shall not complete the command shall not complete with GOOD status until this state machine reaches the SA_PC_1:Active state.

10.2.8.2.5.4 Transition SA_PC_3:Standby to SA_PC_6:Idle_Wait

This transition shall occur if:

a) a START STOP UNIT command with the POWER CONDITION field set to IDLE is received;
b) a START STOP UNIT command with the POWER CONDITION field set to FORCE_IDLE_0 is received; or
c) a command is received which requires the idle power condition.

For transitions resulting from the SSP target port receiving based on a START STOP UNIT command with the IMMED bit set to zero, the device server shall not complete the command shall not complete with GOOD status until this state machine reaches the SA_PC_1:Active state.

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10.2.8.2.6.3 Transition SA_PC_4:Stopped to SA_PC_5:Active_Wait

This transition shall occur if:

a) a START STOP UNIT command with the START bit set to one is received; or
b) a START STOP UNIT command with the POWER CONDITION field set to ACTIVE is received.

If the IMMED bit is set to zero, the device server shall not complete the START STOP UNIT command shall not complete with GOOD status until this state machine reaches the SA_PC_1:Active state.

10.2.8.2.6.4 Transition SA_PC_4:Stopped to SA_PC_6:Idle_Wait

This transition shall occur if:

a) a START STOP UNIT command with the POWER CONDITION field set to IDLE is received; or
b) a START STOP UNIT command with the POWER CONDITION field set to FORCE_IDLE_0 is received.

If the IMMED bit is set to zero, the device server shall not complete the START STOP UNIT command shall not complete with GOOD status until this state machine reaches the SA_PC_2:Idle state.

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10.2.8.2.7.5 Transition SA_PC_5:Active_Wait to SA_PC_6:Idle_Wait

This transition shall occur if:

a) a START STOP UNIT command with the POWER CONDITION field set to IDLE is received;
b) a START STOP UNIT command with the POWER CONDITION field set to FORCE_IDLE_0 is received; or
c) the Power Condition mode page idle condition timer expires.

For transitions resulting from the SSP target port receiving based on a START STOP UNIT command with the IMMED bit set to zero, the device server shall not complete the command shall not complete with GOOD status until this state machine reaches the SA_PC_2:Idle state.

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10.2.8.2.8.5 Transition SA_PC_6:Idle_Wait to SA_PC_5:Active_Wait

This transition shall occur if:

a) a START STOP UNIT command with the POWER CONDITION field set to ACTIVE is received; or
b) a command is received which requires the active power condition.

For transitions resulting from the SSP target port receiving based on a START STOP UNIT command with the IMMED bit set to zero, the device server shall not complete the command shall not complete with GOOD status until this state machine reaches the SA_PC_1:Active state.