To: T10 Technical Committee
From: Jim Hatfield, Seagate (James.C.Hatfield@seagate.com),
Date: Sept 2, 2007
Subject: Minutes from Aug. 18, 2008 meeting: SAS Interface Power Management

Related Documents
08-015r4 - SAS-2+ Add low power transceiver options
08-206rx - SAS-2+m low power transceiver options, phy and link states
08-249rx - SAS 2.+ Link layer power management
T10 Reflector msg from Gerry Houlder, dated Aug. 11 2008 3:11pm:
        "Announcement for Aug. 18 Interface power Management meeting:

Overview
On Aug. 18, 2008, a meeting was held (1pm - 5pm) to resolve open issues related to proposal
08-015r4.

Location:
        Doubletree Hotel
        2050 Gateway Place
        San Jose, CA 95110

Attendees:

Name	Company
Jim Hatfield	Seagate
Dal Allan	ENDL
Dan Colegrove	Hitachi GST
Pak Seto	Intel
Kishore Karthikeyan	Intel
Kevin Marks	Dell
Mark Evans	Western Digital
Mike Fitzpatrick	Fujitsu
George Penokie	LSI
Fred Knight	NetApp
Curtis Stevens	Western Digital
Tim Symons	PMC-Sierra
Edward Chang	Samsung
Mr. Emami (was present but did not sign in)	NetApp

Proceedings:

1. Mark Evans, Fred Knight and George Penokie dominated a discussion about how to get
    to into the states that the proposals dealt with. This took most of the time allotted. I was
    unable to record the gist of the discussion due to the rapid flow and my unfamilarity with
    the subject matter. Please ask Mark, Fred or George for details of the discussion.

2. Regarding the agenda question:
        ```
        Should a new OPEN REJECT primitive be created with a forced
        5 or 10 ms retry time be created? This might reduce the
        number of unsuccessful retries (e.g., OPEN frame, OPEN
        REJECT (RETRY) response, repeat quickly) that could occur
        during slumber recovery. Disadvantage: older hosts with
        newer expander/target might not understand the new primitive
        and would treat it same as OPEN REJECT (RETRY) anyway.
        ```

The group suggested that this may not be an issue, and that a new primitive is not needed, but that a new SMP timer for OPEN REJECT may be preferable.

3. Regarding the agenda question

   ```
   The proposal currently suggests ALIGN(0) and ALIGN(1) as the
   synchronization primitives in the PM recovery sequence.
   There was a suggestion in an earlier teleconference that a
   different pair of ALIGN primitives might be a better choice.
   Lets decide this.
   ```
   The group suggested that the current ALIGN(0) and ALIGN(1) be used.

4. Regarding the agenda question:

   ```
   The AIP (WAITING ON DEVICE) primitive has a "can only be
   sent one time" restriction on it and is only effective for 1
   ms. Should the restriction be lifted so multiple AIPs can be
   sent? Decision has bearing on timeout interval for recovery
   from partial power condition
   ```
   The group suggested that it is not a requirement to only send it one time.

5. Regarding the agenda question:

   ```
   Does SATA interface power management for STP links need to
   be prohibited if SAS power management for SSP links is
   supported?
   ```
   The group will consider allowing SATA power management for STP links.

6. Regarding the agenda question:

   ```
   I have an issue with consequences to an expander if (1)
   target and expander agree on partial condition; (2) target
   is hot-plugged; (3) initiator tries to open the target; (4)
   how long of a "hot-plug timeout" can the expander tolerate
   before recognizing the target is gone and changing to a
   different response [e.g., OPEN REJECT (NO DESTINATION)]. It
   has been suggested that a regular hot-plug timeout interval
   (500 msec) be used for this but this is too long to respond
   with AIP (WAITING ON DEVICE) and might also be too long for
   OPEN REJECT (RETRY). Since the expander has two different
   responses (depending on whether partial or slumber is
   expected) perhaps there should be two different timeouts
   [e.g., 20 us and 20 ms respectively] that are more in tune
   with the responses the expander has to generate?
   ```
   The group commented:
   a) There is a possible 500 msec worth of AIPs
   b) Will something else timeout first ?
   c) What about the upper levels of the system ?

7. Regarding 08-015r4:
   a. figure New1
      i. contains multiple figures. please separate them
      ii. if this page is merely overview or informative material, consider deleting it.
      iii. this looks like OOB where there are no state machines, instead of the Link layer where there are state machines
      iv. see figure 154 of sas2r14c for a different type of diagram. these need to show max/min timing, vertical lines (e.g.'window labels') and there needs to be a table containing the actual numbers
      v. SAS phy x Tx/   s/B   Phy A Tx
      vi. make the diagram look like it is not starting from D.C. idle
      vii. SAS phy y Rx   s/b   Phy B Rx

        viii.   decide whether this is partial or slumber: have a specific case
          ix.   Bus Idle s/b D.C. Idle
   b. text for figure new1
          i.   make match the figure changes
         ii.   add timer info as requested
   c. figure new2
          i.   this is the part that overlaps with proposal 08-206
         ii.   the horizontal line extending to the right
              1.   replace with "..."
        iii.   scrambled random data s/b dwords from link layer (ref fig 147 in SAS2r14c)
        iv.   what context is maintained in the phy, specifically in slumber ?
   d. text for figure new2
          i. add bullet 7):   if ports are multiplexed ....
         ii.

8.   Regarding 08-206r0
   a. figure a
          i.   state: "SP31:PM_Recovery_Start"
              1.   rename this state
              2.   there needs to be a new idle state both before and after it
         ii.   note: SP15 detects the power mgmt request, and puts the device into the power mode, then comes to this state machine
        iii.   the recovery process is identical for partial and slumber - - only the timing varie
        iv.   entry from SP0 s/b entry from SP15
         v.

9.   Regarding 08-249r0:
   a. (page 7, in the list after "The SL receiver sends the following messages to the SL state machines indicating primitive sequences and dwords received from the SP_DWS receiver (see 6.9.2)"
          i.   add ACK and NAK to the list
   b. (page 10: "If a PMREQ Received message is received and power management is **enabled** (see xxx), then this state **shall** send a Transmit PMACK message to the SL transmitter. If a PMREQ Received message is received and power management is not enabled, then this state shall send a Transmit PMNAK message to the SL transmitter.")
          i.   consider changing the first 'shall' to "should"
         ii.   re: 'enabled":
              1.   the scope is SL, not global scope.
              2.   What is the default value ?
              3.   In what layer does the default lie ?
              4.   Need more qualifications for both enabled and disabled cases. (George will revise the paragraph)
   c. (page 10: **7.14.4.2.2 Transition SL_CC0:Idle to SL_CC1:ArbSel)**
          i.   **In CC0:** need a signal going up from the cloud