Seagate comments on SAS 1.1 rev. 9.

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Seagate #1
PDF page 49
3.1.61 expander connection manager (ECM)
The last sentence is “See 4.6.4”. It should reference 4.6.3 instead.

Seagate #2
PDF page 51
3.1.88 identification sequence:
This definition refers to clause 4.4, but a better reference to understand what an identification sequence is would be clause 7.9.

Seagate #3
PDF page 58
3.1.211 speed negotiation sequence:
This definition refers to clause 4.4, but a better reference to understand the speed negotiation sequence would be 6.7.4.2.

Seagate #4
PDF page 59
3.1.231 subtractive routing attribute:
3.1.232 subtractive routing method:
These definitions define “subtractive routing” as “anything that is not direct routing or table routing”. This is too broad a definition. The definitions should say what subtractive routing is, not what it isn’t.

Seagate #5
PDF page 60
3.1.253 virtual phy:
This definition is not really a definition, it doesn’t include any characteristics that differentiate a virtual phy from a real phy. At the very least, it should contain the sentence “A virtual phy contains a vendor-specific interface to another virtual phy in lieu of the described transceiver/ physical link interface”. A sentence similar to this is located in 4.1.2.

Seagate #6
PDF page 76
First instance of list item a)
This states that a phy has a SAS address associated with it. I recall that the SAS address is associated with the port, which will associate the SAS address with a particular phy identifier. I’m not sure that a SAS address should be a required attribute of a phy. See also comment #7. Also figure 15 associates the SAS address attribute with the port.

Seagate #7
PDF page 77 & 78
Figure 12 – phy class diagram
Figure 13 – phy object diagram
The class box for Phy at top of this figure includes a phy identifier attribute but doesn’t include a SAS address attribute. This conflicts with statement on previous page (see comment #6) that requires a SAS address for the phy.

Seagate #8
PDF page 79
4.1.3, last line on the page
The last line on the page ends in the middle of a sentence, then there is a half page of blank space, then the sentence completes at the top of the next page. The first two lines of the next page should be placed on this page, before the page break.

Seagate #9
PDF pages 81 & 82
Figure 15 – Port class diagram
Figure 16 – Port object diagram
These figures (and one earlier figure) use an attribute named “attached SAS address” but there is no definition of what this term is (i.e., how or why it is different than the “SAS address” attribute). There any many other occurrences of this term but most of them are associated with “attached SAS address” field and still don’t define it. A definition for this needs to be added.

Seagate #10
PDF page 81
First line on the page, item h)
This line should be on the previous page, since there is plenty of white space there for one more line.

Seagate #11
PDF page 85
First line on the page, item d)
This line should be on the previous page, since there is plenty of white space there for one more line.

Seagate #12
PDF page 88 & 91
Figure 23 – Edge Expander Device Set
Figure 26 – Edge Expander device set … topology
These figures introduce the terms “upstream phy”, “downstream phy”, and “root edge expander” but there is no definition of these terms. I have also noted that these two figures appear to be identical – perhaps one can be eliminated by having the text that references figure 26 refer to figure 23 instead.

Seagate #13
PDF page 109
4.5 I_T Nexus Loss, last sentence on page.
Change “…loss based on the aforementioned conditions handled by the port layer…” to
“…loss based on the aforementioned conditions <u>is</u> handled by the port layer…”

Seagate #14
PDF page 122
Figure 45 – Level order traversal example
Most of the “end device” boxes are labeled as end devices, but two are labeled “SAS device”. For purposes of this figure, all should be labeled as “end device”. I do see wording in following paragraphs that talk about a “SAS device”, but the wording seems to treat all end devices as a SAS device that could have SSP, STP bridge, or SMP characteristics. I believe this use of SAS device should change to end device also.

Seagate #15
PDF page 154 - 167
Tables 28, 29 & Figures 76, 77, 79, 81
Editor's notes 4 through 8 indicate that pin assignments may be wrong. This must be resolved so the notes can be removed.

Seagate #16
PDF page 168 – 169
Figures 82 & 83
Editor's notes 9 and 10 indicate keys may be wrong. This must be resolved so notes can be removed.

Seagate #17
PDF page 614 – 616
Figures M.2, M.3, M.4, M.5, M.6, M.7
Editor's notes 11 through 17 indicates these icons might be changed. Let's freeze the icons and get rid of the notes.

Seagate #18
PDF page 168
Table 48 – Control character usage
In K28.3 row, Usage in SATA column, it says "All primitives except ALIGN". It should be "All primitives except ALIGN and SATA_ERROR".

Seagate #19
PDF page 212
Tables 50 & 51
An abbreviation called "OOBI" is defined in table 50. OOBI should be added to the abbreviation list in 3.2 and should reference table 50 for the precise definition.

Seagate #20
PDF page 246
Figure 122 – SP_DWS state machine
The transition from state SP_DWS5 to SP_DWS6, Invalid dword, has a strange bend by the words "Invalid dword". This should be fixed.

Seagate #21
PDF page 272
Table 76 – Done primitives
Done(credit-timeout) description is unclear. It should be reworded.

It currently says "The SSP state machine (see 7.16.7) timed out waiting for an RRDY or received a CREDIT BLOCKED and the transmitter is going to transmit BREAK if credit is extended for 1 ms without receiving a frame or a DONE."

Perhaps the last part of the sentence should read "…transmit BREAK in 1 ms unless credit is extended, a frame is received, or DONE is received within 1 ms of transmitting the DONE(CREDIT_TIMEOUT)."

I also don't understand how "credit is extended" because a later paragraph (under table 78) prohibits sending RRDY after a CREDIT_BLOCKED has been sent. Perhaps this phrase should be stricken.

Seagate #22
PDF page 289
7.9.1 Identification and hard reset sequence overview
last sentence on page states "If a device detects the same SAS address incoming on different phys, it shall consider those phys part of the same wide port." Add a sentence "If the device is capable of supporting a wide port on its phys, it may configure the phys as a wide port."

Seagate #23
PDF page 135
Figure 54 — Internal wide cabled environment - controller to controller - symmetric cable
Change “SAS controller internal wide plug connector (4 physical links)”
to “SAS controller internal wide plug or internal compact wide receptacle connector (4 physical links)” in two places in this figure.

Seagate #24
PDF page 142
5.2.3.3.3 SAS external receptacle connector
First sentence below figure 62
Change the word “device” to “devices”.

Seagate #25
PDF page 143
5.2.3.3.5 SAS external compact cable plug connector
Change “The SAS external compact cable plug connector shall not include keys and may include key slots. Key slots are not defined by this standard” to “The SAS external compact cable plug connector shall include key slots”.

Seagate #26
PDF page 144
Figure 63 — SAS external compact cable plug connector
Update figure to show location of B1 in addition to A1.

Seagate #27
PDF page 144
5.2.3.3.6 SAS external compact receptacle connector
Change “The SAS external compact receptacle connector shall not include keys and may include key slots. Key slots are not defined by this standard.” To “The SAS external compact receptacle connector shall include keys.”

Seagate #28
PDF page 145
Figure 64 — SAS external compact receptacle connector
Update figure to show location of B1 in addition to A1.

Seagate #29
PDF page 146
Table 25 — SAS external compact connector pin assignments and physical link usage
All Tx polarities are reversed.

Seagate #30
PDF page 146
5.2.3.3.8 External compact connector keying
Change “Keys may be used in …” to “Keys shall be used in …”.

Seagate #31
PDF page 147
5.2.3.3.8 External compact connector keying
First sentence at top of page.
Change “Figure 65 shows the keys that may be used…” to “Figure 65 shows the keys that shall be used…”.

Seagate #32
PDF page 147
5.2.3.3.8 External compact connector keying
Figure 65 — SAS external compact connector keys for end devices
Update figure to correct key slots in cable plug.

Seagate #33
PDF page 147
5.2.3.3.8 External compact connector keying
First sentence under figure 65.
Change “Figure 66 shows the keys that may be used…” to “Figure 66 shows the keys that shall be used…”.

Seagate #34
PDF page 148
5.2.3.3.8 External compact connector keying
First sentence on page.
Change “Figure 67 shows the keys that may be used…” to “Figure 67 shows the keys that shall be used…”.

Seagate #35
PDF page 150
5.2.3.4.4 SAS internal wide connector pin assignments
First sentence under table 26.
Change “The use of the sideband signals by a controller is vendor-specific” to “The use of the sideband signals by a controller is optional and vendor-specific”.

Seagate #36
PDF page 150
5.2.3.4.4 SAS internal wide connector pin assignments
Last paragraph on page.
Change “Table 27 defines how the signal…” to “Table 27 defines the signal…”.

Seagate #37
PDF page 151
5.2.3.4.4 SAS internal wide connector pin assignments
First sentence under table 27.
Change “The use of the sideband signals by a backplane is vendor-specific” to “The use of the sideband signals by a backplane is optional and vendor-specific”.

Seagate #38
PDF page 151
5.2.3.4.5 SAS internal compact wide cable plug connector
First paragraph, first sentence.
Change “The SAS internal compact wide cable plug connector assembly is defined in SFF-8087 as the fixed (receptacle) right angle connector” to “The SAS internal compact wide cable plug connector assembly is defined in SFF-8087 as the free (plug) cable connector”.

Seagate #39
PDF page 152
5.2.3.4.5 SAS internal compact wide cable plug connector
Figure 70 — SAS internal compact wide cable plug connector
Update figure to include both A1 and B1 pin indications.

Seagate #40
PDF page 153
5.2.3.4.6 SAS internal compact wide receptacle connector
Figure 71 — SAS internal compact wide receptacle connector
Update figure to include both A1 and B1 pin indications.

Seagate #41
PDF page 154
5.2.3.4.7 SAS internal compact wide connector pin assignments
Last paragraph on page.
Change “The use of the sideband signals by a controller is vendor-specific” to “The use of the sideband signals by a controller is optional and vendor-specific”.

Seagate #42
PDF page 156
5.2.3.4.7 SAS internal compact wide connector pin assignments
First paragraph on page.
Change “The use of the sideband signals by a backplane is vendor-specific” to “The use of the sideband signals by a backplane is optional and vendor-specific”.

Seagate #43
PDF page 156
5.2.4.3.5 SAS internal compact wide cable keying
Delete entire section, since internal compact wide doesn’t require any keying.