T10/03-007r1

Rev 1: Revised 2002/12/31 to add the KnowledgeTek comments and LSI #288

Voting Results on T10 Letter Ballot 03-006r0 on
Forwarding SAS to First Public Review
Ballot closed: 2002/12/23 12:00 noon MST

Organization	Name	S	Vote	Add'l Info
Adaptec, Inc.	Ron Roberts	P	Yes	Cmnts
Amphenol Interconnect	Michael Wingard	P	Yes	
Andiamo Systems, Inc.	Claudio DeSanti	P	Yes	
BREA Technologies, Inc.	Bill Galloway	P	Yes	
Brocade	Robert Snively	P	Abs	Cmnts
Cisco Systems, Inc.	David Peterson	P	Yes	
Congruent Software, Inc.	Peter Johansson	P	Abs	Cmnts
Crossroads Systems, Inc.	Robert Griswold	P	Yes	
Dallas Semiconductor	James A. Lott, Jr.	P	Yes	
Dell Computer Corp.	Kevin Marks	P	Yes	Cmnts
EMC	Gary S. Robinson	P	Yes	
Emulex			DNV	
ENDL	Ralph O. Weber	P	No	Cmnts
FCI	Douglas Wagner	P	Yes	
Fujitsu	Mike Fitzpatrick	P	Yes	Cmnts
General Dynamics	Nathan Hastad	P	Yes	
Hewlett Packard Co.	Rob Elliott	P	No	Cmnts
Hitachi Cable Manchester	Zane Daggett	P	Yes	
Honda Connectors	Terry Enright	P	Yes	
IBM Corp.	George O. Penokie	P	No	Cmnts
Intel Corp.	Cris Simpson	P	No	Cmnts
KnowledgeTek, Inc.	Dennis Moore	P	Yes	Cmnts
LSI Logic Corp.	John Lohmeyer	P	No	Cmnts
Maxtor Corp.	Mark Evans	P	Yes	Cmnts
Microsoft Corp.	Rob Haydt	A	No	Cmnts
Molex Inc.	Jay Neer	P	Yes	
Network Appliance Inc.	James R. (Bob) Davis	P	Yes	
Nishan Systems Inc.	Charles Monia	P	Yes	
Ophidian Designs			DNV	
Panasonic Technologies, Inc	Terence J. Nelson	P	Yes	
Philips Electronics	William P. McFerrin	P	Yes	
QLogic Corp.	Skip Jones	P	Yes	
Quantum Corp.	Paul Entzel	P	No	Cmnts
Seagate Technology	Gerald Houlder	P	No	Cmnts
Storage Technology Corp.	Dennis Appleyard	A	Yes	
Sun Microsystems, Inc.	Vit Novak	P	Yes	
Texas Instruments	Paul D. Aloisi	P	Yes	Cmnts
Toshiba	Hiroshi Suzuki	P	Yes	
TycoElectronics	Jie Fan	P	Yes	
UNISYS	Ron Mathews	P	Yes	
Veritas Software	Roger Cummings	P	Abs	Cmnts
Vixel Corp.	Kenneth Hirata	P	Yes	Cmnts

Ballot totals: (29:8:3:2=42)
 29 Yes
  8 No
  3 Abstain
  2 Organization(s) did not vote
 42 Total voting organizations
  1 Duplicate ballot(s) not counted
 18 Ballot(s) included comments

This 2/3rds majority ballot passed.
29 Yes are more than half the membership eligible to vote minus abstentions
  [greater than 19] AND
29 Yes are at least 25 (2/3rds of those voting, excluding abstentions [37]) AND
29 Yes are equal to or exceed a quorum [14]

Key:
P   Voter is principal member
A   Voter is alternate member

Abs Abstain vote
DNV Organization did not vote
Cmnts Comments were included with ballot
NoCmnts No comments were included with a vote that requires comments

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Comments attached to Yes ballot from Ron Roberts of
Adaptec, Inc.:

Global;

1.0 References to ATA through-out the draft need to be reviewed and changed
to SATA where necessary. The interface protocol that SAS implements is SATA. SATA specification in turn references ATA as the upper layer protocol.

2.0 The term "initialization" is used in 3 places. It should be added to the definitions sub-clause.

3.0 The term "idle" used through-out the draft has conflicting meanings. Sometimes it refers to "idle time" and other times to "no activity". We should
use "idle time" or "idle dwords" or "no activity".

General

4.0 P24, 4.1.6 2nd para - Last sentence reads "included in SAS domains if the expander device". S/B "included in SAS domains if the Initiator or expander device"

5.0 P30, 5th para - "physical links that make up to pathway", S/B "physical
links that make up the pathway".

6.0 P66, Figure 33 Internal backplane environment - It is unclear where power for the target device is derieved.

7.0 P68, Table 30 - For clarification, a SATA column S/B added that clearly
shows that the connections are the same.

8.0 P68, Table 30 - Name Column - Names should match SATA to resolve confusion. Refer to figure 6 in SATA 1.0. Use the same terminology used in Table 31 for Rx and Tx signals.

9.0 P71, 5.4.2 2nd para - S/B "one, two, three, or four active physical links".

10.0 P72, 5.7.1 1st para - Is "transmitter and reciever characteristic tables, See Tables 35 & 36, only".

11.0 P73, Figure 35 & 36 - distance from connector pin to loads S/B specified. The connector should also be identified.

12.0 P74, Table 34 - note b - refer to the SATA 1.0 specification

13.0 P77, Top of page - add a new sub-clause 5.7.4.1

14.0 P82, 5.7.11, 3rd para - Is "specification of the external, initiator, expander .....device transmitter". S/B "specification of the initiator, expander .....device transmitter". What is an external device transmitter?

15.0 P94, 6.5 1st para - "signals are low-speed signal patterns detected". S/B "signals are low-speed envelope patterns detected".

16.0 P97, 3rd para - e.g. should read "a SAS reciever shall support its current speed and one generation less. A 3.0Gbps reciever shall support 1.5Gbps, a 6.0Gbps reciever need only support 3.0Gbps. The transmitter and reciever portion of the PHY shall support the same rate.

17.0 P98, 6.6.1, last sentence - "After a HARD RESET a device" S/B "After reciept of a HARD RESET primitive a device".

18.0 P104, Table 49 -RCD - comments- reads "Used by transmitter and reciever
to caculate the speed negotiation window time." S/B "Used by transmitter and
reciever to indicate the speed negotiation window is beginning."

19.0 P104, Table 49 3rd row - "(SNTT for reciever)" S/B "(SNTR for reciever)"

20.0 P104, Table 49 6th row - "(SNLT for reciever)" S/B "(SNLR for reciever)"

21.0 P105, 1st sentence- "If the recieved phy supports the physical link rate...." S/B "If the phy supports the recieved physical link rate...."

22.0 P106, 1st sentence - "...SAS phy fails speed negotiation, it shall....." S/B "...SAS phy fails speed negotiation at all supported rates, it shall....."

23.0 P138, 7.1.4.9, 4th para - TBD?

24.0 P143, 7.1.6.5, delete "used as"

25.0 P151, clarify what is a SMP target/initiator?

26.0 P161, Figure 68 - the figure does not match the verbage on the previous
page - sub-clause 7.10.

27.0 P229, the RETRANSMIT bit shall. Where is the bit shown in the SSP Frame format table 88 or table 96?

28.0 P240, remove the editors note

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Comments attached to Abs ballot from Robert Snively of
Brocade:

I am not sufficiently familiar with the material to judge it properly.
If I have an opportunity to study it, I may later modify my vote.

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Comments attached to Abs ballot from Peter Johansson of
Congruent Software, Inc.:

Insufficient time to review the draft standard.

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Comments attached to Yes ballot from Kevin Marks of
Dell Computer Corp.:

Request investigation of keying feature for SAS 4X external connection to allow future compatibility with SATA 4X JBODs. The current cable selection (non-keyed) is not compatible with any keyed cable. Proposal could anticipate a keyed SAS connector for controllers and JBODs, and a keyed SAS/SATA connector for controllers only.

Request investigation of the HDD connector keying feature to prevent SAS drives from plugging into SATA backplanes. Most drive slots use bays and carriers with integrated levers for increased seating force. The drive

carrier lever engages with the front panel just prior to the connection engagement, which means activating the lever to seat the drive will cause damage to the drive and midplane connectors due to the increased (10x) forces involved.

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Comments attached to No ballot from Ralph O. Weber of ENDL:

ENDL 1
PDF pg 5, pg v
Remove revision history before delivering the dpANS to Public Review.

ENDL 2
PDF pg 41, pg 6, 3.1.17 confirmation
Is a confirmation really just a single parameter passed from a lower layer to a higher layer? Or, is a confirmation a passing of parameters and other state information from a lower layer to a higher layer?

ENDL 3
PDF pg 41, pg 6, 3.1.25 device
The definition of device should include some relationship to SAS. As currently defined, a 'device' may be a pencil, a house, a spaceship, or the moon.

ENDL 4
PDF pg 41, pg 6, 3.1.27 direct current
Provide a definition for A.C.

ENDL 5
PDF pg 41, pg 6, 3.1.27 direct current
Provide a definition for 'signal'. Relying on the standard English definition for 'signal' allows a Stop sign to be a 'signal'.

ENDL 6
PDF pg 42, pg 7, Global
The reason why 'signal' is not a defined term is becoming clear, i.e. 'signal' has no consistent usage in SAS. The term 'signal' as used in the ER definition almost certainly means something very different than the term 'signal' as used in the D.C. definition. Otherwise, a SAS expander operates by switching raw waveforms from one phy to another, which seems unlikely to be the case. The inconsistent usage of 'signal' is far and away the most egregious problem ENDL discovered in its limited Letter Ballot review.

ENDL 7
PDF pg 42, pg 7, 3.1.43 expander port
Please provide a subject for this 'sentence': 'Contains one or more phys.'

ENDL 8
PDF pg 42, pg 7, 3.1.55 hash function
Since 'domain' is equivalent to 'SAS domain' (see 3.1.31), a hash function can be applied only to a SAS domain, whatever that means. Perhaps 'domain' can be replaced with 'value range' twice in the 3.1.55 definition.

ENDL 9
PDF pg 43, pg 8, 3.1.62 indication
Is an indication really just a single parameter passed from a lower layer to a higher layer? Or, is an indication a passing of parameters and other state information from a lower layer to a higher layer?

ENDL 10
PDF pg 43, pg 8, 3.1.63 information unit
'Portion' s/b 'The portion'

ENDL 11
PDF pg 43, pg 8, 3.1.70 link
'A physical link.' s/b 'Synonymous with physical link (see 3.1.86).'

ENDL 12
PDF pg 44, pg 9, 3.1.80 OOB sequence
'OOB signals. Part of' s/b 'OOB signals, part of'

ENDL 13
PDF pg 44, pg 9, 3.1.96 request
Is a request really just a single parameter passed from a higher layer to a lower layer? Or, is a request a passing of parameters and other state information from a higher layer to a lower layer?

ENDL 14
PDF pg 44, pg 9, 3.1.98 response
Is a response really just a single parameter passed from a higher layer to a lower layer? Or, is a response a passing of parameters and other state information from a higher layer to a lower layer?

ENDL 15
PDF pg 45, pg 10, after 3.1.110 SATA domain
Since SAS primitive has a definition, should SATA primitive have a definition?

ENDL 16
PDF pg 45, pg 10, 3.1.115 SCSI initiator device
'originate device service' s/b 'originates device service'

ENDL 17
PDF pg 46, pg 11, 3.1.137 table routing method
It is not clear from the definitions whether a table routing method could result in a routing to an end device. If that is possible, both table routing and direct routing may do the same thing. If that is not possible, then 'route connection requests' should be 'route connection requests to devices other than end devices'.

ENDL 18
PDF pg 50, pg 15, 3.4 Editorial conventions
'Fields containing only one bit are usually referred to as the name bit instead of the name field.' is a repeat of the second sentence in the third paragraph in this subclause. Remove this paragraph because the earlier sentence uses small caps more correctly.

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Comments attached to Yes ballot from Mike Fitzpatrick of Fujitsu:

Comments for SAS Revision 3 letter ballot

FUJITSU-1
PDF page : ix
Section : 1.19 Revision sas-r02c
Figure/Table
Paragraph/sentense/row/colum
Comment : 1.19 Revision sas-03

FUJITSU-2
PDF page : 6
Section : 3.1.18 connection
Figure/Table
Paragraph/sentense/row/colum
Comment : It defines only SSP(SCSI) case. SMP/STP case should be added.
since "3.1.78 nexus:" explains only SCSI and "see SAM-3"

FUJITSU-3

PDF page : 109
Section : 6.8.2 OOB sequence status
Figure/Table : Figure 56
Paragraph/sentense/row/colum : line 3
Comment : "Phy layer SAS phy (SP) state machine" / "SAS phy (SP) state machine" unification of the term as "SAS phy layer (SP) state machine"

FUJITSU-4
PDF page : 139
Section : 7.1.4.11 OPEN_REJECT
Figure/Table :
Paragraph/sentense/row/colum line 2
Comment : "The response to some OPEN_REJECTs is to abandon the connection request and the response to other OPEN_REJECTs is to retry the connection request." This "response" makes confusion as RESPONSE to the originator of OPEN_REJECT. An "action" seems better to understanding.

FUJITSU-5
PDF page : 139
Section : 7.1.4.11 OPEN_REJECT
Figure/Table :Table 61
Paragraph/sentense/row/colum: 2nd row
Comment : OPEN_REJECT (CONNECTION RATE NOT SUPPORTED) by "Any device". No Expander case, this is a mistake of OOB speed matching sequence.
But how to communicate using different speed?
So, this is the case of only Expander.

FUJITSU-6
PDF page : 139
Section : 7.1.4.11 OPEN_REJECT
Figure/Table : Table 61
Paragraph/sentense/row/colum : 1st, last row
Comment : In case of BAD/WRONG destination, Initiator can report to Upper Application, but device can do nothing except to terminate the command. This kind of logical error should be reported on appropriate method.

FUJITSU-7
PDF page : 163
Section : 7.12.2.2 Connection request responses
Figure/Table : Table 78
Paragraph/sentense/row/colum : 4th row
Comment : "OPEN address frame" "indicates two connection requests crossing on the physical link." In no expander case, the action should be defined to avoid racing condition or ping-pong condition. For instance, Initiator implicitly abandon the connection request, and
Target proceeds operation.

FUJITSU-8
PDF page : 163
Section : 7.12.2.2 Connection request response
Figure/Table : Table 78
Paragraph/sentense/row/colum : row 5 BREAK
Comment : According to 7.12.5 and 7.12.6, BREAK is used by originator at first. If BREAK is responded for Connection (OPEN address frame),
this is a protocol error. So, "The destination port or expander port may reply with BREAK indicating the connection is not being established." is not correct. BREAK is the response of the BREAK of open requester not correct response of Connection request (OPEN
address frame).

FUJITSU-9
PDF page : 167

Section : 7.12.5 Abandoning a connection request
Figure/Table : Table 81
Paragraph/sentense/row/colum : row 3 No response and timer expires
Comment : In case of response time out of BREAK, there should be clear action definition. Since BREAK is used for AIP timeout, the response timeout of BREAK is double timeout condition. Link Initialization or something to recover or terminate queue action should be taken. (Then, the other path action should be taken on multiple port devices in future.)

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Comments attached to No ballot from Rob Elliott of
Hewlett Packard Co.:

Summary of Comments on Serial Attached
SCSI Standard

HP #1
PDF Page ix
1.19 Revision sas-r02d
This should be sas-r03 not sas-r02d.

HP #2
PDF Page 30
4.1.11 Connections
This general intro needs to make it clear that frames related to one command (ATA or SCSI) may be transferred in different connections. A connection need not stay open for the duration of the command.

HP #3
PDF Page 59
4.6.11.3 Expander route table
Change "expander" to "expander device" before (i.e., self-reference)

HP #4
PDF Page 61
4.6.11.3 Expander route table
Table 26 - Expander rout table levels
Change "SAS address of the device" to "SAS address of the port" for each entry

HP #5
PDF Page 114
6.8.3 SP state machine
Implement Editor's Note 1 about the interaction between SP and SP_DWS.

HP #6
PDF Page 137
7.1.4.4 BROADCAST
Make one of the BROADCAST primitives BROADCAST (VENDOR SPECIFIC).

HP #7
PDF Page 137
7.1.4.4 BROADCAST
Increase the total number of broadcast primitives to 8. There are 4 more D04.7 codes available.

HP #8
PDF Page 142
7.1.5.6 RRDY (Receiver ready)
Remove:
"RRDY (RESERVED 2) Reserved. Processed the same as RRDY (NORMAL)."
There is no primitive code assigned for this.

HP #9
PDF Page 143

7.2 Clock skew management
Remove blank line after second paragraph

HP #10
PDF Page 151
7.7.2 IDENTIFY address frame
"The SAS ADDRESS field indicates the SAS address of the device transmitting
the IDENTIFY address frame."
It's really the SAS address of the port, not the device.

HP #11
PDF Page 160
7.9 Power management
Change "If the primitives arrives" to "If the primitive arrives"

HP #12
PDF Page 162
7.12.2.1 Connection request
"If none of the
prospective intermediate physical links does not support the requested
connection rate,"
should be
"If one of the ..."
[from hcurley@indra.com]

HP #13
PDF Page 163
7.12.2.2 Connection request responses
BREAK is effectively referenced twice by table 81 since it shows up here,
and this table shows up in table 81
Need to differentiate between originated and received BREAKs (the latter
need responses) too

HP #14
PDF Page 165
7.12.3.1.4 Pathway Recovery
This comparison should also include the connection rate as the lowest
priority bits, so two requests from a wide port (which have
the same source address) resolve consistently
This parallels the normal arbitration fields specified in 7.12.3.1.1 (which
uses AWT, source address, connection rate)

HP #15
PDF Page 207
7.17.3 Preparing to close an STP connection
Add "or" before the last option in the list: "detected, [or] after"

HP #16
PDF Page 216
8.3.2 Port layer
remove duplicate header numbers

HP #17
PDF Page 224
8.4.3.1.2 PL_PM I_T nexus loss timer
Second list:
a) Open Failed (Connection Rate Not Supported)
is unnecessary since targets are required to try 1.5 Gbps and that will
never get this error
(at least for target side)

HP #18
PDF Page 228
9.2.1 SSP frame format
Table 88 - SSP frame format
Change TIMEOUT bit to RETRANSMIT

HP #19
PDF Page 240
9.2.5.1 Target port error handling

and 9.2.6.3.9 in the state machine
"the target port shall return a
CHECK CONDITION status with a sense key of ILLEGAL REQUEST and an
additional sense code of
INFORMATION UNIT TOO SHORT (see 9.2.6.3.9)."
Instead, return a RESPONSE frame with a RESPONSE CODE indicating this
problem. Don't involve the application layer.

HP #20
PDF Page 240
9.2.5.1 Target port error handling
"the target port shall return a CHECK CONDITION status with a sense key of
ILLEGAL
REQUEST and an additional sense code of INFORMATION UNIT TOO LONG (see
9.2.6.3.9)."
Instead, return a RESPONSE frame with a RESPONSE CODE and don't bother the
application layer.

HP #21
PDF Page 258
9.2.6.3.9.1 State description (for ST_TTS7)
Editor's Note 3 - add service response argument to SCSI Command Received ()
and Task Management Function Request ()
This note should be rejected. Errors in command frame reception should
generate RESPONSE frames with RESPONSE CODE
errors, not CHECK CONDITIONs.

HP #22
PDF Page 258
9.2.6.3.9.1 State description (ST_TTS7)
Editor's Note 4 - add local Service Response to Send Command Complete ()
and Task Management Function Executed ()
Implement only if a SAM-3 proposal is accepted in the letter ballot
resolution timeframe.

HP #23
PDF Page 259
9.3.1 Initial FIS
Change "the SMP REPORT SATA PORT function" to "the SMP REPORT PHY SATA
function"

HP #24
PDF Page 259
9.3.2 SATA tunneling for multiple STP initiator ports
Change "CLOSE CLEAR AFFILIATION" to "CLOSE (CLEAR AFFILIATION)"

HP #25
PDF Page 292
10.1.9 SCSI vital product data
Table 128 - Device Identification VPD page required identification
descriptors
The target device name should follow the common string format being
proposed in 02-419 (if that is accepted by CAP).
Only SAS-only devices should be required to use the "naa." format name for
a target device name.
Similarly, only SAS-only devices should be required to use the NAA binary
formats for logical unit names.

HP #26
PDF Page 294
10.3.1 SMP functions
Add a GENERAL CONTROL function 80h.
It has bits to
reset internal targets of each protocol
clear affiliation of an internal STP target
only reset one at a time or multiple at a time allowed?

HP #27
PDF Page 296
10.3.1.2 REPORT GENERAL function

EXPANDER ROUTE INDEXES paragraph
...route indexes PER PHY
also note that some phys may not reach this limit

HP #28
PDF Page 296
10.3.1.2 REPORT GENERAL function
Table 131 - REPORT GENERAL response
The row labeled byte 28 should be labeled byte 11.

HP #29
PDF Page 296
10.3.1.2 REPORT GENERAL function
Table 131 - REPORT GENERAL response
The first row labeled byte 31 should be labeled byte 27.

HP #30
PDF Page 302
10.3.1.4 DISCOVER function
"The ATTACHED SAS ADDRESS field contains the SAS address of the attached phy."
It's really the SAS address of the attached port, as reported by the attached phy.

HP #31
PDF Page 302
10.3.1.4 DISCOVER function
"The SAS ADDRESS field contains the SAS address of this phy."
It's really the address reported by this phy, not the address of this phy.

HP #32
PDF Page 382
Annex J SAS logo
Figure J.1 — SAS logo
The SCSI Trade Association has a new logo for SAS to replace this one.

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Comments attached to No ballot from George O. Penokie of IBM Corp.:

IBM #1
PDF Page ii
Points of Contact
George Penokie's email address is gop@us.ibm.com

IBM #2
PDF Page iii
Abstract
This abstract is inaccurate and should be rewritten to the following:
This standard defines mechanical, electrical, timing requirements, command, and task management delivery protocol requirements to transfer commands and data between SCSI devices attached to a SCSI serial interface. This standard is intended to be used in conjunction with the SCSI command sets. The resulting interface facilitates the interconnection of computers and intelligent peripherals and thus provides a common interface standard for both system integrators and suppliers of intelligent peripherals.

IBM #3
PDF Page v
Revision Information
This needs to be removed before public review.

IBM #4
PDF Page x
Contents
Indents only go one deep. So ,for example, everything under clause 4 should be intended to the same level no matter how many

sub-sections there are. This will happen at either ANSI or ISO any way.
Also, when the indents are more that four deep there is a readability issue
with long section titles.

IBM #5
PDF Page x
Contents
The term 'Page' needs to be move so the 'e' aligns with the LSD of the page
number..Page: xxxiii

IBM #6
PDF Page x
Foreword
The INCITS leadership should be adding here as follows:
Karen Higginbottom, Chair
David Michael, Vice-chair
Monica Vago, Secretary

IBM #7
PDF Page x
Foreword
The t10 leadership should be adding here as follows:
John B. Lohmeyer, Chair
George O. Penokie, Vice-Chair
Ralph O. Weber, Secretary

IBM #8
PDF Page x
Foreword
The list of t10 members should be added here. A good format is to place the
list in three columns (see SPI-5)

IBM #9
PDF Page 1
Figure 1
The statement << this standard >> should in this case be replaced with SAS.

IBM #10
PDF Page 1
Figure 2
The statement << this standard >> should in this case be replaced with SAS.

IBM #11
PDF Page 4
2.3 References under development
Global
The format of the notes should be << NOTE 1 - >> the dash is missing.

IBM #12
PDF Page 4
As far as I can tell there are no references to these documents within this
standard. So why are they listed as norminative? They
should be removed or appropriate references added.

IBM #13
PDF Page 5
3.1.13 broadcast primitive processor
The statement << The portion of an ... >> should be changed to << An object
within an ... >>.

IBM #14
PDF Page 5
3.1 Definitions
The ATA definitions should be replaced with document 03-022.

IBM #15
PDF Page 6
3.1.31 domain:
Get rid of this by using << SAS domain >> in all cases.

IBM #16
PDF Page 6
3.1.32 downstream phy:
The term << primary>> should be deleted as it provide no additional information to the definition.

IBM #17
PDF Page 6
3.1.17 confirmation
A confirmation is not a parameter that is passed rather it is the a response returned from a lower layer indicating completion of a request from a higher layer.

IBM #18
PDF Page 7
3.1.39 expander connection router (ER):
The statement << The portion of an ...>> should be changed to << An object within an ... >>.

IBM #19
PDF Page 7
3.1.41 expander function:
The statement << The portion of an ... >> should be changed to << An object within an ... >>..Sequence number: 3

IBM #19
PDF Page 7
3.1.44 expander route entry:
So what is << A single destination SAS address >>? Do not all SAS addresses belong to an individual device? If so then all are single destination SAS addresses.

IBM #20
PDF Page 7
3.1.55 hash function:
Change the statement << into a hashed value >> to << into a shorter hashed value >>.

IBM #21
PDF Page 8
3.1.62 indication:
An indication is not a parameter that is passed rather it is a transaction from a lower layer that conveys a request to a higher layer.

IBM #22
PDF Page 8
3.1.72 link reset sequence:
This is way to detailed and is a duplicate of what is in 4.4. Delete <<an identification sequence, or a phy reset sequence followed by a hard reset sequence, another phy reset sequence, and an identification sequence>> and replace with <<one or more other sequences (see 4.4).>>

IBM #23
PDF Page 9
3.1.96 request:
A request is not a parameter that is passed rather it is a transaction request from a higher layer that invokes a service from a lower layer.

IBM #24
PDF Page 9
3.1.98 response:
A response is not a parameter that is passed rather it is a transaction from a higher layer that conveys the result of a request to a lower layer.

IBM #25
PDF Page 9
3.1.91 programmed maximum physical link rate:

The definition is no place to be defining the default value. Delete
<<defaults to the hardware maximum physical link rate.>>
3.1.92 programmed minimum physical link rate:
The definition is no place to be defining the default value. Delete
<<defaults to the hardware maximum physical link rate.>>

IBM #27
PDF Page 10
3.1.116 SCSI initiator port:
The statement <<requests and responses are routed>> should be <<requests
and confirmations are routed>>. Note this is also
wrong in SAM-3.

IBM #28
PDF Page 10
3.1.119 SCSI target port:
The statement <<requests and
responses are routed>> should be <<indications and responses are routed>>.
Note this is also wrong in SAM-3.

IBM #29
PDF Page 11
3.1.129 spread spectrum clocking (SSC):
This should be deleted as the term is not used anywhere else in this
standard.

IBM #30
PDF Page 11
3.1.124 Serial Attached SCSI (SAS):
The term <<protocol>> should be <<protocols>> as there are at least two
protocols defined (i.e., SMP and SSP)

IBM #31
PDF Page 12
3.1.146 transport protocol service confirmation:
3.1.147 transport protocol service indication: .
3.1.148 transport protocol service request:
3.1.149 transport protocol service response:
I don't think these should even be in the glossary. But if they remain they
need to change in the same manner suggested in the
confirmation, indication, request, and response definitions.

IBM #32
PDF Page 12
3.1.151 upstream phy:
The term << primary >> should be deleted as it provide no additional
information to the definition.

IBM #33
PDF Page 12
3.2 Symbols and abbreviations
Primitives should not be listed in the abbreviations list. Remove all
primitives from the list.

IBM #34
PDF Page 13
3.2 Symbols and abbreviations
Primitives should not be listed in the abbreviations list. Remove all
primitives from the list.

IBM #35
PDF Page 13
3.2 Symbols and abbreviations
Primitives should not be listed in the abbreviations list. Remove all
primitives from the list.

IBM #36
PDF Page 14
3.3.6 need not::
Remove one of the :s

IBM #37
PDF Page 16
Figure 3
The indication goes from lower layers to higher layers. This should be response name.

IBM #38
PDF Page 16
Figure 3
The indication goes from lower layers to higher layers. This should be response name.

IBM #39
PDF Page 16
Figure 3
The Response goes from higher layers to lower layers. This should be indication name.

IBM #40
PDF Page 16
Figure 3.The Response goes from higher layers to lower layers. This should be indication name

IBM #41
PDF Page 17
3.5.3 Parameters, requests, indications, confirmations, and responses
Loss the """" around the <<'(to all states)'>>.

IBM #42
PDF Page 17
3.6 Bit and byte ordering
There is not need to redefine the LSB and MSB acronym as it has already been defined in the abbreviations list. Change <<least significant bit (LSB) is shown on the right and the most significant bit (MSB)>> to <<LSB is shown on the right and the MSB>>.

IBM #43
PDF Page 19
4.1.1 Architecture overview
This which should be a that.

IBM #44
PDF Page 19
4.1.1 Architecture overview
This which should be a that.

IBM #45
PDF Page 20
4.1.2 Physical links and phys
The statement <<A phy is a transceiver; it is the object in a ...>> should be changed to <<A phy is a transceiver and it is the object in a ...>>

IBM #46
PDF Page 21
4.1.2 Physical links and phys
The statement <<unique phy identifier (see 4.2.6) within the device.>> should be changed to <<phy identifier (see 4.2.6) that is unique within the device>>.

IBM #47
PDF Page 21
4.1.2 Physical links and phys
This should be deleted as it only contains information that is defined elsewhere. It adds nothing to the standard and could easily be forgotten about and not updated in the next version of the standard. Delete
<< Phys transmit and receive bits at physical link rates of 1,5 Gbps or 3,0 Gbps (see 5.7). The bits are part of dwords (see 6.1) which have been 8b10b coded into 10-bit characters (see

6.2).>>

IBM #48
PDF Page 24
4.1.6 Target devices
***
The idea that a target would support both SCSI and ATA is to weird to conceive. I would like the idea deleted. The effect is that some of the and/ors change to or and figure 9 looses the middle set of boxes.

IBM #49
PDF Page 25
Figure 10
The term <<(optional)>> should be deleted as everything is optional unless stated otherwise.

IBM #50
PDF Page 25
4.1.8.2 Edge expander device set
The statement <<grouped into edge expander device sets.>> should be changed to <<grouped into an edge expander device set>>

IBM #51
PDF Page 25
4.1.8.2 Edge expander device set
The statement <<The edge expander device sets are>> should be <<An edge expander device set is>>

IBM #52
PDF Page 25
4.1.8.2 Edge expander device set
The statement <<Edge expander device sets are>> should be <<An edge expander device set is>>.

IBM #53
PDF Page 26
Figure 11
The term <<(optional)>> should be deleted as everything is optional unless stated otherwise..Page: 28

IBM #54
PDF Page 26
4.1.10 Expander device topologies
After the sentence that ends in <<is configured.>> add in the following sentence <<The method used to configure edge expander device sets is outside the scope of this standard.>>

IBM #55
PDF Page 26
Figure 14
The bracket that is labeled <<64 edge expander device sets>> should be rotated 90 degrees and be stretched to bracket the two edge expander device sets.

IBM #56
PDF Page 29
Figure 15
The bracket that is labeled <<64 attached devices or edge expander device sets>> should be rotated 90 degrees and be stretched to bracket the edge expander device set, the initiator or target devices, and the ...s.

IBM #57
PDF Page 29
Figure 16
The bracket that is labeled <<64 physical links per edge expander device set>> should be rotated 90 degrees and be stretched to bracket the initiator or target devices.

IBM #58
PDF Page 29
Figure 16
The bracket that is labeled <<2 edge expander device sets>> should be rotated 90 degrees and be stretched to bracket the 2 edge expander device sets.

IBM #59
PDF Page 30
4.1.11 Connections
The statement <<b) SCSI initiator port(s) to expander port(s) to SCSI target port(s); and>> is not correct. You cannot establish a connection between more that one initiator port and target port at a time. The statement should be changed to <<b) SCSI initiator port to expander port(s) to SCSI target port; and>>. The same is probably true for item c.

IBM #60
PDF Page 30
Global
Having the anchored frame tag at the end of a paragraph can cause paragraphs, lines, and even individual words to be separated be large amounts of white space. This can made it difficult to read. The solution to this is to place the anchor in it's own paragraph. I recommend this be done. throughout this standard.

IBM #61
PDF Page 32
Figure 18
The text in the key list is not lined up.

IBM #62
PDF Page 33
4.2.2 SAS addresses
The statement <<names in this>> in note 7 should be <<names defined by this standard.>>

IBM #63
PDF Page 34
4.2.2 SAS addresses
The _ notation needs to be added to the notations section.

IBM #64
PDF Page 34
4.2.6 Phy identifier
The statement <<a unique 8-bit identifier within the device.>> should be change to <<an 8-bit identifier that is unique within the device.>>.

IBM #65
PDF Page 35
4.3.1 State machine overview
The statement <<and target devices and their relationships to each other and to the SAS device,>> should be changed to <<and target devices, their relationships to each other, and to the SAS device,>>

IBM #65
PDF Page 36.Sequence
Figure 20
The blue dotted line on the last thing on the right is not connected to the correct text box. On closer inspection it looks like there two other blue dotted lines that look like they are going to the wrong place and there are two boxes with no lines coming out.

IBM #66
PDF Page 39
Figure 23
In general this is too detailed for a SAS standard. Reduce the details. At a minimum reduce or eliminate the SATA primitives. All that is needed are some << SATA primitives >> labels.

IBM #67
PDF Page 39
Tables 9 through 22
There needs to be a better notation for the direction indication. the -->
and <-- looks hookey.

IBM #68
PDF Page 39
Tables 9 through 22
In these tables the acronyms for the state machines are used but not all of
them have been defined at this point in the standard.
One solution would be to make a list or table of all the state machines
with there acronyms before table 9. Another way would be to
add in keys to every table with the acronym followed by the long name.

IBM #69
PDF Page 39
4.3.3 Signals between state machines
This section needs to be replaced with proposal 03-023.

IBM #70
PDF Page 40
Tables 11 through 15
Where ever there are multiple blank rows they should be combined to make a
single blank area.

IBM #71
PDF Page 45
Table 18
Why is this the only table that has something called an <<Expander
function>> in the layers column? It seems out of place. At the
minimum some kind if explanation is needed as to what it is and why it is
here..Page: 49

IBM #72
PDF Page 45
4.4.2 Hard reset
In the statement <<If the port is part of a SCSI device, this causes a
Transport Reset>> it is not clear what the <<this>> is referring
to. This needs to be corrected.

IBM #73
PDF Page 45
4.4.2 Hard reset
There should be a reference to SPC-3 at the end of the last paragraph of
this section.

IBM #74
PDF Page 45
4.5 I_T nexus loss
The statement <<an open connection time out in response>> should be changed
to <<an open connection time out occurs in
response>>

IBM #75
PDF Page 45
4.5 I_T nexus loss
The term <<expires>> is not a word that should be used (look up the
definition). It could easily be translated into dies. A quick fix
would be to use <<times out>>. But I am open to other suggestions.

IBM #76
PDF Page 45
4.6.1 Expander device model overview
We have not used the A,B,C convention in any t10 standards yet. We have
been just using the a,b,c even in second level lists. If
we are going to start using this then we need to define in the conventions
section how we will indicate up to four(?) levels for both
ordered and unordered lists. I don't think that is necessary and that

changing this to a,b,c would not cause any confusion.

IBM #77
PDF Page 45
4.6.1 Expander device model overview
I see no benefit from the statement <<For the maximum number of phys, see 4.1.8>>. If should be deleted or at a minimum
reduced to <<(see 4.1.8)>>.

IBM #78
PDF Page 45
4.5 I_T nexus loss
The statement << it shall retry the connection request until: >> appears to be in conflict with Table 61 — OPEN_REJECT abandon
primitives. That table includes OPEN_REJECT (CONNECTION RATE NOT SUPPORTED). So who can it be retried and
abandoned at the same time . This needs to be fixed.

IBM #78
PDF Page 50.Sequence
Figure 25
What is the statement <<Narrow or wide port>> have to do with this figure? It seems like it is saying there is a port that connects
the expander function to the external SAS port. I believe it should be deleted.

IBM #79
PDF Page 50.Sequence
4.6.1 Expander device model overview
In figure 25 it appears the <<external expander port>> is called an <<external SAS port>> also the same figure lists <<IR>> while
the text lists <<SL_IR>>. This inconsistent terminology needs to be resolved.

IBM #80
PDF Page 50.Sequence
4.6.1 Expander device model overview
There are several cases of inconsistent terminology between this section and figure 25. These all need to be resolved to one set
of terms.

IBM #81
PDF Page 51
4.6.6 Expander device interface
The statement <<The interaction between an XL state machine and the expander function is called
the expander device interface, and uses signals called requests, confirmations, indications, and responses.>> should be changed
to <<The interaction between the XL state machine and the expander function consists of requests, confirmations, indications, and
responses. This interaction is called the expander device interface.>>

IBM #82
PDF Page 52
Figure 26
The outputs from the broadcast primitive processor should be called confirmation not indication. The indication only occurs when
there are interim steps between the request and the confirmation.

IBM #83
PDF Page 53
Figure 27
The outputs from the broadcast primitive processor should be called confirmations not indications. The indication only occurs when
there are interim steps between the request and the confirmation..Page: 55

IBM #84
PDF Page 53
Table 24
Global

All the request/indication terms should be changed to just request. There is no need to state the indication part of the procedure.

IBM #85
PDF Page 53
Table 24
Global
All the confirmation/response terms should be changed to just confirmation. There is no need to state the response part of the procedure.
This change should also be made in the globally.

IBM #86
PDF Page 53
4.6.9 Expander connection router interface
The term <<signals>> is not correct here. I'm not sure what it should be maybe <<dwords>> or <<parameters>>.

IBM #87
PDF Page 59
4.6.9 Expander connection router interface
The <<, etc.>> should be deleted because the e.g. implies an etc. at the end of the list.

IBM #88
PDF Page 59
4.6.9 Expander connection router interface
The following <<For each of the level 2 devices that:
a) is an edge expander device with M phys; and
b) is attached to a phy in the level 1 edge expander device with the table routing attribute,
the next M entries shall be the SAS addresses of the devices (level 3) attached to that level 2 edge expander device.>> should be changed to <<For each of the level 2 devices that is an edge expander device with M phys and is attached to a phy in the level 1 edge expander device with the table routing attribute, the next M entries shall be the SAS addresses of the devices (level 3) attached to that level 2 edge expander device.>>

IBM #89
PDF Page 65
5.1 SATA cables and connectors (informative)
This section should be placed in a annex that describes any SATA specific functions..Page: 66

IBM #90
PDF Page 65
Figure 32
The statement <<Tx to Rx on each>> should be changed to <<the Tx signal to the Rx signal on each>>

IBM #91
PDF Page 67
5.2 SAS cables and connectors
The following paragraph should be a footnote in table 29 and should be modified as shown <<The SATA device plug connector (e.g., used by a <<SATA>> disk drive) may be attached to a SAS backplane receptacle connector or a SAS internal cable receptacle connector, connecting the primary signal pairs and leaving the second signal pairs unconnected.

IBM #92
PDF Page 67
5.2 SAS cables and connectors
The term <<drive>> should be deleted as the form factors apply to a size of a device not the type of device.

IBM #93
PDF Page 67

5.3.2.1 SAS plug connector overview
The statement <<(for SAS cables) and SAS backplane
receptacle connectors (for SAS backplanes).>> should be <<for SAS cables
and SAS backplane
receptacle connectors for SAS backplanes>>

IBM #94
PDF Page 67
5.3.3 SAS internal cable receptacle connector
The statement <<link, pins S8 through S14, is>> should be <<link (i.e.,
pins S8 through S14) is>>.

IBM #95
PDF Page 68
Table 30
So when I hook up all the voltage and precharge pins together and blow-up
the drive and the possibly the power supply who is
going to be responsible.
This should change to <<
The precharge pin and each corresponding voltage pin shall be connected
together (e.g., the V5 precharge pin is connected to
the two V5 pins).>>.

IBM #96
PDF Page 68
The statement << AT+ of connector 1 shall connect to AR+ >> should be <<
AT+ signal of connector 1 shall connect to AR+ signal
>>.

IBM #97
PDF Page 68
5.3.6 SAS external cable plug connector
It the statement << It
attaches >> what is the << it >> supposed to be be? I'm not sure. This
needs to be fixed.

IBM #98
PDF Page 68
5.3.5 SAS internal connector pin assignments
The statement <<Table 30 shows>> should be <<Table 30 defines>>.

IBM #99
PDF Page 69
5.3.7 SAS external receptacle connector
It the statement << It
attaches >> what is the << it >> supposed to be be? I'm not sure. This
needs to be fixed.

IBM #100
PDF Page 69
5.3.8 SAS external connector pin assignments
The statement <<Table 31 shows>> should be <<Table 31 defines>>.

IBM #101
PDF Page 70
5.4.1 SAS internal cables
The statement << SATA-style cable receptacle on the initiator device >>
should be << SATA-style cable receptacle (see SATA)
on the initiator device >>.

IBM #102
PDF Page 70
5.4.1 SAS internal cables
The following << A SAS initiator device shall use a SATA-style host plug
connector for connection to the SAS internal cable. The
SATA host plug connector is defined in SATA. The signal assignment for the
SAS initiator device or expander device with this
connector shall be the same as defined for a SATA host in SATA. >> should
be changed to << A SAS initiator device shall use a
SATA-style host plug connector (see STAT) for connection to the SAS

internal cable. The signal assignment for the SAS initiator
device or expander device with this connector shall be the same as a SATA
host (see SATA). >>

IBM #102
PDF Page 71.Sequence
5.4.2 SAS external cables
The statement << not carry power>> should be changed to << not contain
power >>.

IBM #103
PDF Page 71.Sequence
5.6 READY LED pin
The statement << READY LED signal is raised, >> should be << READY LED
signal is asserted, >>

IBM #104
PDF Page 71.Sequence
5.6 READY LED pin
The following should be deleted << since this pin may be connected by a
system directly to power supply GROUND. >>. The
standard does not need to justify a requirement.

IBM #105
PDF Page 71.Sequence
5.6 READY LED pin
global
Whenever a signal name is used it needs to be followed by the term <<
signal >>. Several places in this section READY LED is
used without the term << signal >>. It should have been written as << READY
LED signal >> in all cases.

IBM #106
PDF Page 71.Sequence
5.6 READY LED pin
The title of this section is not correct. It should be << READY LED signal
>>.

IBM #107
PDF Page 71.Sequence
5.6 READY LED pin
global
There should be a reference to where the <<standby or stopped power
condition state,>> are defined.

IBM #108
PDF Page 71.Sequence
5.6 READY LED pin
global
There should be a reference to where the <<. active or idle power condition
state,>> are defined.

IBM #109
PDF Page 72
5.6 READY LED pin
The references to the a,b,c list items should have a cross-reference link.
5.7.2 General interface specification
****
All references to a BER should be removed from this standard. The value as
specific is not low enough and specifying a lower
number is not practical. Any SAS design that only meets the current
specified BER will fail any qualification being used today.

IBM #111
PDF Page 72
5.7.2 General interface specification
****
The following statement indicates there are cable lengths specified in this
standard but there are none.
I believe that with out guidance from this standard as to what reasonable

lengths are for cables this group is doing a disservice to
the using community. I proposal cable lengths be specified in the same
manner as they are in SPI-5.
<< TxRx connections operating at the maximum specified distances may
require some form of equalization (e.g.,
transmitter pre-emphasis, receiver adaptive equalization, or passive cable
equalization) to enable the signal
requirements to be met. >>

IBM #112
PDF Page 74
Table 34
The entries in the characteristics column should be left justified.

IBM #113
PDF Page 74
Table 34
The term << or odd mode, >> is not used anywhere else in this standard and
should be deleted.

IBM #114
PDF Page 74
Table 34
The statement << rate (both up and down). >> should be << rate for both
power on and power off conditions. >>

IBM #115
PDF Page 75
5.7.3.2 Delivered (receive) eye mask at IR, CR, and XR
The term << delivered (receive) >> should be changed to << receive >>

IBM #116
PDF Page 76
5.7.3.3 Jitter tolerance masks
In the statement starting with << However, the leading >> the << however >>
seems odd. It's not clear as to where the << however.>> is referring to.
Either the sentence needs to move or the << however >> should be deleted. I
think deletion is the right answer.

IBM #117
PDF Page 76
5.7.4 Transmitted signal characteristics
After the first usage of the statement << SATA 1.0 signal levels >> there
needs to be a the << (see SATA) >> reference added.

IBM #118
PDF Page 77
Table 35
There need to be a reference to were the << CJTPAT test pattern >> is.

IBM #119
PDF Page 77
Table 36
This table should be broken into three tables with titles of:
<< Delivered signal characteristic at IR compliance points >>, << Delivered
signal characteristic at CR compliance points >>, and
<< Delivered signal characteristic at XR compliance points >>. Then the
first column can be deleted and the table will not flow
across multiple pages.

IBM #120
PDF Page 78
Table 36
The term << guaranteed >> should be deleted in all cases. Standards in
general do not give guarantees. I do not believe anything
would be lost if it is deleted.

IBM #121
PDF Page 80
5.7.8 Jitter compliance test pattern (CJTPAT)

What the heck does CJPAT stand for: Jitter compliance test pattern or
compliant protocol frame? It appears to be defined as both
here. This needs to be resolved.

IBM #122
PDF Page 81
Table 39
The formatting of table 39 needs work. The super-script is running into the
double lines..Sequence number: 2

IBM #122
PDF Page 81
Table 39
The last sentence of the footnotes does not have a period.

IBM #123
PDF Page 81
Table 39
The term << media >> is not defined. This needs to be added to the
glossary.

IBM #124
PDF Page 82
5.7.11 Transmitter characteristics
global
The term << A. C. >> needs to be changed to <<A.C.>> in all cases.

IBM #125
PDF Page 82
5.7.11 Transmitter characteristics
global
The term << D. C. >> needs to be changed to <<D.C.>> in all cases.

IBM #126
PDF Page 82
5.7.11 Transmitter characteristics
global
There should be no << etc. >> at the end of an e.g. list. The ect is
implied in all e.g. lists and is therefore not needed.

IBM #127
PDF Page 82
5.7.11 Transmitter characteristics
In the equation for S21 it in not clear what << f >> is. There needs to be
a << Where: >> after the equation that describes << f >>.

IBM #128
PDF Page 82
5.7.11 Transmitter characteristics
The statement << determined by measurement made >> seems to be missing a
word. I think it should be << determined by a
measurement made >>.

IBM #129
PDF Page 86
The << Usage in SATA >> column should be deleted. As most there could be a
footnote stating << For the SATA usage of K28.3
and K28.5 characters see SATA. >>

IBM #130
PDF Page 88
6.3.2 Transmission order
The statement << (SOF delimiter) >> is not complete in SAS because we use
other delimiters. It should be change to << (e.g.,
SOF delimiter) >>.

IBM #131
PDF Page 88
6.3.2 Transmission order
The statement << (EOF delimiter) >> is not complete in SAS because we use

other delimiters. It should be change to << (e.g.,
EOF delimiter) >>.

IBM #132
PDF Page 88
6.3.3.1 Definitions
The statement << two (not necessarily different) transmission >> should be
change to << two, not necessarily different,
transmission >>.

IBM #133
PDF Page 88
6.3.3.1 Definitions
The term << Current RD >> should not be capitalized. Change to << current
RD >>.

IBM #134
PDF Page 88
6.3.3.1 Definitions
The term << Current RD >> should not be capitalized. Change to << current
RD >>.

IBM #135
PDF Page 92
6.3.3.2 Generating transmission characters
In the statement << the table shall be found >> what table is being
referred to? I don't know and this needs to be fixed.

IBM #136
PDF Page 93
The << 16 >> at the top needs to be fixed.

IBM #137
PDF Page 95
6.5 Out of band (OOB) signals
****
The term << UI >> is used throughout this section with a different meaning
than in all section up to this point. In this section it is
assumed to be a fixed value while in all other sections it assumed to be a
value the is related to the data rate of the bus. This
inconsistency cannot be allowed. The thing that is called UI in this
section needs to be renamed. I like OOBI. Out Of Band Interval.
This would then be defined as the G! UI.

IBM #138
PDF Page 95
Table 46
This statement << UI(OOB) is different than that defined in SATA; SAS has
tighter clock tolerance. >> is meaningless in this
standard as there are lots of differences between SAS and SATA.

IBM #139
PDF Page 97
6.5 Out of band (OOB) signals
The statement << Figure 47 describes SAS OOB signal detection by the SP
receiver. >>
needs a cross-reference to the SP receiver section which 6.7.

IBM #140
PDF Page 97
6.5 Out of band (OOB) signals
Here's another one of those chopped sentences that occur because of the
anchor placement.

IBM #141
PDF Page 97
Tables
Global
Many of the table have spacing between the double line borders and the text
that is to close. This needs to be fixed on all tables.

IBM #142
PDF Page 99
6.6.2 SATA phy reset sequence (informative)
This entire section should be deleted as it only described SATA functionality that is a duplicate of what is defined in the SATA document. If not deleted then it should be moved to a informative annex..Sequence number: 2

IBM #142
PDF Page 99
6.6.3 SAS to SATA phy reset sequence
The statement << in response to a COMINT, >> should be << in response to receiving a COMINT, >>.

IBM #143
PDF Page 100
Figure 50
The << Time z >> and it's definition are not lined up.

IBM #144
PDF Page 102
6.6.4.1 SAS OOB sequence
The statement <<phy A starting the SAS OOB sequence before, after, or at the same time as SAS phy. >> should be << phy A starting the SAS OOB sequence before, after, or at the same time as SAS phy B. >>.

IBM #145
PDF Page 103
6.6.4.2 SAS speed negotiation sequence
The statement << like the SATA speed negotiation sequence. >> is not relevant to this standard and should be deleted.

IBM #146
PDF Page 103
6.6.4.2 SAS speed negotiation sequence
The SNLT is defined elsewhere so there is not need for the statement << a subset of the SNTT used by the receiver. >> which is more confusing than helpful. Delete it.

IBM #147
PDF Page 104
Table 49
The hot-plug time out should be a requirement not a option. The <<should>> should be changed to a << shall >>

IBM #148
PDF Page 104
This statement << UI(OOB) is different than that defined in SATA; SAS has tighter clock tolerance. >> is meaningless in this standard as there are lots of differences between SAS and SATA.

IBM #149
PDF Page 104
6.6.4.2 SAS speed negotiation sequence
****
Much of the information in this section after table 49 is an exact duplicate of the information provided in the SAS speed negotiation states sections. It is not a good idea to have the same thing defined in two places in the standard. I suggest that the duplicate information in this section be placed in annex B.

IBM #150
PDF Page 105
6.6.4.2 SAS speed negotiation sequence
The statement << (supported by phy A but not by phy B, so invalid), >> should be << (i.e., supported by phy A but not by phy B, so invalid), >>

IBM #151
PDF Page 105
6.6.4.2 SAS speed negotiation sequence
The statement << (supported by phy A but not by phy B, so invalid), >>
should be << (i.e., supported by phy A but not by phy B, so
invalid), >>

IBM #152
PDF Page 106
6.6.5 Phy reset sequence after device is attached
The transmission of COMINIT should be a requirement not a option. The
<<should>> should be changed to a << shall >>

IBM #153
PDF Page 108
6.8 SAS phy (SP) state machine
All the states that have << Await >> in the title should be change to <<
Wait >>.

IBM #154
PDF Page 108
6.8.1 Overview
The statement << from the management layer >> should be deleted as the
general rule is that we do not state where things come
from in state diagrams..Page: 109

IBM #155
PDF Page 108
6.8.2.1.1 State description
The statement << This state shall send a Transmit COMINIT parameter to the
SP transmitter and wait for COMINIT to be
transmitted and/or received.>> should be << Upon entry into this state,
this state shall:
a) request a COMINIT be transmitted by sending a Transmit COMINIT parameter
to the SP transmitter then wait for the receipt of a
COMINIT Transmitted parameter and/or a COMINIT Detected parameter; and
b) send a PhyNotReady parameter to the SP_DWS state machine. >>

IBM #156
PDF Page 108
6.8.2.1 SP1:OOB_COMINIT state
There is a problem with this state in that there is not indication as to
the timing relationship between the receipt of COMINIT
Transmitted and COMINIT Detected. This does not allow one to pick out which
one of the three transitions to make. For example a
COMINIT transmitted is received so how long does the state wait before
determining that no COMINIT detected is going to
occur? Or the reverse? This needs to be fixed.

IBM #157
PDF Page 108
Figure 56
The statement << (to all states in the SP state machine causing transition
to SP1:OOB_COMMINIT) >> should be changed to <<
causes all states to transition to SP1:OOB_COMMINIT) >>

IBM #158
PDF Page 108
Figure 56
The labels on the state transitions should be deleted and they don't
necessarily give the complete reason for the transition.

IBM #159
PDF Page 110
6.8.2.3.1 State description
The statement << This state is entered when a COMINIT sequence has been
detected but the COMINIT initiated in
SP1:OOB_COMINIT has not been completely transmitted. >> should be deleted
as we do not describe entry conditions only exit
conditions.

IBM #160
PDF Page 110
6.8.2.4.1 State description
The statement << This state is reached when a COMINIT has been transmitted and detected.>> should be deleted as we do not describe entry conditions only exit conditions.

IBM #161
PDF Page 110
6.8.2.4.1 State description.The statement << This state shall send a Transmit COMSAS parameter to the SP transmitter and wait for COMSAS to be transmitted and/or detected..>> should be << Upon entry into this state, this state shall request a COMSAS be transmitted by sending a Transmit COMSAS parameter to the SP transmitter then wait for the receipt of a COMSAS Transmitted parameter and/or a COMSAS Detected parameter. >>

IBM #162
PDF Page 110
6.8.2.4 SP4:OOB_COMSAS state
There is a problem with this state in that there is not indication as to the timing relationship between the receipt of COMSAS Transmitted and COMSAS Detected. This does not allow one to pick out which one of the three transitions to make. For example a COMSAS Detected is received so how long does the state wait before determining that no COMSAS Transmitted is going to occur? The reverse? This needs to be fixed.

IBM #163
PDF Page 110
6.8.2.3.1 State description
The statement << This state waits for COMINIT to be transmitted. >> should be << This state waits for receipt of a COMINIT Transmitted parameter. >>

IBM #164
PDF Page 111
6.8.2.6.1 State description
The statement << This state is entered when a COMSAS sequence has been both transmitted and detected. >> should be deleted as we do not describe entry conditions only exit conditions.

IBM #165
PDF Page 111
6.8.2.7.1 State description
The statement << time out timer shall be initialized and enabled. >> should be << time out timer shall be set to it's initial value and enabled. >>

IBM #166
PDF Page 111
6.8.2.7.2 Transition SP7:OOB_AwaitCOMSAS to SP1:OOB_COMINIT
The statements << If all of these conditions are true: ... this state shall send a Broadcast Event Notify (SATA Spinup Hold) confirmation to the expander function and perform this transition.
NOTE 11 In other words, SMP PHY CONTROL-based requests to reset the phy bypass spinup hold; all other resets honor it. >>
should be changed to <<This state shall send a Broadcast Event Notify (SATA Spinup Hold) confirmation to the expander function if: .... >> This deletes the note.

IBM #167
PDF Page 113
Figure 57
The term << window >> in 2 places should be << rate >>.

IBM #168
PDF Page 113
Figure 57

The << ALIGN1 Detected >> going into SP11 looks like it is coming from
SP10.

IBM #169
PDF Page 113
Figure 57
The labels on the state transitions should be deleted and they don't
necessarily give the complete reason for the transition.

IBM #170
PDF Page 114
6.8.3.1.1 State description
The following statement should be deleted as the information stated is
already stated elsewhere << This allows time required for a
transmitter to switch to either the next higher or next lower supported
speed. >>

IBM #171
PDF Page 114
6.8.3.1.1 State description
The following statement << This state marks the beginning of the SAS speed
negotiation process. >> should be << This is the
initial state of the SAS speed negotiation >>.

IBM #172
PDF Page 114
6.8.3.1.1 State description
The following statement should be deleted as the same information is
duplicated in the last sentence of this section << It is used to
transmit idle in between
SAS speed negotiation windows. >>.

IBM #173
PDF Page 114
6.8.3.1.1 State description
The statement <<... RCD timer shall be initialized and >> should be << ...
RCD timer shall be set to it's initial value and enabled..>>.

IBM #174
PDF Page 114
6.8.3.1.2 Transition SP8:SAS_Start to SP10:SAS_AwaitALIGN
The statement << speed negotiation window is supported. >> should be <<
speed negotiation rate is supported. >> It's not the
window that's supported or not supported but the link rate for that window.

IBM #175
PDF Page 114
6.8.3.1.3 Transition SP8:SAS_Start to SP9:SAS_RateNotSupported
The statement << speed negotiation window is not supported. >> should be <<
speed negotiation rate is not supported. >> It's not
the window that's supported or not supported but the link rate for that
window.
6.8.3.1.1 State description
This should be an a.b.c list like this:
Upon entering this state, this state shall:
a) set the RCD timer to it's initial value;
b) enable the RCD timer; and
c) send the Set Rate parameter to the SP transmitter to select the next
negotiated rate.

IBM #177
PDF Page 114
6.8.3.1.1 State description
The statement << During this state idle shall be transmitted. >> should be
changed to << This state shall request idle dwords be
transmitted by repeatedly sending a Transmit Idle Dword parameter to
the SP transmitter (see 7.3). >>

IBM #178
PDF Page 114

6.8.3.2.1 State description
The statement << During this state idle shall be transmitted. >> should be changed to << This state shall request idle dwords be transmitted by repeatedly sending a Transmit Idle Dword parameter to the SP transmitter (see 7.3). >>

IBM #179
PDF Page 114
The statement << SNTT timer shall be initialized and enabled. >> should be << SNTT timer shall be set to it's initial value and enabled. >>

IBM #180
PDF Page 114
6.8.3.2.1 State description
This statement adds nothing but confusion and should be deleted << The state machine exits from this state after the SNTT expires.>>

IBM #181
PDF Page 114
6.8.3.1.2 Transition SP8:SAS_Start to SP10:SAS_AwaitALIGN
The statement << occur if the RCD timer expires and the current >> should be << occur after the RCD timer expires if the current >>. The timer will always time out.

IBM #182
PDF Page 114
6.8.3.1.3 Transition SP8:SAS_Start to SP9:SAS_RateNotSupported
The statement << occur if the RCD timer expires and the current >> should be << occur after the RCD timer expires if the current >>. The timer will always time out.

IBM #183
PDF Page 114
6.8.3.2.2 Transition SP9:SAS_RateNotSupported to SP14:SAS_Fail
The statement << if the >> should be <<after the >> as the timer will always time out.

IBM #184
PDF Page 114
6.8.3.3.1 State description.The following should be made into an a,b,c list
<< The state machine shall start transmitting ALIGN (0) primitives at the current rate
(G1, G2, G3.).
Upon entering this state, the SNTT timer and SNLT timer shall be initialized and enabled. >> as follows:
<< Upon entering this state, this state shall:
a) request ALIGN (0) be transmitted at the current rate (e.g., G1, G2, G3) by repeatedly sending a Transmit ALIGN0 parameter to the SP transmitter; and
b) the SNTT timer and SNLT timer shall be set to their initial value and enabled. >>.

IBM #185
PDF Page 114
6.8.3.3.1 State description
The statement << synchronization occurs before >> should be changed to << synchronization (i.e., ALIGN0 Detected parameter
or ALIGN1 Detected parameter received) occurs before >>.

IBM #186
PDF Page 114
6.8.3.1.1 State description
The statement << speed negotiation window received as an argument.>> should be changed to
<< SAS Speed Negotiation Window Rate argument. >>

IBM #187
PDF Page 115

6.8.3.4.1 State description
The statement << This state is reached after ALIGN (0) has been both
transmitted and received. >> should be deleted as we do
not describe entry conditions only exit conditions.

IBM #188
PDF Page 115
6.8.3.4.1 State description
The following statement << This state shall repeatedly send a Transmit
ALIGN0 parameter to the SP transmitter.>> should be
<<This state shall request ALIGN (0) be transmitted at the current rate
(e.g., G1, G2, G3) by repeatedly sending a Transmit
ALIGN0 parameter to the SP transmitter. >>

IBM #189
PDF Page 115
6.8.3.4.2 Transition SP11:SAS_AwaitALIGN1 to SP14:SAS_Fail
The following statement << This transition shall occur if the SNTT timer
expires. This indicates that the other phy has not been able
to lock
at the current rate. >> should be <<This transition shall occur if the
other phy has not locked at the current rate and the SNTT timer
times-out. >>

IBM #190
PDF Page 115
6.8.3.4.3 Transition SP11:SAS_AwaitALIGN1 to SP14:SAS_ AwaitSNW
The statement <<This transition shall occur if this state receives an
ALIGN1 Detected parameter before the SNTT timer expires.
This indicates that the other phy has been able to lock at the current
rate. >> should be changed to << This transition shall occur if
the other phy has locked (i.e., ALIGN1 Detected parameter received before
the SNTT timer expires). >>

IBM #191
PDF Page 115
The statement << This state is reached after ALIGN (1) has been both
transmitted and received. >> should be deleted as we do
not describe entry conditions only exit conditions.

IBM #192
PDF Page 115
6.8.3.5.1 State description
The following statement << This state shall repeatedly send a Transmit
ALIGN1 parameter to the SP transmitter.>> should be
<<This state shall request ALIGN (1) be transmitted at the current rate
(e.g., G1, G2, G3) by repeatedly sending a Transmit
ALIGN1 parameter to the SP transmitter.>>.

IBM #193
PDF Page 115
6.8.3.5.2 Transition SP12:SAS_AwaitALIGN1 to SP13:SAS_Pass
The statement << if the >> should be << after the >>.

IBM #194
PDF Page 115
6.8.3.6.2 Transition SP13:SAS_Pass to SP8:SAS_Start
The statement << which is sent as an argument to the SN_start state>>
should be moved to the end of the section and restated as
<<This transition shall pass a SAS Speed Negotiation Window Rate argument
to the SN_start state. >>.

IBM #195
PDF Page 116
6.8.3.7.3 Transition SP14:SAS_Fail to SP8:SAS_Start
The statement << Which speed negotiation window to use is sent as an
argument with this transition. >> should be changed to
<<This transition shall pass which speed negotiation window to use in the
SAS Speed Negotiation Window Rate argument to the
SN_start state. >>.

IBM #196
PDF Page 116
6.8.3.8.1 State description
The following << to provide rule checking for
dword synchronization and determination of link failure. >> should be
deleted as the information is already in the DWS section. A
reference to DWS would be OK.

IBM #197
PDF Page 116
6.8.3.8.1 State description
The statement << the receipt of a COMINIT; >> should be << the receipt of a
COMINIT Detected parameter >>.

IBM #198
PDF Page 116
6.8.3.8.1 State description
The statement << While in this state, dwords from the link layer are
transmitted at
the negotiated physical link rate >> should be deleted as it is stated 2
times in this section.
6.8.3.8.1 State description
The statement << from the link layer >> should be deleted as the general
rule is that we do not state where things come from in
state diagrams.

IBM #200
PDF Page 117
6.8.3.8.2 Transition SP15:SAS_PHY_Ready to SP1:OOB_COMINIT
The statement << occur if: >> should be << occur after >>.

IBM #201
PDF Page 117
6.8.4 SATA host emulation states
The statement << the SAS device (an initiator device or expander device)
has >> should be << a SAS initiator device or an
expander device has >>.

IBM #202
PDF Page 117
6.8.4 SATA host emulation states
The statement << During SATA host emulation, the SAS device transmits a
COMWAKE sequence and then waits to receive a
COMWAKE. Once the COMWAKE sequence is detected, the SAS device follows the
speed negotiation
sequence defined in SATA. >> should be deleted as the information in this
statement is duplicate information.

IBM #203
PDF Page 118
Figure 58
The COMWAKE Transmitted parameter is missing as a input to SP16.

IBM #204
PDF Page 118
Figure 58
The COMWAKE Detected parameter is missing as a input to SP17.

IBM #205
PDF Page 118
Figure 58
The COMWAKE Completed parameter is missing as a input to SP18.

IBM #206
PDF Page 118
Figure 58
The labels on the state transitions should be deleted and they don't
necessarily give the complete reason for the transition..Page: 119

IBM #207
PDF Page 118
6.8.4.2.2 Transition SP17:SATA_AwaitCOMWAKE to SP18:SATA_AawitNoCOMWAKE
There is a type in the SP18 state name. It should SATA_AwaitNoCOMWAKE.

IBM #208
PDF Page 118
6.8.4.1.1 State description
The statement << wait for COMWAKE to be
transmitted. >> should be changed to << wait for a COMWAKE Completed
parameter to be received. >>.

IBM #209
PDF Page 118
6.8.4.3.1 State description
The statement << This state waits for COMWAKE to be fully received. >>
should be << This state waits for a COMWAKE
Completed parameter to be received. >>

IBM #210
PDF Page 118
6.8.4.4.1 State description
The statement << repeatedly send a Transmit D10.2 parameter to the SP
transmitter; >> should be <<request D10.2s be
transmitted by repeatedly sending a Transmit D10.2 parameter to the SP
transmitter. >>

IBM #211
PDF Page 118
6.8.4.4.1 State description
The statement << start the ALIGN detect time out timer; >> should be << set
the ALIGN detect timer to it's initial value and
enabled it; >>

IBM #212
PDF Page 118
6.8.4.4.1 State description
The statement <<ALIGN to be received or an ALIGN detect time out. >> should
be << ALIGN0 Received parameter to be received
or an ALIGN detect time out to occur. >>

IBM #213
PDF Page 118
6.8.4.4.1 State description
The statement << The SAS device shall start transmitting D10.2 characters
no later than 20 G1 dwords (i.e., 533 ns) after
COMWAKE was deasserted. >> should be deleted as it makes no sense here. It
appears to be more of a transmitter requirement
rather than a requirement of this state. Also COMWAKE is not something that
can be deasserted it is a sequence of signals.

IBM #214
PDF Page 118
6.8.4.4.2 Transition SP19:SATA_AwaitALIGN to SP20:SATA_AdjustSpeed
The statement << at any of its supported physical link rates. >> should be
deleted as it makes no sense here.

IBM #215
PDF Page 118
6.8.4.5.1 State description
The statement << This state shall repeatedly send Transmit D10.2 parameters
to the SP transmitter >> should be <<This state
shall request D10.2s be transmitted by repeatedly sending a Transmit D10.2
parameter to the SP transmitter >>

IBM #216
PDF Page 120
6.8.4.5.2 Transition SP20:SATA_AdjustSpeed to SP21:SATA_TransmitALIGN
This statement << when this state receives a Transmitter Ready parameter.
>> should be <<after receiving a Transmitter Ready

parameter. >>.

IBM #217
PDF Page 120
6.8.4.6.1 State description
The statement << This state shall repeatedly send the Transmit ALIGN0s parameter to the SP transmitter. >> should be << This state shall request ALIGN0s be transmitted by repeatedly sending a Transmit ALIGN0 parameter to the SP transmitter. >>

IBM #218
PDF Page 120
6.8.4.6.1 State description
The statement << When the SP receiver detects three back-to-back non-ALIGNs, the state machine transitions to state SP22:SATA_PHY_Ready. >> should be deleted as all the information is in the transition description.

IBM #219
PDF Page 120
6.8.4.7.4 Transition SP22:SATA_PHY_Ready to SP23:SATA_PM_Slumber
The statement << if this state receives an Enter Slumber request. >> should be << if an Enter Slumber request is received.>>.

IBM #220
PDF Page 120
6.8.4.7.4 Transition SP22:SATA_PHY_Ready to SP23:SATA_PM_Slumber
The statement << if this state receives an Enter Partial request. >> should be << if an Enter Partial request is received.>>

IBM #221
PDF Page 120
6.8.4.7.2 Transition SP22:SATA_PHY_Ready to SP1:Reset
In figure 58 this transition goes to SP1:OOB_COMMINIT but here it goes to SP1:Reset . Only one is correct. This needs to be fixed.

IBM #222
PDF Page 120
6.8.4.7.2 Transition SP22:SATA_PHY_Ready to SP1:Reset
The statement << This transition shall occur if this state receives a COMINIT Received parameter or a DWS Reset parameter. >>
makes no sense as there is not COMINIT Received or DWS Reset in figure 58. So it is not clear what causes this transition.

IBM #223
PDF Page 120
The statement << This state shall send a PhyReady (SATA) parameter to the SP_DWS state machine. >> should be
Upon entering this state, this state shall send a PhyReady (SATA) parameter to the SP_DWS state machine. >>.

IBM #224
PDF Page 120
6.8.4.7.1 State description
The statement << In this state, the SP state machine hands control over dword transmission to the SP_DWS state machine. The SP receiver monitors the input dword stream looking for COMINIT. >> should be << This state sends RhyReady (SATA) parameter to the SP_DWS state machine to enable it. >> If this state needs to take some action if a COMINIT detected or complete happens then there needs to be a parameter input and a description as to what happens when the parameter is received.

IBM #225
PDF Page 120
6.8.4.8.2 Transition SP23:SATA_PM_Partial to SP16:SATA_COMWAKE
The statement << if this state receives a Exit Partial request. >> should be << if an Exit Partial request is received. >>

IBM #226

PDF Page 120
6.8.4.8.3 Transition SP23:SATA_PM_Partial to SP18:SATA_AwaitNoCOMWAKE
The statement << if this state receives a COMWAKE Detected parameter. >>
should be << if a COMWAKE Detected parameter is
received. >>.

IBM #227
PDF Page 120
6.8.4.8.1 State description
The statement << Exit from this state is driven from receipt of COMWAKE or
by request of the link layer. >> should be << This
state waits for a COMWAKE Detected parameter or a Exit Partial parameter to
be received. >>

IBM #228
PDF Page 120
6.8.4.9.1 State description
The statement << Exit from this state is driven from receipt of COMWAKE or
by request of the link layer. >> should be << This
state waits for a COMWAKE Detected parameter or a Exit Slumber parameter to
be received. >>.

IBM #229
PDF Page 120
6.8.4.9.2 Transition SP24:SATA_PM_Slumber to SP16:SATA_COMWAKE
The statement << if this state receives a Exit Slumber request. >> should
be << if an Exit Slumber request is received. >>

IBM #230
PDF Page 121
6.8.4.9.3 Transition SP24:SATA_PM_Slumber to SP18:SATA_AwaitNoCOMWAKE
The statement << if this state receives a COMWAKE Detected parameter. >>
should be << if a COMWAKE Detected parameter is
received. >>.

IBM #231
PDF Page 121
The statement << are sent to the SP_DWS machine >> should be << are
received by the SP_DWS state machine >>.

IBM #232
PDF Page 121
6.9.1 Overview
There should be text here that states what happens when a PhyNotReady
parameter is received.

IBM #233
PDF Page 121
6.9.1 Overview
It seems like there should a Dword Received parameter from the receiver
that goes to all the states within this state machine. As a
result there should be a green open arrow pointing to the edge of the
SP_DWS state machine. The following text should be added
here: All the states within the SP_DWS receive the Dword Receive parameter
from the SP receiver.

IBM #234
PDF Page 121
6.9.1 Overview
The statement << from the SP state machine. >> should be deleted as the
general rule is that we do not state where things come
from in state diagrams.

IBM #235
PDF Page 121
6.9.1 Overview
The statement << from the SP state machine: >> should be deleted as the
general rule is that we do not state where things come
from in state diagrams.

IBM #236
PDF Page 122
Figure 59
There needs to be a cut-out so the PhyNotReady arrow points to the SP_DWS state machine. Also the text need not state that the parameter goes to all states. That is implied. The statement << (This parameter causes a transition to SP_DW0:AcquireSync) >>.

IBM #237
PDF Page 122
Figure 59
The labels on the state transitions should be deleted and they don't necessarily give the complete reason for the transition.

IBM #238
PDF Page 123
6.9.2.1 State description
The statement << This state is entered upon power on loss or previous dword synchronization. >> should be deleted as we do not define entry conditions..Sequence number: 2

IBM #238
PDF Page 123
6.9.2.1 State description
The statement << In this state, the receiver monitors the input data stream >> should be << This state monitors the Dwords received in the Dword Received parameter >>.

IBM #239
PDF Page 123
6.9.2.1 State description
The statement << character it detects into the >> should be << character detected into the >>.

IBM #240
PDF Page 123
6.9.2.2 Transition SP_DWS0:AcquireSync to SP_DWS1:Valid1
The statement << is detected. >> should be << is received >>.

IBM #241
PDF Page 123
6.9.3.1 State description
The statement << This state is reached after one valid primitive has been detected. >> should be deleted as we do not describe entry conditions.

IBM #242
PDF Page 123
6.9.4.1 State description
The statement << This state is reached after the receiver has detected two valid primitives. >> should be deleted as we do not describe entry conditions.

IBM #243
PDF Page 123
6.9.5.1 State description
The statement << This state is reached when the receiver has detected three valid primitives without adjusting the dword synchronization. >> should be deleted as we do not describe entry conditions.

IBM #244
PDF Page 123
6.9.3.1 State description
The statement <<In this state, the receiver shall monitor the input data stream looking >> should be << This state shall monitor the Dwords received in the Dword Received parameter looking >>

IBM #245

PDF Page 123
6.9.4.1 State description
The statement <<In this state, the receiver shall monitor the
input data stream looking >> should be << This state shall monitor the
Dwords received in the Dword Received parameter looking
>>

IBM #246
PDF Page 123
6.9.5.1 State description.The statement << In this state, the receiver
shall monitor the incoming data stream looking >> should be << This state
shall
monitor the Dwords received in the Dword Received parameter looking >>

IBM #247
PDF Page 123
6.9.3.2 Transition SP_DWS1:Valid1 to SP_DWS2:Valid2
The statement << This transition shall occur when a valid primitive is
detected. >>
should be << This transition shall occur after receiving a Dword Received
parameter that contains a valid primitive. >>

IBM #248
PDF Page 123
6.9.4.2 Transition SP_DWS2:Valid2 to SP_DWS3:SyncAcquired
The statement << This transition shall occur when a valid primitive is
detected. >>
should be << This transition shall occur after receiving a Dword Received
parameter that contains a valid primitive. >>

IBM #249
PDF Page 123
6.9.4.3 Transition SP_DWS2:Valid2 to SP_DWS0:AcquireSync
The statement << This transition shall occur when a invalid dword is
detected. >>
should be << This transition shall occur after receiving a Dword Received
parameter that contains an invalid Dword.>>

IBM #250
PDF Page 123
6.9.5.2 Transition SP_DWS3:SyncAcquired to SP_DWS4:Lost1
The statement << This transition shall occur when an invalid dword (i.e.,
the first invalid dword) is detected.>> should be << This
transition shall occur after receiving a Dword Received parameter that
contains an invalid Dword (i.e., the first invalid dword).>>

IBM #251
PDF Page 123
6.9.5.2 Transition SP_DWS3:SyncAcquired to SP_DWS4:Lost1
The statement << An expander forwarding the dword to another phy shall
replace the invalid dword with ERROR for a SAS
physical link or
SATA_ERROR for a SATA physical link. >> seems out of place here. This
should be defined in the expander information that
describes the insertion of error primitives. As most there should be a
reference to that information << For expander rules on invalid
Dwords replacement see x.x.x. >>

IBM #252
PDF Page 124
6.9.6.1 State description
The statement << This state is reached when one invalid dword has been
received and not nullified. >> should be deleted as we
do not describe entry conditions.

IBM #253
PDF Page 124
6.9.7.1 State description
The statement << This state is reached when a valid dword has been
received, and another valid dword will nullify the previous

invalid dword. >> should be deleted as we do not describe entry conditions.

IBM #254
PDF Page 124
6.9.8.1 State description
The statement << This state is reached when two invalid dwords has been
received and not nullified. >> should be deleted as we
do not describe entry conditions.

IBM #255
PDF Page 124
6.9.9.1 State description
The statement << This state is reached when a valid dword has been
received, and another valid dword will nullify the previous
invalid dword. >> should be deleted as we do not describe entry conditions.

IBM #256
PDF Page 124
6.9.6.1 State description
The statement <<In this state, the receiver shall monitor the
incoming data stream looking >> should be << This state shall monitor the
Dwords received in the Dword Received parameter
looking >>

IBM #257
PDF Page 124
6.9.7.1 State description
The statement <<In this state, the receiver shall monitor the
incoming data stream looking >> should be << This state shall monitor the
Dwords received in the Dword Received parameter
looking >>

IBM #258
PDF Page 124
6.9.8.1 State description
The statement <<In this state, the receiver shall monitor the
incoming data stream looking >> should be << This state shall monitor the
Dwords received in the Dword Received parameter
looking >>

IBM #259
PDF Page 124
6.9.9.1 State description
The statement <<In this state, the receiver shall monitor the
incoming data stream looking >> should be << This state shall monitor the
Dwords received in the Dword Received parameter
looking >>

IBM #260
PDF Page 124
6.9.6.2 Transition SP_DWS4:Lost1 to SP_DWS5:Lost1Recovered
The statement << This transition shall occur when a valid dword is
detected. >>
should be << This transition shall occur after receiving a Dword Received
parameter that contains an valid Dword.>>

IBM #261
PDF Page 124
6.9.7.2 Transition SP_DWS5:Lost1Recovered to SP_DWS3:SyncAcquired
The statement << This transition shall occur when a valid dword is
detected. >>
should be << This transition shall occur after receiving a Dword Received
parameter that contains an valid Dword.>>
6.9.8.2 Transition SP_DWS6:Lost2 to SP_DWS7:Lost2Recovered
The statement << This transition shall occur when a valid dword is
detected. >>
should be << This transition shall occur after receiving a Dword Received
parameter that contains an valid Dword.>>

IBM #263

PDF Page 124
6.9.6.3 Transition SP_DWS4:Lost1 to SP_DWS6:Lost2
The statement << This transition shall occur when an invalid dword is
detected.>> should be << This transition shall occur after
receiving a Dword Received parameter that contains an invalid Dword.>>

IBM #264
PDF Page 124
6.9.7.3 Transition SP_DWS5:Lost1Recovered to SP_DWS6:Lost2
The statement << This transition shall occur when an invalid dword is
detected.>> should be << This transition shall occur after
receiving a Dword Received parameter that contains an invalid Dword.>>

IBM #265
PDF Page 124
6.9.8.3 Transition SP_DWS6:Lost2 to SP_DWS8:Lost3
The statement << This transition shall occur when an invalid dword is
detected.>> should be << This transition shall occur after
receiving a Dword Received parameter that contains an invalid Dword.>>

IBM #266
PDF Page 124
6.9.6.3 Transition SP_DWS4:Lost1 to SP_DWS6:Lost2
The statement << An expander forwarding the dword to another phy shall
replace the invalid dword with ERROR for a SAS
physical link or
SATA_ERROR for a SATA physical link. >> seems out of place here. This
should be defined in the expander information that
describes the insertion of error primitives. As most there should be a
reference to that information << For expander rules on invalid
Dwords replacement see x.x.x. >>

IBM #267
PDF Page 124
6.9.7.3 Transition SP_DWS5:Lost1Recovered to SP_DWS6:Lost2
The statement << An expander forwarding the dword to another phy shall
replace the invalid dword with ERROR for a SAS
physical link or
SATA_ERROR for a SATA physical link. >> seems out of place here. This
should be defined in the expander information that
describes the insertion of error primitives. As most there should be a
reference to that information << For expander rules on invalid
Dwords replacement see x.x.x. >>

IBM #268
PDF Page 124
6.9.8.3 Transition SP_DWS6:Lost2 to SP_DWS8:Lost3
The statement << An expander forwarding the dword to another phy shall
replace the invalid dword with ERROR for a SAS
physical link or
SATA_ERROR for a SATA physical link. >> seems out of place here. This
should be defined in the expander information that
describes the insertion of error primitives. As most there should be a
reference to that information << For expander rules on invalid
Dwords replacement see x.x.x. >>

IBM #269
PDF Page 125
6.9.10.1 State description
The statement << This state is reached when three invalid dwords has been
received and not nullified. >> should be deleted as we
do not describe entry conditions.

IBM #270
PDF Page 125
6.9.11.1 State description
The statement << This state is reached when a valid dword has been
received, and another valid dword will nullify the previous
invalid dword. >> should be deleted as we do not describe entry conditions.

IBM #271
PDF Page 125
6.9.10.1 State description
The statement <<In this state, the receiver shall monitor the
incoming data stream looking >> should be << This state shall monitor the
Dwords received in the Dword Received parameter
looking >>

IBM #272
PDF Page 125
6.9.11.1 State description
The statement <<In this state, the receiver shall monitor the
incoming data stream looking >> should be << This state shall monitor the
Dwords received in the Dword Received parameter
looking >>

IBM #273
PDF Page 125
6.9.9.2 Transition SP_DWS7:Lost2Recovered to SP_DWS4:Lost1
The statement << This transition shall occur when a valid dword is
detected. >>
should be << This transition shall occur after receiving a Dword Received
parameter that contains an valid Dword.>>

IBM #274
PDF Page 125
6.9.10.2 Transition SP_DWS8:Lost3 to SP_DWS9:Lost3Recovered
The statement << This transition shall occur when a valid dword is
detected. >>
should be << This transition shall occur after receiving a Dword Received
parameter that contains an valid Dword.>>

IBM #275
PDF Page 125
6.9.11.2 Transition SP_DWS9:Lost3Recovered to SP_DWS6:Lost2
The statement << This transition shall occur when a valid dword is
detected. >>
should be << This transition shall occur after receiving a Dword Received
parameter that contains an valid Dword.>>

IBM #276
PDF Page 125
6.9.9.3 Transition SP_DWS7:Lost2Recovered to SP_DWS8:Lost3
The statement << This transition shall occur when an invalid dword is
detected.>> should be << This transition shall occur after
receiving a Dword Received parameter that contains an invalid Dword.>>

IBM #277
PDF Page 125
6.9.10.3 Transition SP_DWS8:Lost3 to SP_DWS0:AcquireSync.The statement <<
If an invalid dword (i.e., the fourth non-nullified invalid dword) is
detected, this state shall send a DWS Reset
parameter to the SP state machine and this transition shall occur. >>
should be << This transition shall occur after receiving a
Dword Received parameter that contains an invalid Dword (i.e., the fourth
non-nullified invalid dword) and after sending a DWS
Reset parameter to the SP state machine.>>

IBM #278
PDF Page 125
6.9.11.3 Transition SP_DWS9:Lost3Recovered to SP_DWS0:AcquireSync
The statement << If an invalid dword (i.e., the fourth non-nullified
invalid dword) is detected, this state shall send a DWS Reset
parameter to the SP state machine and this transition shall occur. >>
should be << This transition shall occur after receiving a
Dword Received parameter that contains an invalid Dword (i.e., the fourth
non-nullified invalid dword) and after sending a DWS
Reset parameter to the SP state machine.>>

IBM #279

PDF Page 125
6.9.9.3 Transition SP_DWS7:Lost2Recovered to SP_DWS8:Lost3
The statement << An expander forwarding the dword to another phy shall replace the invalid dword with ERROR for a SAS physical link or SATA_ERROR for a SATA physical link. >> seems out of place here. This should be defined in the expander information that describes the insertion of error primitives. As most there should be a reference to that information << For expander rules on invalid Dwords replacement see x.x.x. >>

IBM #280
PDF Page 125
6.10 Spin-up
The statement << NOTE 12 A SATA target device with rotating media spins up:
a) automatically after power on (allowed by SATA);
b) after its phy is enabled (allowed by SATA);
c) after the reset sequence has completed (recommended by SATA); or
d) after the Power Up in Standby flag is cleared by an application (if the ATA Power Up in Standby feature is implemented).
The ATA Power Up in Standby feature is not widely implemented, since it requires the target device to include a nonvolatile memory to remember the state of the Power Up in Standby flag. Desktop-class disk drives do not typically have nonvolatile memory storage. >> has no value to this standard and should be deleted.

IBM #281
PDF Page 127
Table 51
The footnotes have to be on each split of the table not just the last one.

IBM #282
PDF Page 135
7.1.3.1 Primitive sequence overview
The statement << ALIGNs may be sent inside primitive sequences without affecting the count or breaking the consecutiveness requirements. >> should be deleted as it is repeated in each of the next three sections. The other option would be to delete the text in all three sections and leave it here.

IBM #283
PDF Page 135
7.1.3.4 Triple primitive sequence
The statement << consecutively and followed by idle dwords until a response is received. >> should be <<consecutively followed by idle dwords. >> The statement << until a response is received >> is incomplete because it does not describe what the response is that is received. Either that has to be defined or the statement deleted.

IBM #284
PDF Page 135
7.1.3.3 Repeated primitive sequence
The statement << until a response is received >> is incomplete because it does not describe what the response is that is received. Either that has to be defined or the statement deleted.

IBM #285
PDF Page 135
7.1.3.4 Triple primitive sequence
The statement << detect a triple primitive sequence by receiving the identical primitive in three consecutive dwords. >> should be << detect a triple primitive sequence after the identical primitive is received in three consecutive dwords. >>

IBM #286
PDF Page 135
7.1.3.5 Redundant primitive sequence

The statement << shall be sent six times consecutively. >> should be <<
shall be sent six times consecutively followed by idle
dwords.

IBM #287
PDF Page 135
7.1.3.5 Redundant primitive sequence
The statement << detect redundant primitive sequences by receiving an
identical primitive for three consecutive
dwords. >> should be << detect a redundant primitive sequence after the
identical primitive is received in three consecutive
dwords. >>

IBM #288
PDF Page 135
7.1.3.4 Triple primitive sequence
***
In the statement << receiver shall not detect primitive sequences a second
time until it >> it is not clear if the primitive sequence
that shall not be detected is this primitive sequence or any primitive
sequence or any triple primitive sequence. This needs to be
made clear.

IBM #289
PDF Page 135
7.1.3.5 Redundant primitive sequence
***
In the statement << receiver shall not detect primitive sequences a second
time until it >> it is not clear if the primitive sequence
that shall not be detected is this primitive sequence or any primitive
sequence or any redundant primitive sequence. This needs to
be made clear.
7.1.4.2 ALIGN
The statement << are used for >> should be deleted as it is duplicated in
the sentence.

IBM #291
PDF Page 136
7.1.4.2 ALIGN
The statement << NOTE 14 SATA devices are allowed to decode every dword
starting with a K28.5 as an ALIGN, since ALIGN is
the only primitive defined starting with K28.5. >> as it contains no
information that is relevant to this standard.

IBM #292
PDF Page 137
7.1.4.4 BROADCAST
Change << BROADCAST indications >> to << BROADCASTs >>.

IBM #293
PDF Page 137
7.1.4.4 BROADCAST
Change << BROADCAST indication >> to << BROADCAST >>.

IBM #294
PDF Page 137
7.1.4.4 BROADCAST
Change << second indication >> to << second BROADCAST >>.

IBM #295
PDF Page 137
Table 60
The term << initiator affiliation. >> is not used anywhere else in this
standard. So I have no idea as to what it is. It needs to be
defined or changed to a term that is defined.

IBM #296
PDF Page 138
7.1.4.9 NOTIFY
The TBD needs to be replaced with a reference.

IBM #297
PDF Page 138
7.1.4.8 HARD_RESET
There should be a statement that states that the HARD_RESET shall be
ignored if received at any time other than after a phy
reset sequence and before the identification sequence.

IBM #298
PDF Page 138
7.1.4.9 NOTIFY
The statement << devices shall transmit NOTIFY (ENABLE_SPINUP) >> should
changed to << devices shall use NOTIFY
(ENABLE_SPINUP) >>. The rules for usage do follow in this paragraph but the
use of the word << transmit >> in this sentence
makes the sentence seem incomplete.

IBM #299
PDF Page 138
7.1.4.9 NOTIFY
****
The way this is now it is possible that the receiver may not get an ALIGN
within the 2048 dwords if a NOTIFY replaces an ALIGN.
There needs to be a rule that when sending NOTIFYs the transmitter is still
required to send ALIGNs at least once every 2048
dwords.

IBM #300
PDF Page 139
Table 61
The term << affiliation >> needs to be defined.

IBM #301
PDF Page 140
Table 62
There needs to be a double line between the body and footer.

IBM #302
PDF Page 141
Table 63
The statement << Timed out waiting for an ACK or NAK. The ACK/NAK count
does
not match the frame count. Transmitter is going to transmit
BREAK in 1 ms unless DONE is received prior to that. >> should be << The
SSP state machine timed out waiting for an ACK or
NAK (see 7.16.7.2) and Transmitter is going to transmit BREAK unless a DONE
is received within 1 ms of transmitting the DONE.

IBM #303
PDF Page 143
7.2 Clock skew management
The statement << This is used when transmitting data >> should be << The
internal clock is used when transmitting data >>..Sequence number: 2

IBM #303
PDF Page 143
7.2 Clock skew management
The statement << data needs to be latched based >> should be << dwords need
to be latched based >>.

IBM #304
PDF Page 143
7.2 Clock skew management
The statement << receive data
and not be able to >> should be << receive dwords and not be able to

IBM #305
PDF Page 143
7.2 Clock skew management
The statement << have data when needed >> should be << have dwords when

needed >>.

IBM #306
PDF Page 143
7.1.6.3 SATA_HOLD and SATA_HOLDA (Hold and hold acknowledge)
The statement << SATA_HOLDA will arrive within >> should be << SATA_HOLDA arrives within >>.

IBM #307
PDF Page 144
Table 66
Make the information << Original source of data
SSP initiator phy or target phy in SSP connection, SMP initiator phy or SMP target phy in SMP connection, Any phy outside
connections, or
STP target phy in an STP connection >> into a left aligned a,b,c list.

IBM #308
PDF Page 144
7.2 Clock skew management
The term << amongst >> should << through >>

IBM #309
PDF Page 144
7.3 Idle links
The statement << While no connection is open and a physical link is idle, or while an SSP or SMP connection is open and the
physical link is idle, SAS phys shall transmit idle dwords. >> should be << SAS phys shall transmit idle words if:
a) no connection is open and a physical link is idle;
b) an SSP connection is open and the physical link is idle; or
c) an SMP connection is open and the physical link is idle. >>

IBM #310
PDF Page 145
Table 67
The paragraphs within the definitions should have the paragraph designer, basic, line spacing, fixed box unchecked. This will
remove the superscripts running into the line above.

IBM #311
PDF Page 146
7.4.2 CRC generation
The statement << order - the bits within each byte of the data dword are transposed to match the implicit transposition in the 8b10b
encoding process. >> should be << order (i.e., the bits within each byte of the data dword are transposed to match the implicit
transposition in the 8b10b encoding process). >>.

IBM #312
PDF Page 147
7.5 Scrambling
The statement << Table 69 shows when the scrambling logic shall treat data as big-endian and when it shall treat data as
little-endian. >> should be << Table 69 shows when the scrambling logic shall handle data as big-endian and when it shall handle
data as little-endian. >> .

IBM #313
PDF Page 147
7.5 Scrambling
The statement << These patterns can cause issues in the physical >> should be << These patterns may cause issues in the
physical >>.

IBM #314
PDF Page 149
7.7.1 Address frames overview
The statement << Primitives may be inserted in the address frame. >> is no longer valid and needs to be deleted.

IBM #315
PDF Page 150
7.7.2 IDENTIFY address frame
The statement << The recipient shall ignore reserved and ignored fields in
the IDENTIFY address frame. >> should be deleted as
the information is already stated in the keywords definitions..Page: 152

IBM #316
PDF Page 150
7.7.3 OPEN address frame
The statement << The destination device shall reject the connection request
with OPEN_REJECT (PROTOCOL NOT
SUPPORTED) if the PROTOCOL field is set to a value it does not support. >>
should be deleted as this information is already
stated in the state machines.

IBM #317
PDF Page 153
7.7.3 OPEN address frame
The statement << Every phy shall support the 1,5 Gbps connection rate at
every physical link rate. >> should be deleted as this is
not the place to put link speed requirements.

IBM #318
PDF Page 153
The statement << The destination device shall ignore the contents of
reserved fields in the OPEN address frame. >> should be
deleted as it is already stated in the keywords definitions section.

IBM #319
PDF Page 153
7.7.3 OPEN address frame
The statement << The INITIATOR CONNECTION TAG field is used for SSP and STP
connection requests to provide an initiator
port
an easier context lookup when the target port originates a connection
request. >> states no requires or options and should be
deleted.

IBM #320
PDF Page 154
7.8.1 Overview
The statement << Each phy shall also expect to receive an >> should be <<
Each phy receives an >>.

IBM #321
PDF Page 154
7.8.1 Overview
The statement << link reset sequence. >> should be << link reset sequence
(see x.x.x.) >>.

IBM #321
PDF Page 155.Sequence
7.8.2 Initiator device specific rules
The statement << When this is done after a link reset sequence, this allows
the application client within an initiator device to
discover all the devices in the SAS domain. When this is done after a
BROADCAST (CHANGE), this allows the application client
within an initiator device to determine what has changed in the SAS domain.
>> should be << If an application client initiates the
discover process after a link reset sequence then on completion of the
discovery that application client has discovered all the
devices within the SAS domain. If the application client initiates the
discovery process after a BROADCAST (CHANGE) then on
completion of the discovery that application client has discovered any
devices that have been removed or inserted into the SAS
domain. >>

IBM #322

PDF Page 155.Sequence
7.8.2 Initiator device specific rules
The statement << a routing loop. It shall disable routing >> should be << a routing loop then the application client shall disable routing >> .

IBM #323
PDF Page 155.Sequence
7.8.2 Initiator device specific rules
The statement << function request is used to disable the expander port of an expander device. >> should be << function request shall be used to disable the expander port of an expander device. >>

IBM #324
PDF Page 155.Sequence
7.8.5.1 Overview
The statements << The SL_IR state machine sends the following parameters to the SL_IR transmitter:
a) Transmit IDENTIFY; and
b) Transmit HARD_RESET.
The SL_IR state machine receives the following parameters:
a) SOAF Received;
b) Data Dword Received;
c) EOAF Received; and
d) HARD_RESET Received. >> should be placed in section 7.8.6 as that is where the transmitter and receiver information is defined. That way it is all in one place.

IBM #325
PDF Page 155.Sequence
7.8.5.1 Overview
There needs to be an item << c) Transmit Idle Dword >> added to the SL_IR transmitter list.

IBM #326
PDF Page 155.Sequence
7.8.5.1 Overview
There needs to be an items << e) IDENTIFY Transmitted
f) HARD_RESET Transmitted >> add to the SL_IR receiver list.

IBM #327
PDF Page 156
Figure 67.Figure 67
The << Enable Disable Link Layer (Disable) >> confirmation needs to point into each of the 3 state machines. The statement << (to all states in all state machines, causing transition to Idle state) >> should be changed to << ((This parameter causes a transition to SL_IR_xxx1:Idle) >> replace xxx with TIR, RIF, and IRC on the appropriate arrow.

IBM #328
PDF Page 156
Figure 67
Several of the green arrows look like they are originating from other states. They should be shortened to avoid confusion.

IBM #329
PDF Page 156
Figure 67
The << Enable Disable SAS Link (Enable) >> should indicate it goes to SL or XL.

IBM #330
PDF Page 157
7.8.6 SL_IR transmitter and receiver
The statement << SOAF/IDENTIFY address frame/EOAF; >> has a problem in that the name of the parameter that causes the transmission is called << Transmit IDENTIFY >>. Those two names are enough different so it is not obvious one is a result of the other. One solution would be to add << (i.e., Transmit IDENTIFY parameter)

>> to item b).

IBM #331
PDF Page 157
7.8.6 SL_IR transmitter and receiver
The statement << The SL_IR receiver shall ignore any primitive received inside an IDENTIFY address frame. In this case, a data dword shall be considered inside a frame when it is received after an SOAF and before an EOAF if the primitive is received after the 8th data dword following the SOAF. >> seems to be confusing. Changing it to the following may help << The SL_IR receiver shall ignore any primitive received inside an IDENTIFY address frame. In this case, a primitive shall be considered inside a frame when it is received within the first eight data dwords after an SOAF. >>

IBM #332
PDF Page 157
7.8.6 SL_IR transmitter and receiver
There needs to be a new paragraph that describes what the SL_IR receiver receives. Something like << When the SL_IR receiver receives a dword the SL_IR receiver notifies the SL_IR state machine of the receipt of those dwords. The following are the only received dwords that the SL_IR transmitter shall send notifications on:
a) SOAF;
b) Data Dword;
c) EOAF; or
d) HARD_RESET. >>.

IBM #333
PDF Page 157
7.8.6.1.1 Overview
The statement << This is the only state machine in the SL_IR state machines that transmits dwords on the physical link. >> Is obvious and not necessary.

IBM #334
PDF Page 157
The statement << This state shall repeatedly send Transmit Idle Dword to the SL_IR transmitter. >> should be
<< This state shall request idle dwords be transmitted by repeatedly sending a Transmit Idle Dword parameter to the SL_IR transmitter (see 7.3). >>

IBM #335
PDF Page 157
7.8.6.1.2.2 Transition SL_IR_TIR1:Idle to SL_IR_TIR2:Transmit_Identify
The statement << when both: >> should be changed to << after >>.

IBM #336
PDF Page 157
7.8.6.1.2.3 Transition SL_IR_TIR1:Idle to SL_IR_TIR3:Transmit_Hard_Reset
The statement << when both: >> should be changed to << after >>.

IBM #337
PDF Page 157
7.8.6.1.3.1 State description
The statement << This state shall send a Transmit IDENTIFY parameter to the SL_IR transmitter. >> should be << Upon entry into this state, this state shall send a Transmit IDENTIFY parameter to the SL_IR transmitter. >>

IBM #338
PDF Page 158
7.8.6.1.3.2 Transition SL_IR_TIR2:Transmit_Identify to SL_IR_TIR4:Completed
The statement << This transition shall occur after this state has sent an Identify Transmitted parameter. >> should be << This transition shall occur after:
a) receiving a IDENTIFY Transmitted parameter; and
b) sending an Identify Transmitted parameter to the IRC state machine. >>.

IBM #339
PDF Page 158
7.8.6.1.3.1 State description
The statement << When this state receives >> should be << After this state receives >>.

IBM #340
PDF Page 158
7.8.6.1.4.1 State description
The statement << This state shall send a >> should be << Upon entry into this state, this state shall send a >>.

IBM #341
PDF Page 158
7.8.6.1.4.1 State description
The statement << When this state receives >> should be << After this state receives >>.

IBM #342
PDF Page 158
7.8.6.1.4.2 Transition SL_IR_TIR3:Transmit_Hard_Reset to SL_IR_TIR3:Completed
The statement << This transition shall occur after sending a HARD_RESET Transmitted confirmation. >> should be << This.transition shall occur after:
a) receiving a HARD_RESET Transmitted parameter; and
b) sending a HARD_RESET Transmitted confirmation to the management application layer. >>.

IBM #343
PDF Page 158
7.8.6.1.5 SL_IR_TIR4:Completed state
The statement << This state shall repeatedly send the Transmit Idle Dword parameter to the SL_IR transmitter. >> should be <<
This state shall request idle dwords be transmitted by repeatedly sending a Transmit Idle Dword parameter to
the SL_IR transmitter (see 7.3). >>

IBM #344
PDF Page 158
7.8.6.2.2.1 State description
The statement << This state waits for an SOAF to be received from the physical link, indicating an address frame is arriving. >>
should be << This state waits for an address frame to be received. >>

IBM #345
PDF Page 158
7.8.6.2.2.2 Transition SL_IR_RIF1:Idle to SL_IR_RIF2:Receive_Identify_Frame
The statement << when both: >> should be changed to << after >>.

IBM #346
PDF Page 158
7.8.6.2.3.1 State description
The statement << After receiving the frame, it shall check if it is a correct IDENTIFY address frame. >> should be << After
receiving the address frame, this state shall check if it is a valid IDENTIFY address frame. >>

IBM #347
PDF Page 158
7.8.6.2.1 Overview
The statement << an IDENTIFY address frame from the physical link and checks the IDENTIFY address >> should be << an
IDENTIFY address frame and checks that IDENTIFY address >>.

IBM #348
PDF Page 159
7.8.6.2.3.2 Transition SL_IR_RIF2:Receive_Identify_Frame to SL_IR_RIF3:Completed
The statement << This transition shall occur after receiving an EOAF and

sending the Identify Received parameter or Address
Frame Failed confirmation. >> should be << This transition shall occur
after:
a) receiving an EOAF Received parameter; and
b) sending the Identify Received parameter or Address Frame Failed
confirmation. >>

IBM #349
PDF Page 159
7.8.6.2.4 SL_IR_RIF3:Completed state
The statement << This state does nothing except wait for >> should be <<
This state waits for >>.
7.8.6.3.1 Overview
The statement << state machines function is to ensure IDENTIFY address >>
should be << state machine ensures IDENTIFY
address >>.

IBM #351
PDF Page 159
7.8.6.3.2.1 State description
The statement << This state shall >> should be << Upon entry into this
state, this state shall: >>

IBM #352
PDF Page 159
7.8.6.3.2.1 State description
There is not description of when the << Identify Time out >> confirmation
is send out. That confirmation is in figure 67 as an output
from the SL_IR_IRC1 state. This needs to fixed.

IBM #353
PDF Page 160
7.10 Near-end analog loopback test
***
This section should be deleted as it causes implantation problems and is of
little or no use in real life.

IBM #354
PDF Page 160
7.8.6.3.3.1 State description
The statement << from the Transmit IDENTIFY or HARD_RESET
state machine, >> should be deleted as we do not state were things come
from.

IBM #355
PDF Page 160
7.8.6.3.3.1 State description
The statement << initialize a receive identify time out >> should be <<
initialize the receive identify time out >> .

IBM #356
PDF Page 160
7.8.6.3.3.1 State description
The statement << time out timer is
exceeded, this state shall: >> should be << time out timer times out, this
state shall >>.

IBM #357
PDF Page 160
7.8.6.3.3.1 State description
The << Identify Sequence Complete >> confirmation is not shown in figure
67. This needs to be fixed.

IBM #358
PDF Page 160
7.8.6.3.3.1 State description
The << HARD_RESET Received >> confirmation is not shown in figure 67. This
needs to be fixed..Sequence number: 7

IBM #358

PDF Page 160
The statement << time out timer is exceeded before >> should be << time out timer times out before >> .

IBM #359
PDF Page 160
7.8.6.3.3.2 Transition SL_IR_IRC2:Wait to SL_IR_IRC3:Completed
The statement << This transition shall occur after sending a HARD_RESET Received confirmation, Identify Timeout
confirmation, or Identify Sequence Complete confirmation to the management application layer. >> should be << This transition
shall occur:
a) if an Identify Received parameter and an Identify Transmitter parameter are received, and after sending:
A) an Identify Sequence Complete confirmation to the management application layer;
B) in an expander device, a Broadcast Event Notify (Identification Sequence Complete) confirmation to the expander function;
C) a Phy Enabled confirmation to the port layer and the management application layer; and
D) an Enable Disable SAS Link (Enable) parameter to the SL state machine (see 7.13) in initiator devices and target devices or
the XL state machine (see 7.14) in expander devices;
b) if a HARD_RESET Received parameter is received and after sending a HARD_RESET Received confirmation to the
management application layer; or
c) if the identify timer times out and after sending an Identify Timeout confirmation to the management application layer.>>

IBM #360
PDF Page 160
7.8.6.3.4 SL_IR_IRC3:Completed state
The statement << This state does nothing except wait for >> should be << This state waits for >>.

IBM #361
PDF Page 160
The statement << SATA interface power management is not supported in SAS. >> should be deleted. For something that is not
supported there seems to be a lot of discussion in this section.

IBM #362
PDF Page 160
7.10 Near-end analog loopback test
***
This section should be deleted as it causes implantation problems and is of little or no use in real life.

IBM #363
PDF Page 160
7.8.6.3.3.1 State description
The statement << from the Receive IDENTIFY Address Frame state machine >> should be deleted as the general rule is that we
do not state where things come from in state diagrams.

IBM #364
PDF Page 161
7.11 Domain changes
The statement << domain with a discover process (see 4.6.11.5) >> should be << domain using the discover process (see
4.6.11.5) >>.Page: 162

IBM #365
PDF Page 161
The statement << communication can begin. >> should be << any communication begins >>.

IBM #366
PDF Page 161
7.12.2.1 Connection request

The statement << After transmitting an OPEN address frame, the source phy shall initialize an open time out timer to 1 ms and start the timer. Whenever an AIP is received, the source phy shall reinitialize and restart the timer. Source phys are not required to enforce a limit on the number of AIPs received before abandoning the connection request, but they may do so. When any connection response is received, the source phy shall reinitialize the timer. If the timer expires before a connection response is received, the source phy may assume the destination port does not exist and shall transmit BREAK to abandon the connection request. >> is a duplicate of the information that is in the state machines and should be deleted.

IBM #367
PDF Page 163
7.12.3 Arbitration fairness
The statement << the SCALE bit to one; >> should be << the SCALE bit in the OPEN address frame to one; >>.

IBM #368
PDF Page 163
7.12.2.2 Connection request responses
***
The text << the source port shall wait a retry delay of 15 µs before >> has more than one problem.
One is that the term retry delay should be defined as a specific time (i.e., retry delay = 15usec) the 15 usec would then be dropped from the text. Or the the statement needs to change to << the source port shall wait 15 µs before >>.
The next problem is that this is a shall when it should be a should.
The last problem is that there is no tolerance on the value. It should be stated as << shall (should) wait a minimum of 15 us before >>.

IBM #369
PDF Page 163
7.12.2.2 Connection request responses
The term << possible >> should be deleted.

IBM #370
PDF Page 163
7.12.2.2 Connection request responses
global
The statement << I_T_L_Q >> should be << I_T_L_Q nexus >>. In all cases I_T, I_T_L, and I_T_L_Q should be I_T nexus, I_T_L nexus, and I_T_L_Q nexus.

IBM #371
PDF Page 163
The statement << wait timer counting the >> should be << wait timer that counts the >>.

IBM #372
PDF Page 163
7.12.3 Arbitration fairness
The statement << may be unfair, setting the >> should be << may be unfair by setting the >>.

IBM #373
PDF Page 163
7.12.3 Arbitration fairness
The term <<livelocks.>> needs to be added to the glossary.

IBM #374
PDF Page 163
7.12.3 Arbitration fairness
The statement << and helps prevent livelocks. >> should be deleted.

IBM #375
PDF Page 163

7.12.3 Arbitration fairness
The following << the SCALE bit to one; >> should be change to << the SCALE bit <<in the OPEN address frame>> to one; >>.

IBM #376
PDF Page 163
7.12.2.2 Connection request responses
***
The text << the source port shall wait a retry delay of 15 µs before >> has more than one problem.
One is that the term retry delay should be defined as a specific time (i.e., retry delay = 15usec) the 15 usec would then be dropped from the text. Or the the statement needs to change to << the source port shall wait 15 µs before >>.
The next problem is that this is a shall when it should be a should.
The last problem is that there is no tolerance on the value. It should be stated as << shall (should) wait a minimum of 15 us before >>.

IBM #377
PDF Page 164
7.12.3 Arbitration fairness
Note 22 states << of the time a device must wait after receiving OPEN_REJECT (PATHWAY BLOCKED) >> which has two problems one is the word must is used. If that is changed to a shall which seems logical then problem two occurs in that now you have a requirement in a note which is not allowed. This needs to be fixed.

IBM #378
PDF Page 164
7.12.3 Arbitration fairness
The statement << wins arbitration, receiving either >> should be << wins arbitration by receiving either >>.

IBM #379
PDF Page 164
The statement << arbitration request, receiving an OPEN address frame from the destination port with matching PROTOCOL and CONNECTION RATE fields. >>
should be << arbitration request if an OPEN address frame from the destination port with matching PROTOCOL and CONNECTION RATE fields was received. >>

IBM #380
PDF Page 164
7.12.3 Arbitration fairness
The statement << values in this order: >> should be << values in the following order: >>.

IBM #381
PDF Page 164
7.12.3.1.1 Arbitration overview
The statement << values in this order: >> should be << values in the following order: >>.

IBM #382
PDF Page 165
7.12.3.1.1 Arbitration overview
The statement << conditions are met: >> should be << conditions occur >>.

IBM #383
PDF Page 165
7.12.3.1.1 Arbitration overview
The statement << conditions are met: >> should be << conditions occur >>.

IBM #384
PDF Page 165
7.12.3.1.1 Arbitration overview
The statement << conditions are met: >> should be << conditions occur >>.

IBM #385
PDF Page 165
7.12.3.1.1 Arbitration overview
The statement << port which contains >> should be << port that contains >>.

IBM #386
PDF Page 165
7.12.3.1.1 Arbitration overview
The statement << destination (this case occurs >> should be << destination
(i.e., occurs >>

IBM #387
PDF Page 165
7.12.3.1.3 Partial Pathway Timer
The statement << conditions are met: >> should be << conditions occur >>.

IBM #388
PDF Page 165
7.12.3.1.3 Partial Pathway Timer
The statement << above are not met, the >> should be << above do not occur,
the >>.

IBM #389
PDF Page 165
7.12.3.1.3 Partial Pathway Timer
Delete the statement << until reaching zero, >> and place the following
statement in this section <<The expander connection
manager shall stop decrementing the PPT timer when it reaches zero. >>.

IBM #390
PDF Page 165
The statement << manager shall hold the PPT timer at an initial value set
to the partial pathway time out value. >> does not make
sense. This needs to be fixed.

IBM #391
PDF Page 165
7.12.3.1.4 Pathway Recovery
The statement << requests in order to prevent deadlock using Pathway
Recovery Priority comparisons. >> should be << requests
using Pathway Recovery Priority comparisons. >>.

IBM #392
PDF Page 165
7.12.3.1.4 Pathway Recovery
The statement << fields within the OPEN >> should be << fields from the
OPEN >>.

IBM #393
PDF Page 165
7.12.3.1.4 Pathway Recovery
The statement << as follows: >> should be deleted as there is no list that
follows.

IBM #394
PDF Page 166
7.12.4.1 All expander devices
The statement << frame will win >> should be << frame shall will >> or <<
frame wins >>.

IBM #395
PDF Page 166
7.12.3.1.4 Pathway Recovery
The term << effectively >> should be deleted as it adds nothing.

IBM #396
PDF Page 166
7.12.3.1.4 Pathway Recovery
The statement << only with the SOURCE SAS >> should be << only on the
SOURCE SAS >>.

IBM #397
PDF Page 166
7.12.4.1 All expander devices
In the statement << frame unless it has higher >> it is not clear what the
it is referring to. This needs to be fixed.

IBM #398
PDF Page 166
7.12.4.1 All expander devices
The statement << three AIPs consecutively >> should be << three consecutive
AIPs >>.

IBM #399
PDF Page 166
7.12.4.1 All expander devices
The term << immediately >> does not give enough information as to how soon
immediately is. This needs to be fixed.

IBM #400
PDF Page 166
7.12.4.2 Edge expander devices
The statement << this means >> should be deleted.

IBM #401
PDF Page 166
7.12.4.2 Edge expander devices
The statement << When two edge expander >> should be << If two edge
expander >>.

IBM #402
PDF Page 166
7.12.4.2 Edge expander devices
The statement << When a fanout expander >> should be << If a fanout
expander >>.

IBM #403
PDF Page 167
7.12.4.3 Fanout expander devices
The statement << phys which are >> should be << phys that are >>.

IBM #404
PDF Page 167
7.12.4.3 Fanout expander devices
In the statement << it shall compare >> it is not clear what the it is.
This needs to be fixed.

IBM #405
PDF Page 167
7.12.4.3 Fanout expander devices
There are a whole bunch of << it >> s in this section where it is not clear
what the it is. This needs to be fixed.

IBM #406
PDF Page 167
7.12.5 Abandoning a connection request
The statement << After transmitting BREAK, the source port shall initialize
a break time out timer to 1 ms and start the timer. If the
timer expires before a break response is received, the source port may
assume the physical link is
unusable. >> should be deleted as it is duplicated in the state machine
descriptions.

IBM #407
PDF Page 167
This confirms that the connection request has been abandoned.
Table 81
The statement << The BREAK was too late and an open response arrived late.
The originator shall honor this as a response to the
open request it was attempting to abandon. >> is not clear and the

reference to 7.12.2 does not help in understanding this. This
needs to be fixed.

IBM #408
PDF Page 167
7.12.5 Abandoning a connection request
The statement << the target port. >> should be << the destination port >>
as a BREAK can be sent from both targets and initiators .

IBM #409
PDF Page 167
7.12.5 Abandoning a connection request
The term << possible >> should be deleted.

IBM #410
PDF Page 168
7.12.5 Abandoning a connection request
The statement << that an open response will not occur. >> should be << that
an open response shall not occur >>.

IBM #411
PDF Page 168
Figure 69
The order of the BREAKs in this figure is not clear. They should be
numbered in the time order they will occur.

IBM #412
PDF Page 169
7.12.5 Abandoning a connection request
The statement << BREAK to break the connection. >> should be << BREAK to
end the connection >>.

IBM #413
PDF Page 169
7.12.6 Breaking a connection
The statement << to break a connection, >> should be << to end a
connection, >>..Sequence number: 3

IBM #413
PDF Page 169
7.12.6 Breaking a connection
The term << possible >> should be deleted.

IBM #414
PDF Page 169
7.12.6 Breaking a connection
The statement << may be broken as the >> should be ended as the >>

IBM #415
PDF Page 169
7.12.6 Breaking a connection
The statement << to a broken connection: >> should be << to a connection
that has ended do to a BREAK: >>.

IBM #416
PDF Page 169
7.12.6 Breaking a connection
The statement << the broken connection; >> should be << to a connection
that has ended do to a BREAK: >>.

IBM #417
PDF Page 169
7.12.6 Breaking a connection
The statement << a broken connection >> should be << a connection that has
ended do to a BREAK >>.

IBM #418
PDF Page 169
7.12.6 Breaking a connection
The statement << a broken connection >> should be << a connection that has

ended do to a BREAK >>.

IBM #419
PDF Page 170
7.12.7 Closing a connection
The statement << when the connection was opened. >> does not seem necessary and is unclear. It should be deleted.

IBM #420
PDF Page 170
7.12.7 Closing a connection
The statement << If an expander that supports attachment of a SATA target >> should start a new paragraph.

IBM #421
PDF Page 170
Figure 71
It is not at all clear what the purpose of the ACK and RRDY indications from the transmitter is all about. This needs to be fixed..Page: 171

IBM #422
PDF Page 170
7.13.1 Overview
The statement << from the SL_IR state machines >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #423
PDF Page 170
7.13.1 Overview
The statement << from the SSP, STP, and SMP link layer state machines: >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #424
PDF Page 170
7.13.1 Overview
The statement << from the SL_IR state machines >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #425
PDF Page 172
Figure 72
The << Enable Disable Link Layer (Disable) >> confirmation needs to touch the edge of the state machine box. The statement << (to all states in all state machines, causing transition to SL0:Idle) >> should be changed to << (This parameter causes a transition to SL0:Idle) >>.

IBM #426
PDF Page 173
7.13.2 SL transmitter and receiver
There should be a list of inputs and outputs from the SL transmitter listed in this section. Something like this should be added. <<
The SL state machine sends the following parameters to the SL transmitter:
a, b, c list of outputs
The SL state machine receives the following parameters from the SL receiver:
a, b, c list of inputs

IBM #427
PDF Page 174
The statement << The SL receiver shall ignore any primitive received inside an OPEN address frame. In this case, a dword shall be considered inside a frame when it is received after an SOAF and before an EOAF if the primitive is received after the 8th data dword following the SOAF. >> seems to be confusing. Changing it to the following may help << The SL receiver shall ignore any primitive received inside an OPEN address frame. In this case, a primitive

shall be considered inside a frame when it is received
within the first eight data dwords after an SOAF. >>

IBM #428
PDF Page 174
7.13.3.1 State description
The statement << SSP Link (Enable) confirmation is received >> should be <<
SSP Link (Enable) parameter is received >>

IBM #429
PDF Page 174
7.13.3.1 State description
The statement << that is used when the SL state machine is activated and
there is no active connection >> should be << that is
used when the SL state machine is activated and there is no pending or
active connection >>. This should be the same wording
that is used in the XL0 state description in 7.14.2.1.

IBM #430
PDF Page 174
7.13.3.1 State description
The statement << The SL0:Idle state is the >> should be << This state is
the >>.

IBM #431
PDF Page 175
7.13.4.1 State description
The statement << c) If the frame is discarded then no further action is
taken by this state relating to the invalid address
frame. >> should not have a c). It should just me a sentence.

IBM #432
PDF Page 177
7.13.5.2 Transition SL2:Selected to SL0:Idle
The statement in 1, 2, 3, and 4 << then after this >> should be changed to
<< and after this >> . This change should make the
statements more clear that they are currently.

IBM #433
PDF Page 179
7.14.1 Overview
The statement << facilitated by the expander function - specifically the
expander connection manager and expander connection
router. >> should be << facilitated by the expander connection manager and
the expander connection router. >>.Page: 180

IBM #434
PDF Page 179
7.14.1 Overview
The statement << The XL state machine shall be activated after the
completion of the phy reset sequence by receiving an after
receiving an Enable Disable SAS Link (Disable) parameter from the SL_IR
state machines (see 7.8.5). >> should be changed to
<< The state machine shall start in the XL0:Idle state. The state machine
shall transition to the XL0:Idle state from any other state
after receiving an Enable Disable SAS Link (Disable) parameter from the
SL_IR state machines (see 7.8.5). >>

IBM #435
PDF Page 179
7.14.1 Overview
The statement << from the expander connection manager: >> should be deleted
as the general rule is that we do not state where
things come from in state diagrams.

IBM #436
PDF Page 179
7.14.1 Overview
The statement << from the broadcast primitive processor: >> should be
deleted as the general rule is that we do not state where

things come from in state diagrams.

IBM #437
PDF Page 179
7.14.1 Overview
The statement << from the SL_IR state machine: >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #438
PDF Page 181
Figure 74
The << Enable Disable Link Layer (Disable) >> confirmation needs a cut out from the XL state machine and it needs to touch the edge of the state machine box. The statement << (to all states in all state machines, causing transition to XL0:Idle) >> should be changed to << (This parameter causes a transition to XL0:Idle) >>.

IBM #439
PDF Page 182
Figure 75
The << Enable Disable Link Layer (Disable) >> confirmation needs a cut out from the XL state machine and it needs to touch the edge of the state machine box. The statement << (to all states in all state machines, causing transition to XL0:Idle) >> should be changed to << (This parameter causes a transition to XL0:Idle) >>..Page: 183

IBM #440
PDF Page 182
Figure 76
The << Enable Disable Link Layer (Disable) >> confirmation needs a cut out from the XL state machine and it needs to touch the edge of the state machine box. The statement << (to all states in all state machines, causing transition to XL0:Idle) >> should be changed to << (This parameter causes a transition to XL0:Idle) >>.

IBM #441
PDF Page 182
7.14.2 XL0:Idle state (before this section)
There needs to be a section added here they gives the XL transmitter and XL receiver information (i.e., the green arrows). This section would be very similar to 7.13.2 SL transmitter and receiver.

IBM #442
PDF Page 184
7.14.2.1 State description
The statement << Otherwise, this state shall repeatedly send a Transmit Idle Dword parameter to the XL transmitter. >> should be << This state shall request idle dwords be transmitted by repeatedly sending a Transmit Idle Dword parameter to the XL transmitter (see 7.3). >> and should be it's own paragraph.

IBM #443
PDF Page 184
7.14.2.1 State description
The statement << that occurs when there is no pending or active connection >> should be << that is used when the XL state machine is activated and there is no pending or active connection >>. This should be the same wording that is used in the SL0 state description in 7.13.3.1.

IBM #444
PDF Page 184
7.14.2.1 State description
The statement << Transmit Broadcast Primitive parameter >> should be << Transmit Broadcast Primitive request >> .

IBM #445
PDF Page 184

7.14.2.1 State description
The statement << this state shall send a Transmit BROADCAST parameter to the XL transmitter. >> should be << this state shall request a BROADCAST be transmitted by sending a Transmit BROADCAST parameter to the XL transmitter. >>

IBM #446
PDF Page 184
7.14.2 XL0:Idle state
There is not description of what occurs when the Enable Disable SAS Link (Enable) parameter is received. This needs to be fixed.

IBM #447
PDF Page 184
7.14.2 XL0:Idle state
There is not description of what causes an Open Address Frame parameter to be sent to the XL5 state. This needs to be fixed.

IBM #448
PDF Page 184
7.14.2.2 Transition XL0:Idle to XL1:Request_Path
The statement << shall occur when the following conditions are met: >> should be << shall occur if: >>.

IBM #449
PDF Page 184
7.14.2.2 Transition XL0:Idle to XL1:Request_Path
The is nothing in figure 74 that shows a Transmit Open or a Transmit Break. This needs to be fixed.

IBM #450
PDF Page 184
7.14.2.2 Transition XL0:Idle to XL1:Request_Path
The following should be deleted << from another phy via the expander connection router >> as the general rule is that we do not state where things come from in state diagrams.

IBM #451
PDF Page 184
7.14.2.2 Transition XL0:Idle to XL1:Request_Path
The following should be deleted << from another phy via the expander connection router >> as the general rule is that we do not state where things come from in state diagrams. Several of the deletions I am suggesting in 7.14 look like they should reference a section that describes the interaction between expander objects

IBM #452
PDF Page 184
7.14.2.3 Transition XL0:Idle to XL5:Forward_Open
The following should be deleted << from another phy via the expander connection router >> as the general rule is that we do not state where things come from in state diagrams.

IBM #453
PDF Page 184
7.14.2.3 Transition XL0:Idle to XL5:Forward_Open
The following should be deleted << from another XL state machine via the expander connection router >> as the general rule is that we do not state where things come from in state diagrams.

IBM #454
PDF Page 184
7.14.2.3 Transition XL0:Idle to XL5:Forward_Open
The statement << shall occur when the following conditions are met: >> should be << shall occur if: >>.

IBM #455
PDF Page 184
7.14.2.4 Transition XL0:Idle to XL9:Break

The statement << shall occur when a BREAK Received parameter is received. >> should be << shall occur after receiving a BREAK Received parameter. >>.Sequence number: 15

IBM #455
PDF Page 184
7.14.2.5 Transition XL0:Idle to XL10:Break_Wait
The statement << shall occur when a Transmit Break indication is received from another XL state machine via the expander connection router. >> should be << shall occur after receiving a Transmit Break indication. >>.

IBM #456
PDF Page 184
7.14.3.1 State description
The statements << This state shall send the following parameters to the XL transmitter:
a) Transmit AIP (WAITING ON PARTIAL) when an Arbitrating (Waiting On Partial) confirmation is received from the expander connection manager;
b) Transmit AIP (WAITING ON PARTIAL) when an Arbitrating (Blocked On Partial) confirmation is received from the expander connection manager;
c) Transmit AIP (WAITING ON CONNECTION) when an Arbitrating (Waiting On Connection) confirmation is received from the expander connection manager; or
d) Transmit AIP (NORMAL). >> should be << This state shall request:
a) an AIP (WAITING ON PARTIAL) be transmitted by sending a Transmit AIP (WAITING ON PARTIAL) parameter to the XL transmitter if an Arbitrating (Waiting On Partial) confirmation is received;
b)an AIP (WAITING ON PARTIAL) be transmitted by sending a Transmit AIP (WAITING ON PARTIAL) parameter to the XL transmitter if an Arbitrating (WBlocked On Partial) confirmation is received;
c)an AIP (WAITING ON CONNECTION) be transmitted by sending a Transmit AIP (WAITING ON CONNECTION) parameter to the XL transmitter if an Arbitrating (Waiting On Connection) confirmation is received;
d)an AIP (NORMAL) be transmitted by sending a Transmit AIP(NORMAL) if an ????? is received;

IBM #457
PDF Page 184
7.14.3.1 State description
The statement << Request Path request >> should be << Request Path confirmation >>.

IBM #458
PDF Page 185
7.14.3 XL1:Request_Path state
The way Arbitrating (Block On Partial) is used is not consistent with the way confirmations and parameters are used in the rest of this standard. It is acting more like a signal is this description. This needs to be fixed. There needs to be two arguments; one for Blocked On Partial and another called something like Partial Cleared. The descriptions would then say that the timer starts on Arbitration (Blocked On Partial) and if no Arbitrating (Partial Cleared) is received before the timer timers out then xyz happens.

IBM #459
PDF Page 185
7.14.3.1 State description
The statement << status is conveyed to the expander >> should be << status is sent to the expander >>.

IBM #460
PDF Page 185
7.14.3 XL1:Request_Path state
There was no description of the Arb Reject parameter shown in figure 74 in

this section.
7.14.3.2 Transition XL1:Request_Path to XL2:Request_Open
The following should be deleted << from the expander connection manager. >>
should be deleted as the general rule is that we
do not state where things come from in state diagrams.

IBM #462
PDF Page 185
7.14.3.2 Transition XL1:Request_Path to XL2:Request_Open
The following should be deleted << from the expander connection manager. >>
should be deleted as the general rule is that we
do not state where things come from in state diagrams.

IBM #463
PDF Page 185
7.14.3.2 Transition XL1:Request_Path to XL2:Request_Open
The following should be deleted << from the expander connection manager. >>
should be deleted as the general rule is that we do
not state where things come from in state diagrams.

IBM #464
PDF Page 185
7.14.3.2 Transition XL1:Request_Path to XL2:Request_Open
7.14.3.3 Transition XL1:Request_Path to XL4:Open_Reject
7.14.3.4 Transition XL1:Request_Path to XL0:Idle
7.14.3.5 Transition XL1:Request_Path to XL9:Break
The term < when >> should be << after >>.

IBM #465
PDF Page 185
7.14.4.1 State description
The statement << This state shall repeatedly send a Transmit Idle Dword
parameter to the XL transmitter. >> should be << This
state shall request idle dwords be transmitted by repeatedly sending a
Transmit Idle Dword parameter to
the XL transmitter (see 7.3). >>.

IBM #466
PDF Page 185
7.14.4 XL2:Request_Open state
The Transmit Idle Dword parameter, the Transmit Open request (?), and
Transmit Open indication (?) are missing from figure 75.
This needs to be fixed.

IBM #467
PDF Page 185
7.14.4.1 State description
The statement << This state shall send a Transmit >> give no indication as
to when this is supposed to happen. I am guessing the
statement should be << Upon entry into this state, this state shall send a
Transmit >>.

IBM #468
PDF Page 185
7.14.4.1 State description
The statement << received by the destination phy as a Transmit Open
indication. >> should be deleted.

IBM #469
PDF Page 185
7.14.4 XL2:Request_Open state
The statement << Transmit Open request/indication >> should be << Transmit
Open request >>..Sequence number: 13

IBM #469
PDF Page 185
7.14.4.2 Transition XL2:Request_Open to XL3:Open_Confirm_Wait
The statement << This transition shall occur after the OPEN address frame
has been forwarded to a destination phy. >> should be
<< This transition shall occur after sending an OPEN address frame

transmitted by sending a Transmit OPEN Address Frame
parameter to the XL transmitter of a destination phy. >>

IBM #470
PDF Page 185
7.14.3.1 State description
The statement << from the expander connection manager. >> should be deleted
as the general rule is that we do not state where
things come from in state diagrams.

IBM #471
PDF Page 186
7.14.5.3 Transition XL3:Open_Confirm_Wait to XL7:Connected
There is no << OPEN_ACCEPT Transmitted >> parameter in figure 75.

IBM #472
PDF Page 186
7.14.5.1 State description
Most of what is in the following statements should be placed in the section
that describe the transitions as the receipt of the various
confirmation (if they really are configurations) and parameter cause the
state transitions It also needs to be reworded to match the
wording used in the other state diagram sections << This state shall send
the following parameters to the XL transmitter:
a) Transmit AIP (NORMAL) when an Arb Status (Normal) confirmation is
received;
b) Transmit AIP (WAITING ON PARTIAL) when an Arb Status (Waiting On
Partial) confirmation is received;
c) Transmit AIP (WAITING ON CONNECTION) when an Arb Status (Waiting On
Connection) confirmation is received;
d) Transmit AIP (WAITING ON DEVICE) when an Arb Status (Waiting On Device)
confirmation is received;
e) Transmit OPEN_ACCEPT when an Open Accept confirmation is received;
f) Transmit OPEN_REJECT when an Open Reject confirmation is received; or
g) Transmit Idle Dword when none of the previous conditions are present.
This state shall send a Transmit Break request to a destination phy when a
BREAK Received parameter is received. >>

IBM #473
PDF Page 186
7.14.5.1 State description
The statement << g) Transmit Idle Dword when none of the previous
conditions are present. >> should be << This state shall
request idle dwords be transmitted by repeatedly sending a Transmit Idle
Dword parameter to
the XL transmitter (see 7.3). >>.

IBM #474
PDF Page 186
7.14.5.1 State description
The statement << Arb Status (Waiting on Partial) is received, >> should be
<< Arb Status (Waiting on Partial) request is received,
>>

IBM #475
PDF Page 186
7.14.5.1 State description.The statement << Otherwise, this state shall
send a Phy Status (Partial Pathway) confirmation to the expander connection
manager. >> Is not precise in that it gives no information as to when the
Phy Status (Partial Pathway) confirmation is to be sent.

IBM #476
PDF Page 186
7.14.5.2 Transition XL3:Open_Confirm_Wait to XL0:Idle
The statement << from a destination phy, >> should be deleted.

IBM #477
PDF Page 186
7.14.5.2 Transition XL3:Open_Confirm_Wait to XL0:Idle
The statement << from a destination phy, >> should be deleted.

IBM #478
PDF Page 186
7.14.5.2 Transition XL3:Open_Confirm_Wait to XL0:Idle
The statement << from a destination phy, >> should be deleted.

IBM #479
PDF Page 186
77.14.5.3 Transition XL3:Open_Confirm_Wait to XL7:Connected
The statement << from a destination phy, >> should be deleted.

IBM #480
PDF Page 186
7.14.5.5 Transition XL3:Open_Confirm_Wait to XL10:Break_Wait
The statement << from a destination phy, >> should be deleted.

IBM #481
PDF Page 186
7.14.5.2 Transition XL3:Open_Confirm_Wait to XL0:Idle
7.14.5.3 Transition XL3:Open_Confirm_Wait to XL7:Connected
According to Figure 75 the term << confirmation >> in these sections should be << request >>.

IBM #482
PDF Page 186
7.14.5.2 Transition XL3:Open_Confirm_Wait to XL0:Idle
There is no parameter in figure 75 that shows anything about << path resources >> being released. This needs to be fixed.

IBM #483
PDF Page 186
7.14.5.4 Transition XL3:Open_Confirm_Wait to XL9:Break
The statement << after a BREAK Received parameter is received and a Transmit Break request has been sent to a destination phy. >> should be << after receiving BREAK Received parameter and requesting a BREAK be transmitted by sending a Transmit BREAK parameter to the XL transmitter of a destination phy. >>

IBM #484
PDF Page 186
7.14.5.5 Transition XL3:Open_Confirm_Wait to XL10:Break_Wait
The statement << occur when a Transmit Break indication is received >> should be << occur after receiving a Transmit Break request. >>..Sequence number: 15

IBM #484
PDF Page 186
7.14.6.1 State description
There is no Arb Reject confirmation in figure 74. There is an Arb Reject parameter passed from the XL1 state. But that is not described in the XL1 state. This needs to be fixed.

IBM #485
PDF Page 186
7.14.6.1 State description
Most of what is in the following statements should be placed in the section that describe the transitions as the receipt of the various confirmation (if they really are configurations) and parameter cause the state transitions It also needs to be reworded to match the wording used in the other state diagram sections << This state shall send the following parameters to the XL transmitter:
a) Transmit OPEN_REJECT (NO DESTINATION) when an Arb Reject (No Destination) confirmation is received from the expander connection manager;
b) Transmit OPEN_REJECT (BAD DESTINATION) when an Arb Reject (Bad Destination) confirmation is received from the expander connection manager;
c) Transmit OPEN_REJECT (CONNECTION RATE NOT SUPPORTED) when an Arb Reject (Bad Connection Rate) confirmation is received from the expander connection manager;

d) Transmit OPEN_REJECT (PATHWAY BLOCKED) when an Arb Reject (Pathway
Blocked) confirmation is received from the
expander connection manager. >>

IBM #486
PDF Page 186
7.14.6.1 State description
The statement << This state shall >> should be << This state shall >>

IBM #487
PDF Page 186
7.14.6.1 State description
The statement << from the expander connection manager;>> should be deleted
as the general rule is that we do not state where
things come from in state diagrams.

IBM #488
PDF Page 186
7.14.6.1 State description
The statement << from the expander connection manager; >> should be deleted
as the general rule is that we do not state where
things come from in state diagrams.

IBM #489
PDF Page 187
7.14.7 XL5:Forward_Open state
The is an << Open Address Frame >> parameter and a << Transmit Idle Dword
>> parameter in figure 75 for this state that are not
described in this section. That needs to be fixed.

IBM #490
PDF Page 187
7.14.7.1 State description
The statement << frame indicated by the Transmit Open indication received
from a source phy >> does not make any sense. I'm
not sure how to fix it but it must be fixed..Sequence number: 3

IBM #490
PDF Page 187
7.14.7.1 State description
There is no << Transmit Open indication >> shown in figure 75. This needs
to be fixed.

IBM #491
PDF Page 187
7.14.7.1 State description
The statement << This state shall send a Transmit OPEN Address Frame
parameter to the XL transmitter with the fields set to the
values specified by the >> has some problems. There is no indication as to
where or what event causes what is stated to occur.
This needs be fixed. Then it needs to be reworded to something like <<
After (trigger event) this state shall request an OPEN
address frame be transmitted by sending a Transmit OPEN Address Frame
parameter to the XL transmitter. The Transmit OPEN
Address Frame arguments shall be set to the values specified by the
Transmit Open indication. >>

IBM #492
PDF Page 187
How does this state know when an << OPEN address frame has been
transmitted. >> when there are no Open Address Frame
Transmitted parameters as inputs? This needs to be fixed.

IBM #493
PDF Page 187
7.14.8.1 State description
The statement << This state shall transmit idle dwords. >> >> should be <<
This state shall request idle dwords be transmitted by
repeatedly sending a Transmit Idle Dword parameter to
the XL transmitter (see 7.3). >>.

IBM #494
PDF Page 187
7.14.8.1 State description
There is no OPEN_ACCEPT or OPEN_REJECT parameters shown in figure 75. This needs to be corrected.

IBM #495
PDF Page 187
7.14.8.1 State description
Most of what is in the following statements should be placed in the section that describe the transitions as the receipt of the various confirmation (if they really are configurations) and parameter cause the state transitions It also needs to be reworded to match the wording used in the other state diagram sections
<< This state shall send the following responses through the expander connection router to a source phy,
received by the source phy as confirmations:
a) Open Accept when OPEN_ACCEPT is received;
b) Open Reject when OPEN_REJECT is received;
c) Backoff Retry when a higher priority OPEN address frame is received (see 7.12.3) and the source SAS address and connection
rate of the received OPEN address frame are not equal to the destination SAS address and connection rate of the transmitted OPEN address frame; or
d) Backoff Reverse Path when a higher priority OPEN address frame is received (see 7.12.3) and the source SAS address and
connection rate of the received OPEN address frame are equal to the destination
SAS address and connection rate of the transmitted OPEN address frame.

IBM #496
PDF Page 187
7.14.8.1 State description
The statement << This state shall send the following arbitration responses through the expander connection router to a source phy,
received by the source phy as confirmations:
a) Arb Status (Waiting On Device) when an AIP Received parameter has not been received;.b) Arb Status (Normal) when an AIP (NORMAL) Received parameter is received;
c) Arb Status (Waiting On Partial) when an AIP (WAITING ON PARTIAL) Received parameter is received;
d) Arb Status (Waiting On Connection) when an AIP (WAITING ON CONNECTION) Received parameter is received; and
e) Arb Status (Waiting On Device) when an AIP (WAITING ON DEVICE) Received parameter is received.
>> should be << This state shall request:
a) an Arb Status (Waiting On Device) be transmitted by sending an Arb Status (Waiting On Device) parameter to the XL transmitter
if an AIP Received parameter is not received; >>This gives no indication as to when the parameter that is not received is checked
or under what conditions it is considered not received <<
b)an Arb Status (Normal) be transmitted by sending an Arb Status (Normal) parameter to the XL transmitter if an AIP (NORMAL)
Received parameter is received;
c)an Arb Status (Waiting On Partial) be transmitted by sending an Arb Status (Waiting On Partial) parameter to the XL transmitter if
an AIP (WAITING ON PARTIAL) Received parameter is received;
d)an Arb Status (Waiting On Connection) be transmitted by sending an Arb Status (Waiting On Connection) if an AIP (WAITING
ON CONNECTION) Received parameter is received; and
e)an Arb Status (Waiting On Device) be transmitted by sending an Arb Status (Waiting On Device) if an AIP (WAITING ON
DEVICE) Received parameter is received. >>.

IBM #497
PDF Page 187
7.14.6.1 State description
The statement << from the expander connection manager; >> should be deleted as the general rule is that we do not state where
things come from in state diagrams.

IBM #498
PDF Page 187
7.14.6.1 State description
The statement << from the expander connection manager; >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #499
PDF Page 188
7.14.8.1 State description
The statement << Otherwise, this state shall send a Phy Status (Partial Pathway) confirmation to the expander connection manager. >> Is not precise in that it gives no information as to when the Phy Status (Partial Pathway) confirmation is to be sent.

IBM #500
PDF Page 188
7.14.8.1 State description
The statement << Arb Status (Waiting on Partial) is received, >> should be << Arb Status (Waiting on Partial) request is received, >>

IBM #501
PDF Page 188
7.14.8.1 State description
The statement << This state shall send a Transmit Break request to a source phy when a BREAK Received parameter is received. >> needs to be moved into the relevant state transition. And reworded to the standard wording.

IBM #502
PDF Page 188
7.14.8.2 Transition XL6:Open_Response_Wait to XL0:Idle
The statement << The XL7:XL0 transition shall occur after one of the following conditions are met: >> should be << This transition shall occur after: >>..Sequence number: 5

IBM #502
PDF Page 188
7.14.8.2 Transition XL6:Open_Response_Wait to XL0:Idle
The statement << OPEN_REJECT is received, Open Reject response has been sent to a source phy, and path resources have been released; >> should be << an OPEN_REJECT is received, and after requesting an Open Reject be transmitted by sending an Open Reject response to the XL transmitter of a source phy and after path resources have been released >>
Also, there is nothing in figure 75 that would indicate what parameter is used to determine that << resources have been released >>.

IBM #503
PDF Page 188
7.14.8.2 Transition XL6:Open_Response_Wait to XL0:Idle
The statement << received OPEN address frame >> should be << received OPEN Address Frame Received parameter >>

IBM #504
PDF Page 188
7.14.8.2 Transition XL6:Open_Response_Wait to XL0:Idle
The statement << a Backoff Retry response has been sent to a source phy, and path resources have been released. >> should be << and after requesting an Backoff Retry be transmitted by sending a Backoff Retry response to the XL transmitter of a source phy and after path resources have been released >>
Also, there is nothing in figure 75 that would indicate what parameter is used to determine that << resources have been released >>.

IBM #505

PDF Page 188
7.14.8.3 Transition XL6:Open_Response_Wait to XL2:Request_Open
The statement << received OPEN address frame >> should be << received OPEN Address Frame Received parameter >>

IBM #506
PDF Page 188
7.14.8.3 Transition XL6:Open_Response_Wait to XL2:Request_Open
The statement << and Backoff Reverse Path response has been sent to a source phy.>> should be << and after requesting a Backoff Reverse Path be transmitted by sending a Backoff Reverse Path response to the XL transmitter of a source phy >>

IBM #507
PDF Page 188
7.14.8.5 Transition XL6:Open_Response_
The statement << occur after a BREAK is received and Transmit Break response is sent to a source phy. >> should be << after receiving BREAK Received parameter and requesting a BREAK be transmitted by sending a Transmit BREAK parameter to the XL transmitter of a source phy. >>

IBM #508
PDF Page 188
7.14.8.6 Transition XL6:Open_Response_Wait to XL10:Break_Wait
The statement << occur when a Transmit Break indication is received >> should be << occur after receiving a Transmit Break request. >>.

IBM #509
PDF Page 188
7.14.8.6 Transition XL6:Open_Response_Wait to XL10:Break_Wait
The statement << from a source phy. >> should be deleted..Sequence number: 13

IBM #509
PDF Page 188
7.14.9.1 State description
The statement << This state shall send a Transmit Break request to a connected phy when a BREAK Received parameter is received.. >> needs to be moved into the relevant state transition. And reworded to the standard wording.

IBM #510
PDF Page 188
7.14.9.1 State description
The statement << This state shall send a Transmit Close request to a connected phy when a CLOSE Received parameter is received >> needs to be moved into the relevant state transition. And reworded to the standard wording.

IBM #511
PDF Page 188
7.14.9.1 State description
The statements << This state shall transmit all dwords received by the Transmit Dword indication from a connected phy via the expander connection router.
This state shall send all valid dwords received by the SAS phy through the expander connection router to a connected phy using the Transmit Dword request with the exception of BREAK and CLOSEes. >> are very confusing. The indications, responses, and parameters need to be more clearly defined as to which cause what action. This needs to be fixed.

IBM #512
PDF Page 188
7.14.9.2 Transition XL7:Connected to XL8:Close_Wait
The statement << from a connected phy via the expander connection router. >> needs to be deleted.

IBM #513
PDF Page 188
7.14.9.1 State description
The statement << Tis transition shall occur when a Transmit Close indication is received >> should be This transition shall occur after receiving a Transmit Close indication and after requesting a Transmit Close be transmitted by sending a Transmit Close parameter to the XL transmitter of a connected phy. >>

IBM #514
PDF Page 188
7.14.9.1 State description
The statement << This state shall send a Phy Status (Connected) confirmation to the expander connection manager. >> gives no indication as to what event triggers the confirmation being sent. This needs to be fixed.

IBM #515
PDF Page 189
7.14.9.3 Transition XL7:Connected to XL9:Break
The statement << occur when a BREAK Received parameter is received. >> should be << after receiving BREAK Received parameter and requesting a BREAK be transmitted by sending a Transmit BREAK parameter to the XL transmitter. >>

IBM #516
PDF Page 189
7.14.9.4 Transition XL7:Connected to XL10:Break_Wait.The statement << occur when a Transmit Break indication is received >> should be << occur after receiving a Transmit Break request. >>.

IBM #517
PDF Page 189
7.14.9.4 Transition XL7:Connected to XL10:Break_Wait
The statement << from a connected phy via the expander connection router. >> should be deleted.

IBM #518
PDF Page 189
7.14.10.4 Transition XL8:Close_Wait to XL10:Break_Wait
The statement << from a connected phy via the expander connection router. >> should be deleted.

IBM #519
PDF Page 189
7.14.10.4 Transition XL8:Close_Wait to XL10:Break_Wait
The statement << occur when a Transmit Break indication is received >> should be << occur after receiving a Transmit Break request. >>

IBM #520
PDF Page 189
7.14.10.3 Transition XL8:Close_Wait to XL9:Break
The statement << occur when a BREAK Received parameter is received. >> should be << after receiving BREAK Received parameter and requesting a BREAK be transmitted by sending a Transmit BREAK parameter to the XL transmitter. >>

IBM #521
PDF Page 189
7.14.10.2 Transition XL8:Close_Wait to XL0:Idle
The statement << after a CLOSE has been both transmitted and received and after path resources have been released for this connection. >> should be << after receiving a Close Received parameter, after requesting a CLOSE be transmitted by sending a Transmit Close to the XL transmitter of a connected phy, and after sending a Transmit Close request to the ???? . The expander device shall transmit the same CLOSE primitive that was received (e.g. CLOSE

(NORMAL) forwarded as CLOSE (NORMAL)). >>.

IBM #522
PDF Page 189
7.14.10.1 State description
The statement << This state shall send a Transmit Break request to a connected phy when a BREAK Received parameter is received. >> needs to be moved into the relevant state transition. And reworded to the standard wording.

IBM #523
PDF Page 189
The statement << This state shall send a Transmit Close request to a connected phy when a CLOSE Received parameter is received. The expander device shall transmit the same CLOSE primitive that was received (e.g. CLOSE (NORMAL) forwarded as CLOSE (NORMAL)). >> needs to be moved into the relevant state transition. And reworded to the standard wording.

IBM #524
PDF Page 189
The statement << This state shall send a Transmit >> gives no indication as to when this is supposed to occur. This needs to be fixed..Sequence number: 11

IBM #524
PDF Page 189
7.14.10.1 State description
The statement << then shall repeatedly send a Transmit Idle Dword parameter to the XL transmitter. >> should be << then this state shall request idle dwords be transmitted by repeatedly sending a Transmit Idle Dword parameter to the XL transmitter (see 7.3). >>.

IBM #525
PDF Page 189
7.14.10.1 State description
The statement << This state shall send a Phy Status (Connected) confirmation to the expander connection manager. >> gives no indication as to what event triggers the confirmation being sent. This needs to be fixed.

IBM #526
PDF Page 189
7.14.10.1 State description
The statements << This state shall send all valid dwords received by the SAS phy through the expander connection router to a connected phy using the Transmit Dword request with the exception of BREAK and CLOSEes. >> are very confusing. The indications, responses, and parameters need to be more clearly defined as to which cause what action. This needs to be fixed.

IBM #527
PDF Page 189
7.14.11.1 State description
How does this happen? << releases any path resources. >>

IBM #528
PDF Page 189
7.14.11.1 State description
The statement << This state shall send a Transmit BREAK parameter to the XL transmitter. >> needs to be moved into the relevant state transition. And reworded to the standard wording.

IBM #529
PDF Page 189
The statement << This transition shall occur after transmitting a BREAK. >> should be << This transition shall occur after requesting a BREAK be transmitted by sending a Transmit BREAK parameter to

the XL transmitter. >>

IBM #530
PDF Page 189
7.14.12.1 State description
How does this happen? << releases any path resources. >>

IBM #531
PDF Page 189
The statement << send a Transmit BREAK parameter to the XL transmitter. >>
should be << request a BREAK be transmitted by
sending a Transmit BREAK parameter to the XL transmitter.

IBM #531
PDF Page 190.Sequence
7.14.12.2 Transition XL10:Break_Wait to XL0:Idle
The statement << whichever occurs first. >> should be deleted.

IBM #532
PDF Page 190.Sequence
7.15 Rate matching
The statement << on any potential
intermediate physical link. >> should be << on any physical link that makes
up any potential pathway >>.

IBM #533
PDF Page 190.Sequence
7.15 Rate matching
The statement << to reduce EMI. >> should be deleted. As that information
is not needed.

IBM #534
PDF Page 190.Sequence
Figure 77
This figure would be clearer if the phy-expander-phy boxes where removed
and the arrows from the text point to the correct blobs.

IBM #535
PDF Page 190.Sequence
7.15 Rate matching
The term << immediately >> should be deleted.

IBM #536
PDF Page 190.Sequence
The statement << after seeing an OPEN_ACCEPT. >> should be << after
transmitting (receiving ??) an OPEN_ACCEPT >>. I'm
not sure which is correct but I don't think expanders are going to have
eyes that will see things.

IBM #537
PDF Page 190.Sequence
7.15 Rate matching
****
There is no description about when the source is supposed to start
transmitting at the link rate sent in the OPEN. This needs to be
specified here.

IBM #538
PDF Page 191
7.16.2 Full duplex
The statement << so the DONE (NORMAL) may be followed
by RRDYs, ACKs, and NAKs. >> should be << allowing RRDYs, ACKs, and NAK to
follow a DONE (NORMAL). >>

IBM #539
PDF Page 191
The statement << The link layer shall
check that the number of data dwords between the SOF and EOF is at least 28
bytes and that the CRC is
valid. >> should be deleted as the requirement is contains in the state

descriptions.

IBM #540
PDF Page 191
7.16.4 SSP flow control
The statement << An SSP target port or an SSP target/initiator port acting in its target role may refuse to provide credit for any reason, including because it needs to transmit a frame itself. This prevents deadlocks where both ports are waiting on the other to provide credit. >> should be << To prevent deadlocks where both an SSP target port and an SSP initiator port are waiting on the other to provide credit an SSP target port or an SSP target/initiator port acting in its target role may refuse to provide credit for any reason, including because it needs to transmit a frame itself. >>

IBM #541
PDF Page 191
7.16.4 SSP flow control
The statement << be interlocked. >> should be << be interlocked and which shall be non-interlocked >>.

IBM #542
PDF Page 193
7.16.6 Preparing to close an SSP connection
The statement << 1 ms; the ACK/NAK count >> should be << 1 ms and as a result the ACK/NAK count >>.

IBM #543
PDF Page 193
7.16.6 Preparing to close an SSP connection
The is a space missing at the end if this sentence << channel.Once a port >>.

IBM #544
PDF Page 193
7.16.6 Preparing to close an SSP connection
I believe the may in the statement << it may close the connection by transmitting the CLOSE >> should be a shall.

IBM #545
PDF Page 194
7.16.7.1 Overview
The statement << from the SL state machine >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #546
PDF Page 194
7.16.7.1 Overview.The statement << from the SL state machine >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #547
PDF Page 194
7.16.7.1 Overview
The statement << from the SSP_D1:DONE_Wait state >> as the general rule is that we do not state where things come from in state diagrams.

IBM #548
PDF Page 194
7.16.7.1 Overview
The statement << from the SSP_D1:DONE_Wait state >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #549
PDF Page 197
7.16.7 SSP link layer (SSP) state machines
There needs to be a section added after figure 84 and before 7.16.7.2 to

describe the SSP transmitter and SSP receiver.
Something like this needs to be here . << The SSP state machine sends the following parameters to the SSP transmitter:
a, b, c list of outputs
The SSP state machine receives the following parameters from the SSP receiver:
a, b, c list of inputs >> in addition there should be wording like that in section 7.13.2.

IBM #550
PDF Page 199
7.16.7.5.1 State description
The statement << from the port layer >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #551
PDF Page 199
7.16.7.4.1 State description
The statement << A DONE (ACK/NAK TIMEOUT) confirmation informs >> should be << A DONE Received (ACK/NAK TIMEOUT)
>>.

IBM #552
PDF Page 200
7.16.7.7.1 State description
The statement << that the frame has been >> should be << that the SOF/frame/EOF have been >>..Page: 202

IBM #553
PDF Page 200
7.16.7.11 SSP_RIM1:Rcv_Interlock_Monitor state
The statement << from the SSP_TAN1:Idle state >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #554
PDF Page 200
7.16.7.11 SSP_RIM1:Rcv_Interlock_Monitor state
The statement << from the SSP_RF1:Rcv_Frame state >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #555
PDF Page 203
7.16.7.14.1 State description
The statement << from the SSP_RF1:Rcv_Frame state. >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #556
PDF Page 204
7.17.1 STP frame transmission
The statement << Table 84 shows a target port transmitting a SATA frame to an expander port. >> should be << Table 84 shows the expander port or STP initiator port translation of a SATA frame or primitive to an STP frame or primitive when the STP frame or primitive is received from a SATA target >>.

IBM #557
PDF Page 204
7.17.1 STP frame transmission
The statement << on the path to the STP initiator port solely for the frame. >> should be << on the pathway to the STP initiator port. >>. I don't understand what << solely for the frame >> means. It doesn't seems to imply that every frame requires an open to be transmitted which should not be correct.

IBM #558
PDF Page 204

7.17.1 STP frame transmission
The statement << Table 85 shows an STP initiator port transmitting a frame, with the expander device attached to the SATA target port opening a connection solely for the frame. >> should be << Table 85 shows the expander port translation of a STP frame or primitive to an SATA frame or primitive when the STP frame or primitive is received from an STP initiator port or expander port. The STP initiator port opens a connection to an expander port on a pathway to the expander. >> I don't understand what << solely for the frame >> means. It doesn't seems to imply that every frame requires an open to be transmitted which should not be correct..Page: 205

IBM #559
PDF Page 204
7.17.2 STP flow control
The statement << number of dwords it must store in an internal buffer if it can do so without exceeding >> should be << number of dwords it is required to store in an internal buffer if it does so without exceeding >>.

IBM #560
PDF Page 204
7.17.2 STP flow control
The statement << during which each expander device must accept incoming data dwords into a buffer. >> should be << during which each expander device shall accept incoming data dwords into a buffer. >>.

IBM #561
PDF Page 204
7.17.1 STP frame transmission
The statement << CLOSE on the expander >> should be << CLOSE at the expander >>.

IBM #562
PDF Page 204
7.17.1 STP frame transmission
The statement << CLOSE on the expander >> should be << CLOSE at the expander >>.

IBM #563
PDF Page 204
7.17.1 STP frame transmission
The statement << While the connection is open, the expander device is not involved. >> should be << While the connection is open, the expander device passes through all dwords without modification. >>

IBM #564
PDF Page 207
7.17.3 Preparing to close an STP connection
The term << command-tag queuing >> is not used anywhere else in this document. Either it needs to be defined or deleted.

IBM #565
PDF Page 207
7.17.3 Preparing to close an STP connection
The statement << An expander device may issue CLOSE at the end of each frame, after a time out waiting for another frame, after every n frames, after a certain time period, after a SATA_CONT is detected, after a SATA_HOLD is detected. >> should be an a,b,c list and needs an << or >> between the last two cases..Page: 208

IBM #566
PDF Page 207
7.18.4.1 Overview
The statement << from the SL state machine >> should be deleted as the general rule is that we do not state where things come

from in state diagrams.

IBM #567
PDF Page 207
7.18.4.1 Overview
The statement << from the SL state machine >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #568
PDF Page 207
7.18.4.1 Overview
The statement << from the SL state machine >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #569
PDF Page 207
7.18.4.1 Overview
The statement << from the SMP_IL3:Rcv_response_Frame state >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #570
PDF Page 207
7.18.4.1 Overview
The statement << from the SMP_IL3:Rcv_response_Frame state >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #571
PDF Page 207
7.18.4.1 Overview
The statement << from the SMP_TL2:Wait_transmit_frame state >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #572
PDF Page 207
7.18.4.1 Overview
The statement << from the SMP_TL1:Wait_originate_frame state >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #573
PDF Page 210
There needs to be a section added after figure 84 and before 7.16.7.2 to describe the SMP transmitter and SMP receiver.
Something like this needs to be here . << The SMP state machine sends the following parameters to the SMP transmitter:
a, b, c list of outputs
The SMP state machine receives the following parameters from the SMP receiver:
a, b, c list of inputs >> in addition there should be wording like that in section 7.13.2

IBM #574
PDF Page 211
7.18.4.2.3.1 State description
The statement <<from the port layer >> should be deleted as the general rule is that we do not state where things come from in state diagrams.

IBM #575
PDF Page 213
8 Port layer
This section should be entirely replaced with document 03-024 plus figures.

IBM #576
PDF Page 215

8.3.1 Overview
global
In some places within this document AWT is used and in other places << arbitration wait timer >> is used. This needs to be made consistent. I vote for fewer acronyms.

IBM #577
PDF Page 216
Figure 91
Some of the text on the arrows needs to be positioned better. For example: the << Phy Enabled >> text entering into PL_OC1 covers most of the arrow, it is not clear which transition the << (requests to each phy) from the PL_OC2 is attached to, and the name of the state machine should be across the top as in all the other state diagrams.
8.3.3.1.1 State description overview
I thought all arguments had the first letter of each word capitalized. None of these do. This should be made consistent.

IBM #579
PDF Page 228
Table 88
There is no description of the << TIMEOUT >> bit, This needs to be fixed.

IBM #580
PDF Page 229
Table 89
****
I thought we outlawed 0 length data frames. I think the IU size for DATA should be 1 to 1 024.

IBM #581
PDF Page 229
9.2.1 SSP frame format
Why not put this information into table 89 << An SSP frame containing a COMMAND information unit (IU) is called a COMMAND frame; an SSP frame containing a TASK IU is called a TASK frame; etc. >> or make it an a,b,c list. But in any case list them all.

IBM #582
PDF Page 229
9.2.1 SSP frame format
I don't see any bit named this in table 88. It needs to be added or this paragraph needs to be deleted << The RETRANSMIT bit may be set to one for RESPONSE frames and shall be set to zero for all other frame types. This field indicates the frame is a retransmission after the target port timed out waiting for the ACK or NAK for its previous attempt to transmit the frame. >>. If it stays then the term << field >> in the second sentence needs to be changed to << bit >>.

IBM #583
PDF Page 229
9.2.1 SSP frame format
The statement << The TAG field allows the initiator port to establish a context for commands and task management functions. >> should be << The TAG field is an value assigned by the application client and sent to the initiator port in the SCSI command information unit and the task management information unit. The tag is used to establish a context between different commands and different task management functions. >>

IBM #584
PDF Page 229
9.2.1 SSP frame format
The statement << that is unique for the I_T nexus. >> should be << that is unique for the I_T nexus defined by the source SAS address and the destination SAS address. >>.
9.2.1 SSP frame format
The statement << SAM-3; the TAG field >> should be <<SAM-3. The TAG field

>>.

IBM #586
PDF Page 229
9.2.1 SSP frame format
Delete the term << quickly >> as the is no time reference as to how quick quick is.

IBM #587
PDF Page 229
9.2.1 SSP frame format
The statement << that need this field >> should be << that use this field >>.

IBM #588
PDF Page 229
9.2.1 SSP frame format
The statement << set a value that is unique for the I_T nexus. >> should be << set it to a value that is unique for each I_T nexus.
>>

IBM #589
PDF Page 229
9.2.1 SSP frame format
The statement << need this field >> should be << use this field >>.

IBM #590
PDF Page 229
9.2.1 SSP frame format
The statement << frame (due to a >> should be << frame (e.g., due to >>.

IBM #591
PDF Page 230
9.2.1 SSP frame format
The statement << not the transport layer. >> is redundant and should be deleted.

IBM #592
PDF Page 230
9.2.2.1 COMMAND information unit
The term << performed >> should be << processed >>.

IBM #593
PDF Page 230
9.2.2.1 COMMAND information unit
The term << SCSI >> should be deleted as it is redundant with SPC-2.
9.2.2.1 COMMAND information unit
The term << specifies >> should be << contains >>.

IBM #595
PDF Page 231
The statement << For example, a six-byte CDB occupies the first six bytes of the CDB field; the remaining ten bytes are reserved and the ADDITIONAL CDB BYTES field is not present. >> should be << (e.g., a six-byte CDB occupies the first six bytes of the CDB field; the remaining ten bytes are reserved and the ADDITIONAL CDB BYTES field is not present). >>

IBM #596
PDF Page 231
9.2.2.2 TASK information unit
The << performed >> should be << processed >>.

IBM #597
PDF Page 232
9.2.2.2 TASK information unit
The term << specifies >> should be << contains >>.

IBM #598
PDF Page 232

9.2.2.2 TASK information unit
The term << SCSI >> should be deleted as it is redundant with SPC-2.

IBM #599
PDF Page 232
Table 93
global
In the description column there are several cases where small caps is used
when they should not be. Small caps should only be
used when referencing the name of a field not the contains of the field.
For example <<
The task manager shall perform the ABORT TASK SET task management function
with L set to LOGICAL UNIT NUMBER >>
should be << The task manager shall perform the ABORT TASK SET task
management function with L set to logical unit number
>> .

IBM #600
PDF Page 232
9.2.2.2 TASK information unit
The statement << The TARGET RESET task management function defined in SAM-3
is not supported. >> should be a footnote in
table 91.

IBM #600
PDF Page 233.Sequence
9.2.2.3 XFER_RDY information unit
The term << indicates >> should be << contains >>.

IBM #601
PDF Page 233.Sequence
9.2.2.3 XFER_RDY information unit
The statement << initial application client buffer offset of the write data
>> implies that all XFER_RDYs for a given I_T_L_Q nexus
will have the same value. That does not seem right. Is it?

IBM #602
PDF Page 233.Sequence
9.2.2.3 XFER_RDY information unit
The statement << (using DATA frames). >> seems redundant and could be
interpreted to means that there is another way to to
move data besides DATA frames.

IBM #603
PDF Page 233.Sequence
9.2.2.3 XFER_RDY information unit
The term << indicates >> should be << contains >>.

IBM #604
PDF Page 233.Sequence
9.2.2.3 XFER_RDY information unit
The statement << (using DATA frames). >> seems redundant and could be
interpreted to means that there is another way to to
move data besides DATA frames.

IBM #605
PDF Page 233.Sequence
9.2.2.3 XFER_RDY information unit
The paragraph << The initial XFER_RDY frame for a given command shall set
the relative offset to the value of the FIRST BURST
SIZE field in the Disconnect-Reconnect mode page (see 10.1.1.1.5). If any
additional XFER_RDY frames are required, the
RELATIVE OFFSET field shall be set to the value of the previous XFER_RDY
frames relative offset plus the previous XFER_RDY
frames write data length. >> need to move up under the relative offset
field paragraph.

IBM #606
PDF Page 233.Sequence
Table 94

****
The field name << RELATIVE OFFSET >> is a problem because when this table is combined with the header information (in table 88) you then have two fields with exactly the same name. So things get confusing real fast. I recommend changing the name of the field in XFER_RDY to something like << XFER_RDY RELATIVE OFFEST >>.

IBM #607
PDF Page 234
9.2.2.4 DATA information unit
The statement << constrained by >> should be << limited to >>..Sequence number: 2

IBM #607
PDF Page 234
9.2.2.4 DATA information unit
The statement << The DATA frame shall only contain write data for a single XFER_RDY frame. >> should be << The DATA frame shall contain no more write data than was indicated in the WRITE DATA LENGTH field of a single XFER_RDY frame. >>.

IBM #608
PDF Page 235
9.2.2.5.1 RESPONSE information unit overview
This should be deleted << which defines the format and content of the response IU. >> as this information is in the table.

IBM #609
PDF Page 235
9.2.2.5.1 RESPONSE information unit overview
The statement << and if an error occurs >> should be << and in response to any errors that occur >>.

IBM #610
PDF Page 236
9.2.2.5.3 RESPONSE information unit RESPONSE_DATA format
The term << certain >> should be deleted as it add a level in uncertainty to the standard.

IBM #611
PDF Page 237
9.2.2.5.4 RESPONSE information unit SENSE_DATA format
This seems like a strange value to pick << than 1 000 and shall >> why not 1024? Unless there is some reason it should be changed to 1 024.

IBM #612
PDF Page 237
9.2.3 Frame sequences
The statement << sequence. The transport protocol services (see 10.1.1) invoked by the application layer are also shown. >> should be << sequence and the transport protocol services (see 10.1.1) invoked by the application layer. >>.

IBM #613
PDF Page 237
Figures 94 - 97
Put the term << IU >> after all the IU names (e.g., TASK IU, RESPONSE IU)..Sequence number: 4

IBM #613
PDF Page 237
9.2.3 Frame sequences
****
Somewhere in this section there should be a paragraph that states the following :
- that commands can be sent any time.
- When commands are queued data may be transferred for any command at any time.
- Responses may be returned in any order.

IBM #614
PDF Page 238
9.2.3 Frame sequences
The statement << sequence. The transport protocol services (see 10.1.1)
invoked by the application layer are also shown. >>
should be << sequence and the transport protocol services (see 10.1.1)
invoked by the application layer. >>.

IBM #615
PDF Page 238
9.2.3 Frame sequences
The statement << sequence. The transport protocol services (see 10.1.1)
invoked by the application layer are also shown. >>
should be << sequence and the transport protocol services (see 10.1.1)
invoked by the application layer. >>.

IBM #616
PDF Page 239
9.2.3 Frame sequences
The statement << sequence. The transport protocol services (see 10.1.1)
invoked by the application layer are also shown. >>
should be << sequence and the transport protocol services (see 10.1.1)
invoked by the application layer. >>.

IBM #617
PDF Page 239
9.2.4.3 XFER_RDY frame
The statement << and does not receive an ACK or NAK, it shall close >>
should be << and times out waiting for ACK or NAK it
shall close >>.

IBM #618
PDF Page 240
9.2.4.4 DATA frame
The statement << and does not receive an ACK or NAK, it shall close >>
should be << and times out waiting for ACK or NAK it
shall close >>.

IBM #619
PDF Page 240
9.2.4.4 DATA frame
The statement << and does not receive an ACK or NAK, it shall abort >>
should be << and times out waiting for ACK or NAK it
shall abort >>

IBM #620
PDF Page 240
9.2.4.5 RESPONSE frame
There is no bit named << RETRANSMIT bit >> in the SSP frame. This needs to
be fixed.

IBM #621
PDF Page 240
9.2.4.5 RESPONSE frame
The statement << RETRANSMIT bit of one, and it >> should be << RETRANSMIT
bit set to one, and it >>

IBM #622
PDF Page 241
9.2.5.2 Initiator port error handling
The statement << is not twelve bytes long, >> should be << is not 12 bytes
long, >>.

IBM #623
PDF Page 241
9.2.5.2 Initiator port error handling
The last three paragraphs all need a statement about what the initiator
does if it does receive a RESPONSE. I believe << discard it
>> is the right answer but it needs to be stated.

IBM #624
PDF Page 242
9.2.6.1 Overview
The statement << SSP transport layer contains state >> should be << SSP transport layer (ST) contains state >>.

IBM #625
PDF Page 242
The statement << perform the following functions: >> should be << run in parallel to: >>.

IBM #626
PDF Page 242
9.2.6.2.1 Overview
The statement << (initiator send frame) >> should be deleted.
9.2.6.2.1 Overview
The statement << (initiator process response) >> should be deleted.

IBM #628
PDF Page 242
9.2.6.2.1 Overview
The statement << (initiator process response) >> should be deleted.

IBM #629
PDF Page 242
9.2.6.2.1 Overview
The statement << (initiator send frame) >> should be deleted.

IBM #630
PDF Page 242
9.2.6.2.1 Overview
The statement << (initiator send frame) >> should be deleted.

IBM #631
PDF Page 242
9.2.6.2.1 Overview
The statement << (initiator receive data) >> should be deleted.

IBM #632
PDF Page 242
9.2.6.2.1 Overview
The statement << (initiator frame router) >> should be deleted.

IBM #633
PDF Page 242
9.2.6.2.1 Overview
The statement << (initiator frame router) >> should be deleted.

IBM #634
PDF Page 242
9.2.6.2.1 Overview
The statement << (initiator frame router) >> should be deleted.

IBM #635
PDF Page 242
9.2.6.2.1 Overview
The statement << (initiator frame router) >> should be deleted.

IBM #636
PDF Page 242
9.2.6.2.1 Overview
The statement << from the SCSI initiator devices application layer, >> should be deleted as we do not indicate where things come from only where they go to.

IBM #637
PDF Page 242
9.2.6.2.1 Overview
The statement << from the ST_IFR (initiator frame router) state machine >>

should be deleted as we do not indicate where things
come from only where they go to.

IBM #638
PDF Page 242
9.2.6.2.1 Overview
The statement << from the ST_IFR (initiator frame router) state machine >>
should be deleted as we do not indicate where things
come from only where they go to.

IBM #639
PDF Page 242
9.2.6.2.1 Overview
The statement << from the ST_IFR (initiator frame
router) state machine >> should be deleted as we do not indicate where
things come from only where they go to.

IBM #640
PDF Page 242
9.2.6.2.1 Overview
The statement << from the ST_ISF (initiator send frame) state machine. >>
should be deleted as we do not indicate where things
come from only where they go to.

IBM #641
PDF Page 242
9.2.6.2.1 Overview
The statement << from the port layer state machine >> should be deleted as
we do not indicate where things come from only
where they go to.

IBM #642
PDF Page 242
9.2.6 SSP transport layer state machines
global in 9.2.6
The term << port layer state machines >> should in most if not all cases be
<< port layer >>.

IBM #643
PDF Page 243
9.2.6.2.1 Overview
The statement << (initiator process response) >> should be deleted.

IBM #644
PDF Page 243
9.2.6.2.1 Overview
The statement << (initiator receive data) >> should be deleted.
9.2.6.2.1 Overview
The statement <<
from the port layer state machine. >> should be deleted as we do not
indicate where things come from only where they go to.

IBM #646
PDF Page 243
9.2.6.2.1 Overview
The statement << from the SCSI initiator device's application layer >>
should be deleted as we do not indicate where things come
from only where they go to.

IBM #647
PDF Page 244
9.2.6.2.1 Overview
The term << describes >> should be << shows >>.

IBM #648
PDF Page 244
Figure 98
The term << Request >> should be deleted from the << Send Task Management
Request >>

IBM #649
PDF Page 245
9.2.6.2.2.1 State description
The statement << from the SCSI initiator device's application layer >>
should be deleted.

IBM #650
PDF Page 245
9.2.6.2.2.1 State description
The statement << from the ST_IFR (initiator frame router) state machine. >>
should be deleted.

IBM #651
PDF Page 245
9.2.6.2.2.1 State description
The statement << from the
ST_ISF2:Prepare_Command_Request state, >> should be deleted.

IBM #652
PDF Page 245
9.2.6.2.2.1 State description
The statement << from the
ST_ISF3:Prepare_Send_Data_Out state. >> should be deleted.

IBM #653
PDF Page 245
9.2.6.2.2.1 State description
The paragraph <<The ST_ISF state machine shall be initiated when a Send
SCSI Command or a Send Task Management
Request transport protocol service request is received from the SCSI
initiator device's application layer or when an XFER_RDY
Arrived parameter is received from the ST_IFR (initiator frame router)
state machine. >> does not belong here. It should be part of
the overview for the state machine. This is only supposed to be information
about the state not the state machine. And should be
changed to << The ST_ISF state machine shall be activated when a Send SCSI
Command or a Send Task Management Request
transport protocol service request is received or when an XFER_RDY Arrived
parameter is received. >>

IBM #654
PDF Page 245
9.2.6.2.2.1 State description
The paragraph <<This state shall be entered when either a COMMAND or TASK
frame is received from
theST_ISF2:Prepare_Command_Request state, or when a DATA frame is received
from the ST_ISF3:Prepare_Send_Data_Out
state. >> should be << This state is the initial state and is the state
that is used after the ST_ISF state machine has been
activated. >>

IBM #655
PDF Page 245
9.2.6.2.2.1 State description
The statement << A Send SCSI Command or a Send Task Management Request
transport protocol service request includes the
following to be used >> should be << A Send SCSI Command transport protocol
service request or a Send Task Management
protocol service request includes the following to be used >>

IBM #656
PDF Page 245
9.2.6.2.2.1 State description
The statement << The request may >> should be << The transport protocol
service request may >>.

IBM #657
PDF Page 245
9.2.6.2.2.1 State description
It looks like the term << request: >> should be << transport protocol

service request >> in all cases in this section. This needs to be
fixed.

IBM #658
PDF Page 245
9.2.6.2.2.1 State description
The statement << If the ST_ISF state machine was initiated as the result of
receiving a transport protocol service request, then
this state shall transition to the ST_ISF2:Prepare_Command_Request state.>>
belongs in the transition description not here.

IBM #659
PDF Page 245
9.2.6.2.2.1 State description
The term << initiated >> should be << activated >> in this section.

IBM #660
PDF Page 245
9.2.6.2.2.1 State description
****
I don't like the mays in item a) and item b). Why is this a may instead of
a shall?.Page: 246

IBM #661
PDF Page 245
9.2.6.2.2.1 State description
The statement << from the port layer state machine. >> should be deleted.

IBM #662
PDF Page 245
9.2.6.2.2.1 State description
The statement << e) If the length of the XFER_RDY frame is 12 bytes, the
write data length is correct, and an ACK Transmitted
confirmation has been received, then this state shall transition to
theST_ISF3:Prepare_Send_Data_Out state. >> belongs in the
transition description. It should be moved there.

IBM #663
PDF Page 245
9.2.6.2.2.1 State description
The statement << If this state is entered from the
ST_ISF2:Prepare_Command_Request state, then this state shall send a
Transmit Frame (Interlocked) request to the port layer state machine. >>
should be << Upon entry into this state from the
ST_ISF2:Prepare_Command_Request state, this state shall send a Transmit
Frame (Interlocked) request to the port layer state
machine. >>

IBM #664
PDF Page 245
9.2.6.2.2.1 State description
The statement << If this state is entered from the
ST_ISF3:Prepare_Send_Data_Out state, then this state shall send a Transmit
Frame (Non-interlocked) request to the port layer state machine. >> should
be << Upon entry into this state from the
ST_ISF3:Prepare_Send_Data_Out state, this state shall send a Transmit Frame
(Non-Interlocked) request to the port layer state
machine. >>

IBM #665
PDF Page 245
9.2.6.2.2.1 State description
The statement << from this state >> should be deleted.

IBM #666
PDF Page 245
9.2.6.2.2.1 State description
The statement << (initiator process response) >> should be deleted.

IBM #667

PDF Page 245
9.2.6.2.2.1 State description
The statement << After sending a Transmit Frame request this state shall wait for a Transmission Status confirmation. If the confirmation is not Transmission Status (Frame Transmitted), >> should be << After sending a Transmit Frame request to the port layer this state shall wait for a Transmission Status confirmation. If the confirmation is not Transmission Status (Frame Transmitted) confirmation, >>

IBM #668
PDF Page 245
The statement << After sending a Delivery Failure parameter to the ST_IPR state machine, the ST_ISF state machine shall terminate. >> does not belong here. It should be part of the overview for the state machine. This is only supposed to be information about the state not the state machine. It should also be reword to remove the << terminate >> term. Maybe stopped or removed or deactivated.

IBM #669
PDF Page 245
9.2.6.2.2.1 State description
***
The may in the statement << If the transmitted frame was a DATA frame, then this state may transition to the >> seems like there should be more description. The transition either occurs or it does not occur.
Also this whole paragraph should be down in the transition section. This needs to be fixed.

IBM #670
PDF Page 245
9.2.6.2.2.1 State description
The statement << After sending a Delivery Failure parameter to the ST_IPR state machine, the ST_ISF state machine shall terminate. >> is a duplicate of what is stated just above and does not belong here. It should be in the state machine overview.

IBM #671
PDF Page 245
9.2.6.2.2.1 State description
***
The may in the statement <<This state may also send a Cancel request to the port layer state >> seems like there should be more description. The transition either occurs or it does not occur.

IBM #672
PDF Page 245
9.2.6.2.2.1 State description
The statement << The ST_ISF state machine shall terminate upon receipt of a Cancel Acknowledge confirmation. >> does not belong here. It should be in the state machine overview.

IBM #673
PDF Page 245
9.2.6.2.2.2 Transition ST_ISF1:Send_Frame to ST_ISF2:Prepare_Command_Request
The statement << occur after a Send SCSI Command or Send Task Management Request transport protocol service request has been received. >> should be << occur after receiving a Send SCSI Command or Send Task Management Request transport protocol service request. >>.

IBM #674
PDF Page 247
9.2.6.2.2.3 Transition ST_ISF1:Send_Frame to ST_ISF3:Prepare_Send_Data_Out
The statement << a) an ACK Received confirmation has been received for a COMMAND frame for a data-out operation and the first burst size is not zero;

b) an XFER_RDY Arrived parameter has been received, all required values are present and correct, and an ACK Transmitted confirmation has been received; or
c) a Transmission Status (Frame Transmitted) confirmation for a Transmit Frame (Non-interlocked) request has been received and the number of data bytes that has been transmitted for the request is less than the first burst size or the write data length. >>
should be
<< a) receiving an ACK Received confirmation for a COMMAND frame for a data-out operation if the first burst size is not zero;
b) receiving an XFER_RDY Arrived parameter with all required values present and correct, and after receiving an ACK.Transmitted confirmation; or
c) receiving a Transmission Status (Frame Transmitted) confirmation for a Transmit Frame (Non-interlocked) request if the number of data bytes that has been transmitted for the Transmit Frame (Non-interlocked) request is less than the first burst size or the write data length. >>

IBM #675
PDF Page 247
9.2.6.2.3.1 State description
The statement << received from the SCSI initiator device's application layer >> should be deleted.

IBM #676
PDF Page 247
9.2.6.2.3.1 State description
The statement << received from the SCSI initiator device's application layer >> should be deleted.

IBM #677
PDF Page 247
9.2.6.2.3.2 Transition ST_ISF2:Prepare_Command_Request to ST_ISF1:Send_Frame
The statement << after the ST_ISF2:Prepare_Command_Request state >> should be <<after this state >>.

IBM #678
PDF Page 247
9.2.6.2.4.1 State description
The statement << (these were received either from the SCSI initiator device's application layer or included in an XFER_RDY Arrived parameter): >> should be deleted.

IBM #679
PDF Page 248
9.2.6.2.4.1 State description
In what case would the following statement not be true? << If all of the data for the request is not included in the frame, the number of data bytes in the frame shall be a multiple of four, and the number of fill bytes shall be zero. >> If it is always true or is described somewhere else then it should be deleted.

IBM #680
PDF Page 248
9.2.6.2.4.2 Transition ST_ISF3:Prepare_Send_Data_Out to ST_ISF1:Send_Frame
The statement << after the ST_ISF3:Prepare_Send_Data_Out state has >> should be << after this state has >>.

IBM #681
PDF Page 248
9.2.6.2.5.1 State description
The statement << The ST_IRD state machine shall be initiated when a Data-In Arrived parameter is received. >> should be in the state machine overview not here.

IBM #682
PDF Page 248
9.2.6.2.5.1 State description.The statement << This state machine shall

terminate after sending the parameter. >> should be in the state machine overview not
here.

IBM #683
PDF Page 248
9.2.6.2.5.2 Transition ST_IRD1:Receive_Data_In to ST_IRD2:Process_Received_Data_In
The statement << by the ST_IRD1:Receive_Data_In has been >> should be << by this state has been >>.

IBM #684
PDF Page 248
9.2.6.2.6 ST_IRD2:Process_Received_Data_In state
The statement << The ST_IRD state machine shall terminate after the data-in data is processed. >> should be in the state
machine overview not here.

IBM #685
PDF Page 248
9.2.6.2.7 ST_IPR1:Process_Received_Response state
The statement << The ST_IPR state machine shall be initiated when a Response Arrived parameter is received or a Delivery
Failure parameter is received. >> should be in the state machine overview not here.

IBM #686
PDF Page 249
9.2.6.2.7 ST_IPR1:Process_Received_Response state
The statement << The ST_IPR state machine shall terminate after sending a confirmation.>> should be in the state machine
overview not here.

IBM #687
PDF Page 249
9.2.6.2.7 ST_IPR1:Process_Received_Response state
The statement << of the RETRANSMIT bit. >> is a problem because there is no RETRANSMIT bit . This needs to be fixed.

IBM #688
PDF Page 249
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
The statement << The ST_IFR state machine shall be initiated when:
a) an Accept_Reject OPENs request is received;
b) a Frame Received confirmation is received;
c) a DONE Received confirmation is received; or
d) a hard reset occurs. >> should be in the state machine overview not here.

IBM #689
PDF Page 249
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
The statement << If the ST_IFR state machine was initiated as the result of receiving >> should be << If this state initially received
>>.

IBM #690
PDF Page 249
The statement << The ST_IFR state machine shall terminate
after sending an Accept_Reject OPENs request to the port layer state
machine. >> should be in the state machine overview not
here.

IBM #691
PDF Page 250
9.2.6.3.1 Overview
The statement << from the port layer state machine >> should be deleted.

IBM #692
PDF Page 250

9.2.6.3.1 Overview
The statement <<from the SCSI target device's application layer >> should
be deleted.

IBM #693
PDF Page 250
9.2.6.3.1 Overview
The statement <<from the SCSI target device's application
layer; >> should be deleted.

IBM #694
PDF Page 250
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
The statement << If the ST_IFR state machine was initiated as the result of
receiving >> should be << If this state initially received
>>.

IBM #695
PDF Page 250
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
The statement << If the ST_IFR state machine was initiated as the result of
receiving >> should be << If this state initially received
>>.

IBM #696
PDF Page 250
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
The statement << If the ST_IFR state machine was initiated as the result of
a >> should be << If this state initially received a >>.

IBM #697
PDF Page 250
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
All these << terminate >>s are a problem because the state machine comings
and goings should be specified in the state
machines overview.

IBM #698
PDF Page 250
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
The statement << specify an existing state machine, >> should be << specify
an active state machine >>..Sequence number: 9

IBM #698
PDF Page 250
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
The statement << The ST_IFR state machine shall terminate after sending a
parameter to another state machine. >> should be in
the state machine overview not here.

IBM #699
PDF Page 250
9.2.6.3.1 Overview
The statement << (target frame router) >> should be deleted.

IBM #700
PDF Page 250
9.2.6.3.1 Overview
The statement << (target transport server) >> should be deleted.

IBM #701
PDF Page 250
9.2.6.3.1 Overview
The statement << (target transport server) >> should be deleted.

IBM #702
PDF Page 250
9.2.6.3.1 Overview
The term << several >> should be deleted. in item d)

IBM #703
PDF Page 251
9.2.6.3.1 Overview
The term << describes >> should be << shows >>.

IBM #704
PDF Page 251
Figure 99
Either all the crossing lines need hops or none should have them. For this figure it looks like none would be OK.

IBM #705
PDF Page 251
Figure 99
The term << Request >> in the << task Management Request Received >> should be deleted.

IBM #705
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << from the SCSI target device's application layer, >> should be deleted.

IBM #706
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << from the port layer state machine, >> should be deleted.

IBM #707
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << The ST_TFR state machine shall be initiated when:
a) an Accept_Reject OPENs request is received;
b) a Frame Received confirmation is received; or
c) a hard reset occurs. >> should be in the state machine overview not here.

IBM #708
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << Each indication or parameter shall contain the content of the SAS frame.
The ST_TFR state machine shall terminate after sending a Data-Out Arrived parameter or transport protocol
service indication. >> should be in the state machine overview not here.

IBM #709
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << If the ST_TFR state machine was initiated as the result of receiving >> should be << If this state initially received
>>.

IBM #710
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << If the ST_TFR state machine was initiated as the result of receiving >> should be << If this state initially received
>>.

IBM #711
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << If the ST_TFR state machine was initiated as the result of receiving >> should be << If this state initially received
>>.

IBM #712
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state

All these << terminate >>s are a problem because the state machine comings and goings should be specified in the state machines overview.

IBM #713
PDF Page 252.Sequence
The statement << with the received attribute to the port layer state machine. >> should be << with the attribute received with the Accept_Reject OPEN to the port layer state machine. >>

IBM #714
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << the length of the information unit is [28 + (4 x additional CDB length)] bytes. >> should be << the length of the information unit (see 9.2.5.1) >>. All the length rules are specified elsewhere and should not be here.

IBM #715
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << the length of the information unit is 28 bytes. >> should be << the length of the information unit (see 9.2.5.1) >>.
All the length rules are specified elsewhere and should not be here.

IBM #716
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << information unit is not 28 bytes, >> should be << information unit is not correct, >>

IBM #717
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << If it conflicts, this state may send a Response >> should be << If the tag is checked and it conflicts this state shall send a >>. There should no requirement for checking but if checked and there is a error then the response should be a shall.

IBM #718
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << hard reset, then the ST_TFR state >> should be << HARD_RESET Received confirmation , then the ST_TFR state >>

IBM #719
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
global
It looks like the term << request: >> when used in relation to requests from the application layer should be << transport protocol service request >> in all cases in this section. This needs to be fixed.

IBM #720
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << then the ST_TFR state machine shall discard >> should be << then this state machine shall discard >>.

IBM #721
PDF Page 252.Sequence
9.2.6.3.2 ST_TFR1:Target_Frame_Router state
The statement << then the ST_TFR state machine shall discard >> should be << then this state machine shall discard >>..Page: 253

IBM #722
PDF Page 252.Sequence
9.2.6.3.3.2 Transition ST_TTS1:Target_Request_Response_Router to ST_TTS2:Send_Frame

The statement << from the SCSI target device's application layer. >> should be deleted.

IBM #723
PDF Page 252.Sequence
9.2.6.3.3.3 Transition ST_TTS1:Target_Request_Response_Router to ST_TTS4:Receive_Data_Out
The statement << from the SCSI target device's application layer. >> should be deleted.

IBM #724
PDF Page 252.Sequence
9.2.6.3.3.4 Transition ST_TTS1:Target_Request_Response_Router to ST_TTS7:Prepare_Response
The statement << from the SCSI target device's application layer. >> should be deleted.

IBM #725
PDF Page 252.Sequence
9.2.6.3.4.1 State description
The statement << This state is entered when a DATA frame is received from the ST_TTS3:Prepare_Send_Data_In state, when an XFER_RDY frame is received from the ST_TTS4:Receive_Data_Out state, when a RESPONSE frame is received from the ST_TTS7:Prepare_Response state, or after the ST_TTS7:Prepare_Response state has determined that the vendor-specific number of retries for a RESPONSE frame has been exceeded. >> should be deleted as we do not describe entry conditions.

IBM #726
PDF Page 252.Sequence
9.2.6.3.3.1 State description
The statement << from the SCSI target device's application layer: >> should be deleted.

IBM #727
PDF Page 252.Sequence
9.2.6.3.3.1 State description
The statement << The ST_TTS state machine shall be initiated when one of the following is received from the SCSI target device's application layer:
a) a Send Data-In transport protocol service request;
b) a Receive Data-Out transport protocol service request;
c) a Task Management Function Executed transport protocol service response; or
d) a Send Command Complete transport protocol service response. >> should be in the state machine overview not here.

IBM #728
PDF Page 252.Sequence
9.2.6.3.3.1 State description
The list << a) connection rate;
b) initiator connection tag;
c) destination SAS address; and
d) source SAS address. >>should be moved into the lists for each of the protocol services. I know this will create the same entries in each but it would be clearer.

IBM #729
PDF Page 252.Sequence
Delete << also >> and add in the complete list.

IBM #730
PDF Page 252.Sequence
9.2.6.3.3.1 State description
Delete << also >> and add in the complete list.

IBM #731
PDF Page 252.Sequence
9.2.6.3.3.1 State description

Delete << also >> and add in the complete list.

IBM #732
PDF Page 252.Sequence
9.2.6.3.3.2 Transition ST_TTS1:Target_Request_Response_Router to
ST_TTS2:Send_Frame
The statement << after the ST_TTS1:Target_Request_Response_Router state has
received a Send Data-In transport protocol
service request >> should be << after receiving a Send Data-In transport
protocol service request. >>

IBM #733
PDF Page 252.Sequence
9.2.6.3.3.3 Transition ST_TTS1:Target_Request_Response_Router to
ST_TTS4:Receive_Data_Out
The statement << after the ST_TTS1:Target_Request_Response_Router state has
received a
Receive Data-Out transport protocol service request >> should be << after
receiving a Receive Data-Out transport protocol service
request. >>

IBM #734
PDF Page 252.Sequence
9.2.6.3.3.4 Transition ST_TTS1:Target_Request_Response_Router to
ST_TTS7:Prepare_Response
The statement << after the ST_TTS1:Target_Request_Response_Router state has
received a Task
Management >> should be << after receiving a Task
Management >>.

IBM #735
PDF Page 254
9.2.6.3.4.1 State description
The statement << from the
port layer state machine. >> should be deleted.

IBM #736
PDF Page 254
9.2.6.3.4.1 State description
The statement << from the port layer state machine. >> should be deleted.

IBM #737
PDF Page 254
9.2.6.3.4.1 State description
If the TTS state machine was initiated as the result of this state
receiving a Send Data-In transport protocol.service request, the specified
values are included with the request, and this state has received an ACK
Transmitted confirmation, then this state shall transition to the
ST_TTS3:Prepare_Send_Data_In state. >> should be in the state
machine overview not here.

IBM #738
PDF Page 254
9.2.6.3.4.1 State description
The statement << state shall receive >> should be << state shall wait for
receipt >>.

IBM #739
PDF Page 254
9.2.6.3.4.1 State description
The statement << If the frame transmitted was a DATA frame, then this state
may transition to the
ST_TTS3:Prepare_Send_Data_In state after receiving a Transmission Status
(Frame Transmitted)
confirmation. >> should be moved to the relevant state transition
description.

IBM #740
PDF Page 254
9.2.6.3.4.1 State description

The statement << If the confirmation is ACK Received and the transmitted
frame was an XFER_RDY frame, then this state shall
transition to the ST_TTS4:Receive_Data_Out state. >> should be moved to the
relevant state transition description.

IBM #741
PDF Page 254
9.2.6.3.4.1 State description
The statement << If the frame transmitted was an XFER_RDY frame or a
RESPONSE frame, then this state shall wait to receive
an ACK Received, NAK Received, or Connection Failed confirmation before
transitioning from this state. >> should be moved to
the relevant state transition description.

IBM #742
PDF Page 254
9.2.6.3.4.1 State description
The statement << one of the following: >> should be << one of the following
occurs >>.

IBM #743
PDF Page 255
9.2.6.3.4.1 State description
The statement << from the port layer state machine. >> should be deleted.

IBM #744
PDF Page 255
9.2.6.3.4.4 Transition ST_TTS2:Send_Frame to ST_TTS7:Prepare_Response The
statement << from
the port layer state machine: >> should be deleted.

IBM #745
PDF Page 255
9.2.6.3.4.1 State description
The statement << The ST_TTS state machine shall terminate after sending the
Data-In Delivered confirmation. >> should be in.the state machine overview
not here.

IBM #746
PDF Page 255
9.2.6.3.4.1 State description
The statement << The ST_TTS state machine terminates upon receipt of a
Cancel Acknowledge confirmation >> should be in the
state machine overview not here.

IBM #747
PDF Page 255
9.2.6.3.4.2 Transition ST_TTS2:Send_Frame to ST_TTS3:Prepare_Send_Data_In
The statement << this state receives >> should be << receiving >>

IBM #748
PDF Page 255
9.2.6.3.4.2 Transition ST_TTS2:Send_Frame to ST_TTS3:Prepare_Send_Data_In
The statement << this state receives >> should be << receiving >>

IBM #749
PDF Page 255
9.2.6.3.4.3 Transition ST_TTS2:Send_Frame to ST_TTS4:Receive_Data_Out
The statement << this state has received >> should be << receiving >>

IBM #750
PDF Page 255
9.2.6.3.5.1 State description
The statement << the tag received from the ST_TTS2:Send_Frame state to
construct the frame. >> should be << the received tag
to construct the frame. >>.

IBM #751
PDF Page 255
9.2.6.3.5.2 Transition ST_TTS3:Prepare_Send_Data_In to ST_TTS2:Send_Frame

The statement << after the ST_TTS3:Prepare_Send_Data_In state has >> should be << after this state has >>.

IBM #752
PDF Page 256
9.2.6.3.6.1 State description
The statement << This state is entered after one of the following occurs:
a) a Receive Data-Out service request is received from the ST_TS1:Request_Response_Router state;
b) a DATA frame is received from the ST_TFR (target frame router) state machine;
c) an ACK Received confirmation for an XFER_RDY frame was received from the ST_TTS2:Send_Frame state;
d) an XFER_RDY frame has been constructed by the ST_TTS5:Prepare_XFER_RDY state; or
e) data-out data has been processed by the ST_TTS6:Process_Received_Data_Out state. >> should be deleted as we do not describe entry conditions.

IBM #753
PDF Page 256
The statement << from the port layer state machine >> should be deleted.

IBM #754
PDF Page 256
9.2.6.3.6.1 State description
The statement << from the ST_TFR state machine. >> should be deleted.

IBM #755
PDF Page 256
9.2.6.3.6.1 State description
The statement << from the ST_TFR1:Target_Frame_Router state. >> should be deleted.

IBM #756
PDF Page 256
9.2.6.3.6.1 State description
The statement << If this state was entered as the result of receiving a Receive Data-Out service request from the ST_TS1:Request_Response_Router state then this state shall transition to the ST_TTS5:Prepare_XFER_RDY state. >> should be moved to the relevant state transition description.

IBM #757
PDF Page 256
9.2.6.3.6.1 State description
The statement << The ST_TTS state machine shall terminate after sending the confirmation. >> should be in the state machine overview not here.

IBM #758
PDF Page 256
9.2.6.3.6.1 State description
The statement << The ST_TTS state machine shall terminate after sending the confirmation. >> should be in the state machine overview not here.

IBM #759
PDF Page 256
9.2.6.3.6.1 State description
The statement << The ST_TTS state machine shall terminate after sending the confirmation. >> should be in the state machine overview not here.

IBM #760
PDF Page 256
9.2.6.3.6.1 State description
The statement << The ST_TTS state machine shall terminate after sending the confirmation. >>

should be in the state machine overview not here.

IBM #761
PDF Page 256
9.2.6.3.6.1 State description
The statement << If the target transport tag value matches the value sent with the corresponding XFER_RDY frame, and the length of the data does not exceed that specified by the XFER_RDY frame that requested the data, then this state shall transition to the ST_TTS6:Process_Received_Data_Out state. >> should be moved to the relevant state transition description.

IBM #762
PDF Page 256
9.2.6.3.6.1 State description
The statement << If this state is entered from the ST_TTS5:Prepare_XFER_RDY state, then this state shall transition to the ST_TTS2:Send_Frame state. >> should be moved to the relevant state transition description.

IBM #763
PDF Page 256
9.2.6.3.6.1 State description
The statement << The ST_TTS state machine shall terminate after sending the confirmation. >> should be in the state machine overview not here.

IBM #764
PDF Page 257
9.2.6.3.6.4 Transition ST_TTS4:Receive_Data_Out to ST_TTS6:Process_Received_Data_Out
The statement << from the ST_TFR (target frame router) state machine. >> should be deleted.

IBM #765
PDF Page 257
9.2.6.3.9.1 State description
The statement << by this state from the ST_TFR state machine. >> should be deleted.

IBM #766
PDF Page 257
9.2.6.3.9.1 State description
The statement << This state is entered after one of the following occurs:
a) a Response Data parameter is received by this state from the ST_TFR state machine;
b) a Task Management Function Executed transport protocol service response was received by the ST_TTS1:Target_Request_Response_Router state from the SCSI target device's application layer;
c) a Send Command Complete transport protocol service response was received by the ST_TTS1:Target_Request_Response_Router state from the SCSI target device's application layer; or
d) the ST_TTS2:Send_Frame state receives something other than a Transmission Status (Frame Transmitted) confirmation followed by an ACK Received confirmation for a RESPONSE frame from the port layer state machine (i.e., the frame transmission was unsuccessful). >> should be deleted as we do not describe entry conditions.

IBM #767
PDF Page 257
9.2.6.3.9.1 State description
The statement << If not already running, the ST_TTS state machine shall be initiated when a Response Data parameter is received. >> should be in the state machine overview not here.

IBM #768

PDF Page 257
9.2.6.3.6.2 Transition ST_TTS4:Receive_Data_Out to ST_TTS2:Send_Frame
The statement << This transition shall occur after this state has received
an XFER_RDY frame from the
ST_TTS5:Prepare_XFER_RDY state. >> should be << This transition shall occur
if this state is entered from the
ST_TTS5:Prepare_XFER_RDY state. >>
9.2.6.3.6.4 Transition ST_TTS4:Receive_Data_Out to
ST_TTS6:Process_Received_Data_Out
The statement << after the ST_TTS4:Receive_Data_Out state receives a
Data-Out Arrived parameter >> should be << after
receiving a Data-Out Arrived parameter >>

IBM #770
PDF Page 257
The statement << This transition shall occur after a Receive Data-Out
transport protocol service request has been received by the
ST_TTS4:Receive_Data_Out state from the ST_TTS1:Request_Response_Router
state. >> should be << This transition shall
occur if this state is entered from the ST_TTS1:Request_Response_Router
state. >>

IBM #771
PDF Page 257
9.2.6.3.7.2 Transition ST_TTS5:Prepare_XFER_RDY to ST_TTS4:Receive_Data_Out
The statement << after the ST_TTS5:Prepare_XFER_RDY state has >> should be
<< after this state has >>.

IBM #772
PDF Page 258
9.2.6.3.9.1 State description
The statement << from the ST_TTS1:Target_Request_Response_Router state, >>
should be deleted.

IBM #773
PDF Page 258
9.2.6.3.9.1 State description
The statement << from the port layer state machine >> should be deleted.

IBM #774
PDF Page 258
9.2.6.3.9.1 State description
The statement << from the ST_TFR state
machine, >> should be deleted.

IBM #775
PDF Page 258
9.2.6.3.9.1 State description
The statement << from the ST_TFR state
machine, >> should be deleted.

IBM #776
PDF Page 258
9.2.6.3.9.1 State description
The term << retransmit >> as in retransmit bit should be in small caps.

IBM #777
PDF Page 259
9.3.2 SATA tunneling for multiple STP initiator ports
The statement << from an STP initiator
port, >> should be deleted.

IBM #778
PDF Page 259
9.2.6.3.9.2 Transition ST_TTS7:Prepare_Response to ST_TTS2:Send_Frame
The statement << after the ST_TTS7:Prepare_Response state has >> should be
<< after this state has >>.

IBM #779
PDF Page 259

9.3.2 SATA tunneling for multiple STP initiator ports
Why is the term << PHY OPERATION >> in small caps? I don't think it should be.

IBM #780
PDF Page 259
9.3.2 SATA tunneling for multiple STP initiator ports
The statement << In this state, >> should be << Under these conditions, >>.

IBM #781
PDF Page 259
9.3.2 SATA tunneling for multiple STP initiator ports
Why is the term << PHY OPERATION >> in small caps? I don't think it should be.

IBM #782
PDF Page 259
9.3.2 SATA tunneling for multiple STP initiator ports
This statement << STP initiator port issues an >> should be << STP initiator port sends an >>

IBM #783
PDF Page 259
9.3.2 SATA tunneling for multiple STP initiator ports
Why is the term << PHY OPERATION >> in small caps? I don't think it should be.

IBM #784
PDF Page 259
9.3.2 SATA tunneling for multiple STP initiator ports
Why is the term << PHY OPERATION >> in small caps? I don't think it should be.

IBM #785
PDF Page 259
9.3.3 BIST Activate FIS
The acronym << BIST >> is not in the acronyms list. It needs to be added or removed from here.

IBM #786
PDF Page 260
9.4.1 SMP overview
The statement << Other target ports >> should be << Target ports >>.

IBM #787
PDF Page 260
Figure 100
The label << Target port >> should be << Expander port or Target port >>.

IBM #788
PDF Page 260
9.4.2 SMP_REQUEST frame
The statement << length is based on the function >> should be << length is based on the function >> length is determined by the selected function >>.

IBM #789
PDF Page 260
Table 102
There needs to be a row labeled << Full bytes in Needed >> added to this table.

IBM #790
PDF Page 261
9.4.3 SMP_RESPONSE frame
global for SMP
The statement << the target port >> should be << the target port or expander port >> or << destination port >>

IBM #791

PDF Page 261
Table 103
There needs to be a row labeled << Full bytes in Needed >> added to this
table.

IBM #792
PDF Page 261
9.4.3 SMP_RESPONSE frame
There is no description of what the << FUNCTION >> field is. This needs to
be fixed.

IBM #793
PDF Page 261
9.4.3 SMP_RESPONSE frame
The statement << requested, and are described in the
model section. >> should be << requested (see x.x.x.). >>

IBM #793
PDF Page 262.Sequence
9.4.4.1 Overview
The statement << that process requests from the management application
layer and >> should be << that process management
requests and >> .

IBM #794
PDF Page 262.Sequence
9.4.4.2.1 Overview
The statement << processes requests from the management application layer.
>> should be << processes management requests.
>>.

IBM #795
PDF Page 262.Sequence
9.4.4.2.1 Overview
The term << communicated >> should be << sent >>.

IBM #796
PDF Page 262.Sequence
9.4.4.2.1 Overview
The statement << in a return confirmation. >> should be <<as a
confirmation. >>.

IBM #797
PDF Page 263
9.4.4.2.2.1 State description
The statement << from the management application layer. >> should be
deleted.

IBM #798
PDF Page 263
9.4.4.2.2.1 State description
The statement << of values to be used in the CONNECTION RATE, INITIATOR
CONNECTION TAG, DESTINATION SAS ADDRESS, and SOURCE SAS ADDRESS fields in
the OPEN address frame, and
the FUNCTION and ADDITIONAL REQUEST BYTES fields in the SMP_REQUEST frame.
>> should list the actual values, not the
fields they go into, in an a,b,c list like the ones in the several of the
other ST state descriptions.

IBM #799
PDF Page 264
9.4.4.2.4.1 State description
The statement << from the port layer >> should be deleted.

IBM #800
PDF Page 264
The statement << is communicated from the port layer and that confirmation
is sent to the management
application layer. >> should be << is sent to the management
application layer. >>.

IBM #801
PDF Page 264
9.4.4.2.3.1 State description
The statement << received in the MT_ID1:Idle to MT_ID2:Send transition, >>
should be deleted.

IBM #802
PDF Page 264
9.4.4.2.3.1 State description
The statement << frame using the function and additional request bytes
arguments >> should be << frame using the received
function and additional request bytes arguments >>

IBM #803
PDF Page 264
9.4.4.2.3.1 State description
The statement << used for the CONNECTION RATE, INITIATOR CONNECTION TAG,
DESTINATION SAS ADDRESS, and
SOURCE SAS ADDRESS fields in the OPEN address frame >> should list the
actual values, not the fields they go into, in an a,b,c
list like the ones in the several of the other ST state descriptions.

IBM #804
PDF Page 264
The statement << after a Transmission Status (SMP Frame Transmitted)
confirmation is received. >> should be << after receiving
a Transmission Status (SMP Frame Transmitted) confirmation. >>.

IBM #805
PDF Page 264
9.4.4.2.4.1 State description
The statement << This state shall initialize a SMP frame receive time out
timer to a vendor-specific time and start the timer upon
entry into this state. >> should be << Upon
entry into this state, this state shall initialize a SMP frame receive time
out timer to a vendor-specific time and start the timer. >>

IBM #806
PDF Page 264
9.4.4.2.4.2 Transition MT_ID3:Receive to MT_ID1:Idle
The statement
<< a) an Frame Received (SMP) confirmation is received, and, as a result,
this state has sent an SMP Frame Pair Sent/Received
confirmation to the management application layer;
b) a Connection Closed or Frame Received (SMP Failure) confirmation is
received, and, as a result, this state has sent an SMP
Frame Tx/Rcv Failure confirmation to the management application layer; or
c) the SMP frame receive time out timer is exceeded before a SMP Frame Pair
Sent/Received confirmation is received, and, as a
result, this state has sent an SMP Frame Receive Time out confirmation to
the management application layer and has sent an
SMP Transmit Break request to the port layer. >> should be
<< a) receiving a Frame Received (SMP) confirmation and after sending an
SMP Frame Pair Sent/Received confirmation to the
management application layer;
b) receiving a Connection Closed or Frame Received (SMP Failure)
confirmation and after sending an SMP Frame Tx/Rcv Failure
confirmation to the management application layer; or
c) the SMP frame receive time out timer times out before a SMP Frame Pair
Sent/Received confirmation is received and after this
state has sent an SMP Frame Receive Timeout confirmation to the management
application layer and has sent an SMP Transmit
Break request to the port layer. >>
9.4.4.3.1 Overview
The term << forwards >> should be << sends >>.

IBM #808
PDF Page 265
9.4.4.3.2.1 State description

The statement << from the port layer. >> should be deleted.

IBM #809
PDF Page 265
9.4.4.3.3.1 State description
The statement << from the management application layer. >> should be
deleted.

IBM #810
PDF Page 265
9.4.4.3.2.2 Transition MT_TD1:Idle to MT_TD2:Respond
The statement << occur after an Frame Received (SMP) confirmation is
received, and, as a result, this state
has sent an SMP Frame Received confirmation to the >> should be << occur
after receiving a Frame Received (SMP)
confirmation and after sending an SMP Frame Received confirmation to the >>

IBM #811
PDF Page 265
9.4.4.3.3.1 State description
The statement << Upon receipt, this state
shall send a Transmit Frame (SMP) request to the port layer. >> should be a
new paragraph and changed to << This state
shall send a Transmit Frame (SMP) request to the port layer after receiving
a Tx SMP Frame request. >>.

IBM #812
PDF Page 265
9.4.4.3.3.2 Transition MT_TD2:Respond to MT_TD1:Idle
The statement
<< a) a Transmission Status (SMP Frame Transmitted) confirmation is
received; or
b) a Connection Closed confirmation is received, and, as a result, this
state has sent an SMP Connection Closed confirmation to
the management application layer. >> should be <<
a) receiving a Transmission Status (SMP Frame Transmitted) confirmation ;
or
b) receiving a Connection Closed confirmation and after sending an SMP
Connection Closed confirmation to the management
application layer. >>.

IBM #813
PDF Page 267
10.1.1.1 Transport protocol services overview
The statement << and how each
transport protocol service is implemented in SSP. >> should be << and the
SSP implementation of each
transport protocol service. >>..Sequence number: 2

IBM #813
PDF Page 267
10.1.1.1 Transport protocol services overview
The terms << state machines >> should be deleted as we don't normally refer
to state machines only layers.

IBM #814
PDF Page 267
10.1.1.2 Send SCSI Command transport protocol service
The statement << protocol service request to have an initiator port >>
should be << protocol service request to request an initiator
port >>

IBM #815
PDF Page 268
10.1.1.2 Send SCSI Command transport protocol service
The statement << shows how the arguments to the Send SCSI Command transport
protocol service are used. >> should be <<
shows the usage of the Send SCSI Command transport protocol service
arguments. >>.

IBM #816
PDF Page 268
10.1.1.3 SCSI Command Received transport protocol service
The statement << shows how the arguments to the SCSI Command Received transport protocol service are
determined. >> should be << shows the usage of the SCSI Command Received transport protocol service arguments >>

IBM #817
PDF Page 268
10.1.1.3 SCSI Command Received transport protocol service
The statement << If a target port calls SCSI Command Received () with a TAG already in use (i.e., an overlapped command), the
device server responses are defined in SAM-3. >> should be deleted as the tag checking rules are defined elsewhere in this
document.

IBM #818
PDF Page 269
10.1.1.4 Send Command Complete transport protocol service
The statement << shows how the arguments to the Send Command Complete transport protocol service are used. >> should be
<< shows the usage of the Send Command Complete transport protocol service arguments. >>.

IBM #819
PDF Page 269
10.1.1.4 Send Command Complete transport protocol service
The statement << have a target port transmit >> should be << request a target port transmit >>..Page: 270

IBM #820
PDF Page 269
10.1.1.5 Command Complete Received transport protocol service
The statement << shows how the arguments to the Command Complete Received transport protocol service are
determined. >> should be << shows the usage of the Command Complete Received transport protocol service arguments. >>.

IBM #821
PDF Page 269
10.1.1.6 Send Data-In transport protocol service
The term << I_T_L_Q >> should be << I_T_L_Q nexus >> in all cases.

IBM #822
PDF Page 269
10.1.1.6 Send Data-In transport protocol service
The statement << have a target port transmit >> should be << request a target port transmit >>.

IBM #823
PDF Page 271
10.1.1.6 Send Data-In transport protocol service
The statement << shows how the arguments to the Send Data-In transport protocol service are used. >> should be << shows the
usage of the Send Data-In transport protocol service arguments. >>.

IBM #824
PDF Page 271
10.1.1.7 Data-In Delivered transport protocol service
The statement << shows how the arguments to the Data-In Delivered transport protocol service are determined. >> should be <<
shows the usage of the Data-In Delivered transport protocol service arguments. >>.

IBM #825
PDF Page 271
10.1.1.8 Receive Data-Out transport protocol service
The term << I_T_L_Q >> should be << I_T_L_Q nexus >> in all cases.

IBM #826
PDF Page 271
10.1.1.8 Receive Data-Out transport protocol service
The statement << A device server shall not call Receive Data Out () for a
given I_T_L_Q until Data Out Received () has returned
for the previous Receive Data Out () call (i.e., no XFER_RDY until all
write DATA frames for the previous XFER_RDY frame, if any,
and has provided link layer acknowledgement for all of the previous write
DATA frames for that I_T_L_Q). >> does not parse I think
it should be << A device server shall not call Receive Data Out () for a
given I_T_L_Q nexus until Data Out Received () has been
returned for the previous Receive Data Out () call (i.e., no XFER_RDY sent
until all write DATA frames for the previous
XFER_RDY frame, if any, and have been provided by link layer
acknowledgements for all of the previous write DATA frames for
that I_T_L_Q nexus). >>

IBM #827
PDF Page 271
10.1.1.7 Data-In Delivered transport protocol service
The statement << have a target port transmit >> should be << request a
target port transmit >>.

IBM #828
PDF Page 272
10.1.1.8 Receive Data-Out transport protocol service
The statement << shows how the arguments to the Receive Data-Out transport
protocol service are used. >> should be << shows
the usage of the Receive Data-Out transport protocol service arguments. >>.

IBM #829
PDF Page 272
10.1.1.9 Data-Out Received transport protocol service
The statement << shows how the arguments to the Data-Out Received transport
protocol service are determined. >> should be <<
shows the usage of the Data-Out Received transport protocol service
arguments. >>.

IBM #830
PDF Page 272
10.1.1.10 Send Task Management Request transport protocol service
The statement << have an initiator port transmit >> should be << request an
initiator port transmit >>.

IBM #831
PDF Page 273
10.1.1.12 Task Management Function Executed transport protocol service
The statement << have a target port transmit >> should be << request a
target port transmit >>.

IBM #832
PDF Page 273
10.1.1.10 Send Task Management Request transport protocol service
shows how the arguments to the Send Task Management Request transport
protocol service are used. >> should be << shows the
usage of the Send Task Management Request transport protocol service
arguments. >>.

IBM #833
PDF Page 273
10.1.1.11 Task Management Request Received transport protocol service
The statement << shows how the arguments to the Task Management Request
Received transport protocol service
are determined. >> should be << shows the usage of the Task Management
Request Received transport protocol service
arguments. >>.

IBM #834
PDF Page 273
10.1.1.11 Task Management Request Received transport protocol service

The statement << If a target port calls Task Management Request Received ()
with a TAG already in use, the device server.responses are defined in
SAM-3. >> should be deleted as the tag checking rules are defined elsewhere
in this document.

IBM #835
PDF Page 274
10.1.1.12 Task Management Function Executed transport protocol service
The statement << shows how the arguments to the Task Management Function
Executed transport protocol service
are used. >> should be << shows the usage of the Task Management Function
Executed transport protocol service arguments. >>.

IBM #836
PDF Page 275
10.1.1.13 Received Task Management Function-Executed transport protocol
service
The statement << shows how the arguments to the Received Task Management
Function-Executed transport protocol service are
determined. >> should be << shows the usage of the Received Task Management
Function-Executed transport protocol service
arguments. >>.

IBM #837
PDF Page 275
10.1.2 Device server error handling
The information in this section could be placed in a single table. This
should make the presentation of the error information easier
to determine.
<< If a device server calls Receive Data-Out () and receives a Delivery
Result that indicate a deliver failure the device server shall
respond as shown in table xx.
Table xx - Response to Delivery Result DELIVERY FAILURE
Columns would be: Delivery Result : Status : Sense Key : Additional sense
code: >>

IBM #838
PDF Page 276
10.1.3 Application client error handling
The statement << it determines the ACK for the RESPONSE frame was seen by
the target port. This is indicated by: >> should be
deleted. The workings of the lower layers is not needed here.

IBM #839
PDF Page 276
The statement << If an application client calls Send SCSI Command () and an
initiator port calls Command Complete Received ()
and delivers a Service Response of Service Delivery of Target Failure -
ACK/NAK Timeout, the application client shall send a
QUERY TASK task management function with Send Task Management Request () to
determine whether the command was
received successfully. If Received Task Management Function Executed ()
returns a Service Response of FUNCTION
SUCCEEDED, the application client shall assume the
command was delivered successfully. If it returns a Service Response of
FUNCTION COMPLETE, and Command Complete
Received () has not yet been called a second time for the command in
question, the application client shall assume the command
was not delivered successfully and may reuse the tag. >> is very awkward.
There must be a better way to present this information.
May by some kind of table like the one suggested in the target error
handling suggested in the above comment..Page: 277

IBM #840
PDF Page 276
10.1.5.1 INQUIRY command
The statement << is modified as described >> should be << by a SAS device
is described >>.

IBM #841

PDF Page 276
10.1.5.4 START STOP UNIT command
The statement << are modified as described >> should be << by a SAS device is described >>.

IBM #842
PDF Page 279
10.1.6.1.3 MAXIMUM CONNECT TIME LIMIT field
The statement << (i.e., a value of one in this field specifies that the time shall be
less than or equal to 100 µs, a value of two in this field specifies that the time shall be less than or equal to 200
µs, etc.). >> should be << (e.g., a value of one in this field specifies that the time shall be
less than or equal to 100 µs, a value of two in this field specifies that the time shall be less than or equal to 200
µs). >>

IBM #843
PDF Page 279
10.1.6.1.4 MAXIMUM BURST SIZE field
The statement << (i.e., a value of one in this field specifies that the number
of bytes transferred to the initiator port for the nexus shall be less than or equal to 512, a value of two in this
field specifies that the number of bytes transferred to the initiator port for the nexus shall be less than or equal
to 1 024, etc.). >> should be << (e.g., a value of one in this field specifies that the number
of bytes transferred to the initiator port for the nexus shall be less than or equal to 512, a value of two in this
field specifies that the number of bytes transferred to the initiator port for the nexus shall be less than or equal
to 1 024). >>

IBM #844
PDF Page 279
10.1.6.1.5 FIRST BURST SIZE field
The term << XFER_RDY frame >> is << XFER_RDY >> in many other places in the standard. This needs to be stated one way. I
believe just << XFER_RDY >> is used everywhere else.

IBM #845
PDF Page 279
10.1.6.1.5 FIRST BURST SIZE field
The statement << (i.e., a value of one in this field specifies that the number of bytes transferred by the initiator port shall be less
than or equal to 512, a value of two in this field specifies that the number of bytes transferred by the initiator port shall be less than
or equal to 1 024, etc.). >> should be << (e.g., a value of one in this field specifies that the number of bytes transferred by the
initiator port shall be less than or equal to 512, a value of two in this field specifies that the number of bytes transferred by the
initiator port shall be less than or equal to 1 024). >>

IBM #846
PDF Page 279
10.1.6.1.5 FIRST BURST SIZE field
The statement << size, i.e., an initiator port shall transmit no data frames to the target port before receiving an XFER_RDY frame. >>
should be << size (i.e., an initiator port shall transmit no data frames to the target port before receiving an XFER_RDY frame). >>

IBM #847
PDF Page 281
10.1.6.2.2 Protocol-Specific Port mode page - short format
The statement << connection time outs before treating it as an I_T nexus loss >> should be << connection time outs before
creating an I_T nexus loss >>

IBM #848
PDF Page 281
10.1.6.2.2 Protocol-Specific Port mode page - short format
****
The statement << If the mode page is implemented, the default setting shall be 2 000 ms. >>is a problem. We have never specified a default value for a more page value. Why are we going it here? I don't believe we should start now. We could possibly recommend the value in a note. Reword to << Note xx: If this mode page is implemented a non-zero default value should be specified. It is recommend that this value be 2 000 ms. >>

IBM #849
PDF Page 281
10.1.6.2.2 Protocol-Specific Port mode page - short format
The statement << indicates the target port shall never consider rejections an I_T nexus loss. >> should be << indicates the target port shall not stop retrying OPEN_REJECT (NO DESTINATION), OPEN_REJECT (CONNECTION RATE NOT SUPPORTED) connection requests.

IBM #850
PDF Page 281
10.1.6.2.3 Protocol-Specific Port mode page - Phy Control And Discover subpage
The statement << and indicates the number of SAS phy mode descriptors that follow. >> is obvious and should be deleted.

IBM #851
PDF Page 282
10.1.6.2.3 Protocol-Specific Port mode page - Phy Control And Discover subpage
The statement << The PHY IDENTIFIER field, ATTACHED DEVICE TYPE field, NEGOTIATED PHYSICAL LINK RATE field, ATTACHED SSP INITIATOR bit, ATTACHED STP INITIATOR bit, ATTACHED SMP INITIATOR bit, ATTACHED SSP TARGET bit, ATTACHED STP TARGET bit, ATTACHED SMP TARGET bit, ATTACHED SAS ADDRESS field, SAS ADDRESS field, HARDWARE MINIMUM PHYSICAL LINK RATE field, and HARDWARE MAXIMUM PHYSICAL LINK RATE field are defined in the SMP DISCOVER function (see 10.3.1.4). >> needs to made into an a,b,c list..Page: 283

IBM #852
PDF Page 282
10.1.6.2.3 Protocol-Specific Port mode page - Phy Control And Discover subpage
The statement << The PHY OPERATION field, PROGRAMMED MINIMUM PHYSICAL LINK RATE field, and PROGRAMMED MAXIMUM PHYSICAL LINK RATE field are defined in the SMP PHY CONTROL function >> . >> needs to made into an a.b.c list.

IBM #853
PDF Page 282
Table 124
The term << Protocol-specific log parameter >> should be changed to << SAS log parameter >> in all cases.

IBM #854
PDF Page 284
Table 125
The term << Protocol-specific log parameter >> should be changed to << SAS log parameter >> in all cases.

IBM #855
PDF Page 285
Table 126
Left justify all the entries in the << Description >> column.

IBM #856
PDF Page 286
10.1.7.1 Protocol-Specific log page for SAS
The statement << The PHY IDENTIFIER field, ATTACHED DEVICE TYPE field, NEGOTIATED PHYSICAL LINK RATE field,
ATTACHED SSP
INITIATOR bit, ATTACHED STP INITIATOR bit, ATTACHED SMP INITIATOR bit, ATTACHED SSP TARGET bit, ATTACHED
STP TARGET bit, ATTACHED SMP TARGET bit, ATTACHED SAS ADDRESS field, and SAS ADDRESS field are defined in the
SMP DISCOVER function (see 10.3.1.4). >> needs to made into an a,b,c list.

IBM #857
PDF Page 287
The statement << The INVALID DWORD COUNT field, DISPARITY ERROR COUNT field, LOSS OF DWORD
SYNCHRONIZATION field, and PHY RESET PROBLEM COUNT field are each defined in the SMP REPORT PHY ERROR LOG
response data (see 10.3.1.5). >> needs to made into an a,b,c list.

IBM #858
PDF Page 287
10.1.8 SCSI power condition states
The statement << a) after power on, if the target device has not received a START STOP UNIT command with the START bit set
to zero, transition to the active power condition state after receiving NOTIFY (ENABLE_SPINUP). The target device automatically
transitions after power on without waiting for the application client; and
b) after power on, if the target device has previously received a START STOP UNIT command with the START bit set to zero when
it receives a START STOP UNIT command with the START bit set to one, spin-up after receiving the next NOTIFY
(ENABLE_SPINUP). The application client's request is effectively delayed until NOTIFY (ENABLE_SPINUP) arrives. >> makes no
sense in the context of this section. Something is wrong here and I have no idea what is going on here. This needs to be fixed.

IBM #859
PDF Page 287
10.1.8 SCSI power condition states
The statement << The SA_PC
state machine is an enhanced version of the logical unit power condition state machines described in SPC-3, SBC-2, and RBC. >>
doesn't add anything to SAS and should be deleted.

IBM #860
PDF Page 287
10.1.8 SCSI power condition states
The list of state machines needs cross-references and an indication of the initial state.

IBM #861
PDF Page 288
Figure 103
This drawing needs the orange background and the state machine title in it like all the other state machine drawings in this
document.

IBM #862
PDF Page 288
10.1.8.1.1 State description
The statement << This state shall be entered upon power on. This state consumes zero time. >> should be << Upon power on this
state shall be entered. >> All states are zero time so there is no need to state it here.

IBM #863
PDF Page 289
10.1.8.2.2 Transition SA_PC_1:Active to SA_PC_2:Idle
The term << expires.>> should be << timed out >>.

IBM #864
PDF Page 289
10.1.8.2.3 Transition SA_PC_1:Active to SA_PC_3:Standby
The term << expires.>> should be << timed out >>

IBM #865
PDF Page 289
10.1.8.3.3 Transition SA_PC_2:Idle to SA_PC_3:Standby
The term << expires.>> should be << timed out >>.

IBM #866
PDF Page 290
10.1.8.5.1 State description
The statement << This state is only implemented >> should be << This state shall only implemented >>

IBM #867
PDF Page 291
10.1.8.6.1 State description
The statement << This state is only implemented >> should be << This state shall only implemented >>.

IBM #868
PDF Page 291
10.1.8.6.2 Transition SA_PC_5:Active_Wait to SA_PC_1:Active
****
The statement << the device does not temporarily consume additional power during the transition to SA_PC_1:Active. >> should be << the device does not temporarily consume additional power as a result of a transition to SA_PC_1:Active. >> but I don't understand what this is all about. The statement itself tells me nothing. This needs to be fixed.

IBM #869
PDF Page 291
10.1.8.6.3 Transition SA_PC_5:Active_Wait to SA_PC_3:Standby
The term << expires.>> should be << timed out >>

IBM #870
PDF Page 291
10.1.8.6.5 Transition SA_PC_5:Active_Wait to SA_PC_6:Idle_Wait
The term << expires.>> should be << timed out >>.

IBM #871
PDF Page 291
10.1.8.7.1 State description
The statement << This state is only implemented >> should be << This state shall only implemented >>.Sequence number: 6

IBM #871
PDF Page 291
10.1.8.7.3 Transition SA_PC_6:Idle_Wait to SA_PC_3:Standby
The term << expires.>> should be << timed out >>

IBM #872
PDF Page 292
10.1.9 SCSI vital product data
The statement << the Device Identification vital product data (VPD) page (83h) >> should be << the Device Identification VPD page (83h) >>

IBM #873
PDF Page 292
Table 128
The statement << The IDENTIFIER field contains the SAS address of the target port being used to run the INQUIRY command. >> should be << The IDENTIFIER field contains the SAS address of the target port though which the INQUIRY command was received. >>

IBM #874
PDF Page 294
10.3.1.1 Function overview
The statement << The CRC field is included in each frame, although that
field is parsed by the link layer. >> should be deleted as it
is information that is stated else where and should not be here.

IBM #875
PDF Page 296
10.3.1.2 REPORT GENERAL function
The statement << 1) Table 131 defines the response format. >> should not
have a << 1) >> in it. This needs to be fixed.

IBM #876
PDF Page 296
10.3.1.2 REPORT GENERAL function
The statement << for either of the following reasons: >> should be << for
the following reasons: >>

IBM #877
PDF Page 296
10.3.1.2 REPORT GENERAL function
The << EXPANDER ROUTE INDEXES field >> and the << CONFIGURABLE ROUTE
TABLE>> need some cross references to
where the expander route table is defined and the configurable route table
is defined..Page: 297

IBM #878
PDF Page 296
10.3.1.2 REPORT GENERAL function
<< table that
shall be configured. >> should be << table that
is required to be configured. >>

IBM #879
PDF Page 298
10.3.1.3 REPORT MANUFACTURER INFORMATION function
****
The statement << The vendor identification string should be one defined >>
should be << The vendor identification string shall be
as defined >>

IBM #880
PDF Page 299
10.3.1.4 DISCOVER function
The statement << by the phy, as well as the routing attribute supported >>
should be << by the phy and the routing attribute
supported >>

IBM #881
PDF Page 299
10.3.1.4 DISCOVER function
global
The usage of small caps should be limited to field names only. The use when
talking about the value is not correct (e.g., NUMBER
OF PHYS and FUNCTION RESULT) here. This needs to be fixed.

IBM #882
PDF Page 301
10.3.1.4 DISCOVER function
The statement << complete (when a SAS device is attached) or after the
initial Register - Device to Host FIS has been received
(when a SATA device is attached). >> should be << complete if a SAS device
is attached or after the initial Register - Device to
Host FIS has been received if a SATA device is attached. >>
10.3.1.4 DISCOVER function
The statement << The ROUTING ATTRIBUTE field shall not change based on the
attached device type. The routing method used
by the expander connection manager shall change based on the attached

device type as described in table 137. >> If not clear as
to the point that is trying to be made. This needs to be fixed or deleted.

IBM #884
PDF Page 302
10.3.1.4 DISCOVER function
In the statement << link rate if they have been >> what it the << they >>
referring to. This needs to be fixed.

IBM #885
PDF Page 302
Table 139
The statement << in its local data structures >> should be deleted as that
kind of data structure is not defined anywhere.

IBM #886
PDF Page 302
10.3.1.4 DISCOVER function
All the << The xxx bit indicates the xxx value received during the link
reset sequence. >> should be for example<< An ATTACHED
SSP INITIATOR bit set to one indicates an SSP initiator is attached. An
ATTACHED SSP INITIATOR bit set to zero indicates an
SSP initiator is not attached. >>

IBM #887
PDF Page 302
10.3.1.4 DISCOVER function
The statement << completes, when a SAS device is attached; >> should be <<
completes if a SAS device is attached; >>

IBM #888
PDF Page 302
10.3.1.4 DISCOVER function
The statement << completes, when a SATA device is attached; >> should be <<
completes if a SATA device is attached; >>

IBM #889
PDF Page 303
10.3.1.4 DISCOVER function
The statement << The default value for PARTIAL PATHWAY TIMEOUT VALUE shall
be 7 µs. >> is a problem. We have never
specified a default value for a more page value. Why are we going it here?
I don't believe we should start now. We could possibly
recommend the value in a note. Reword to << Note xx: If this function is
implemented a it is recommend that this value be 7 µs. >>

IBM #890
PDF Page 305
10.3.1.5 REPORT PHY ERROR LOG function
The statement << have been received (outside of phy reset sequences). >>
should be << have been received outside of phy reset
sequences. >>

IBM #891
PDF Page 305
10.3.1.5 REPORT PHY ERROR LOG function
The statement << have been received (outside of phy reset sequences). >>
should be << have been received outside of phy reset
sequences. >>

IBM #892
PDF Page 305
10.3.1.5 REPORT PHY ERROR LOG function
The statement << has been lost (outside of phy reset sequences). >> should
be << has been lost outside of phy reset sequences.
>>.

IBM #893
PDF Page 307
10.3.1.7 REPORT ROUTE INFORMATION function

The statement << This function is used primarily as a diagnostic tool to
resolve
topology issues. >> should be << This function is used to resolve topology
issues. >>

IBM #894
PDF Page 308
10.3.1.7 REPORT ROUTE INFORMATION function
The statement << the table routing attribute (see 4.x.x.x) the >> needs a
real cross reference.

IBM #895
PDF Page 312
10.3.1.8 CONFIGURE ROUTE INFORMATION function
The statement << the table routing attribute (see 4.x.x.x) the >> needs a
real cross reference.

IBM #896
PDF Page 312
Table 152
What happened to the << rest of data is invalid. >> statement in the two
descriptions. It should be stated here also..Page: 314

IBM #897
PDF Page 312
10.3.1.9 PHY CONTROL function
The << PROGRAMMED MINIMUM PHYSICAL LINK RATE field >> and << PROGRAMMED
MAXIMUM PHYSICAL LINK RATE
field >> need to be described in separate paragraphs.

IBM #898
PDF Page 312
10.3.1.9 PHY CONTROL function
The statement << may be set beforehand >> should be << may be sent in an
operation other than a LINK RESET operation before
a LINK RESET is sent. >>

IBM #899
PDF Page 316
Table 157
What happened to the << rest of data is invalid. >> statement in the two
descriptions. It should be stated here also.

IBM #900
PDF Page 319
A.1 Compliant jitter test pattern (CJTPAT)
The statements << The second column (8b data dword) lists the >> and << The
third column (Scrambler output dword) lists >> and
<< The fourth column (Scrambled 8b data dword) shows >> need to reference
the table to which they are referencing.

IBM #901
PDF Page 326
C.1 CRC generator and checker implementation examples
The statement << 1, 2, and 3 below are included to provide a validation >>
needs a more precise. The reference to <<below >>
needs to be more accurate.

IBM #902
PDF Page 330
The statement << 4.2.2 describes hashed SAS addresses >> should be << See
4.2.2 for a description of the hashed SAS
addresses >>

IBM #903
PDF Page 330
Table D.1
Center all the cells.

IBM #904

PDF Page 331
D.3 Hash generation
The statement << length can be treated as >> should be << length is treated as >>.

IBM #905
PDF Page 332
D.5 Hash implementation with XORs
The statement << 24-bit HASHED SAS ADDRESS field for the SSP frame >> should be << 24-bit hashed SAS address for the SSP frame >> .

IBM #906
PDF Page 336
E.1 Scrambler implementation in C
The term << specified >> should be deleted.

IBM #907
PDF Page 340
F.3 Byte and bit ordering
The statement << Thus, the first byte contains the least >> should be << As a result the first byte contains the least >>
H.1 Overview
The statement << Hamming distance (the number of bits different in two patterns) of at least >> should be << Hamming distance (i.e., the number of bits different in two patterns) of at least >>.

IBM #909
PDF Page 366
I.2 Header file
The statement << SMP Request, must be initialized >> should be << SMP Request, is initialized >>.

IBM #910
PDF Page 369
I.2 Header file
The statement << SMP Response, must be initialized >> should be << SMP Response, is initialized >>

IBM #911
PDF Page 370
I.2 Header file
The statement << file will perform the >> should be << file performs the >>.

IBM #912
PDF Page 371
I.3 Source file
The statement << change primitives will initiate >> should be << change primitives initiate >>.

IBM #913
PDF Page 371
I.3 Source file
The statement << discover information will end up >> should be << discover information ends up >>.
I.2 Header file
The statement << expander in the chain must be configured >> should be << expander in the chain is configured >>.

IBM #915
PDF Page 373
I.2 Header file
The statement << production code must handle >> should be << production code handles >>. Requirements cannot be in an informative annex.

IBM #916
PDF Page 373
I.2 Header file

The statement << production code must handle >> should be << production code handles >>. Requirements cannot be in informative annex.

IBM #917
PDF Page 374
I.3 Source file
The statement << this routine will add a SAS Address >> should be << this routine adds a SAS Address >>.

IBM #918
PDF Page 374
I.3 Source file
The statement << this routine will add a SASAddress >> should be << this routine adds a SASAddress >>.

IBM #919
PDF Page 374
I.3 Source file
The statement << this routine will reset the ChainEntry >> should be << this routine resets the ChainEntry >>.

IBM #920
PDF Page 375
I.3 Source file
The statement << this routine will get the route index >> should be << this routine gets the route index >>.

IBM #921
PDF Page 375
I.3 Source file.The statement << this routine will get the >> should be << this routine gets the >>.

IBM #922
PDF Page 379
I.3 Source file
The statement << this routine will append >> should be << this routine appends >>.

IBM #923
PDF Page 380
I.3 Source file
The statement << DiscoverProcess will get >> should be << DiscoverProcess gets >>.

IBM #924
PDF Page 380
I.3 Source file
The statement << we find will naturally move >> should be << we find naturally moves >>.

IBM #925
PDF Page 382
Annex J
There seems to a bogus frame title at the end of the document. It shows up as an << untitled >> entry in the bookmarks list in Acrobat which seems to be hyper linked to something on page 172.

****

Comments attached to No ballot from Cris Simpson of Intel Corp.:

intel001
PDF Page 2
Front matter
HIS s/b IHS

intel002

PDF Page 3
Abstract
"Serial ATA compatible physical layer": partly true, but overly
limited. Implies that SATA is used as-is, across the board.
Expand/clarify.

intel003
PDF Page 4
ANSI stuff
2002 s/b 2003 or 200x

intel004
PDF Page 31
TOC
Fix para formatting for Annex TOC entries

intel005
PDF Page 33
Foreword
Fix 'of it' or reword for clarification from
"At the time of it approved this standard, INCITS had the
following members:"
   to
"At the time of standard approval, INCITS had the following members:"

intel006
PDF Page 40
3.1.3 ATA device
NOTE 4
"uses the term device": place single quotes around words
when the word itself is referenced:
   the term 'device', the term 'target device'

intel007
PDF Page 40
3.1.4 ATA domain
"(ATA) service delivery subsystem": Clarify whether this has the
same defn as the SCSI SDS

intel008
PDF Page 40
3.1.6 ATA initiator port
"Equivalent to a host adapter": 'initiator port' is an abstraction,
'host adapter' is, at least in one sense, a
piece of hardware.   Clarify model, and that
reference to 'HA' is to the term 'HA', not a thing. (FRAG)

intel009
PDF Page 40
3.1.3 ATA device
NOTE 4
GLOBAL
"ATA/ATAPI V1": Be consistent w/ 2.4, which uses ATAPI-7 (GLOBAL)

intel010
PDF Page 40
3.1.9 ATA target port
"task router" does not appear in ATAPI7. Use correct ATA terminology.

intel011
PDF Page 40
3.1.14 byte
8 s/b 'eight'

intel012
PDF Page 40
3.1.15 character
10 s/b 'ten'

intel013

PDF Page 41
3.1.30 discoverer process
management application client: Clarify whether 'process' means
'algorithm' or some executing code.

intel014
PDF Page 41
3.1.25 device
'A physical entity' seems quite vague. Clarify whether that is the intent.

intel015
PDF Page 41
3.1.34 (Page 6) dword synchronization
Add '(see 6.9)'

intel016
PDF Page 42
3.1.45 expander route index
Fix typo -- change "a" to "an"

intel017
PDF Page 42
3.1.47 fanout expander device
'no phys with subtractive' - ambiguous. Change 'with' to 'having'

intel018
PDF Page 42
3.1.40 (Page 7) expander device
Make defn more generic - It provides connectivity by routing frames.

intel019
PDF Page 42
3.1.43 (Page 7) expander port
"A SAS expander device object that routes SSP, SMP, and STP frames
to and from physical links or to internal initiator ports and/or
target ports. Contains one or more phys."
Either add: 'routes primitives, primitive sequences and other frames
too.' or make more generic by not listing every function.

intel020
PDF Page 43
3.1.62 indication
indication: Defn is same as for 'confirmation'.
Clarify whether they are identical.

intel021
PDF Page 44
3.1.95 reflection coefficient
This is the upper-case greek letter "gamma". It normally
represents a complex number indicating phase as well as
magnitude. Later, the char 'rho' is used, representing abs val.

intel022
PDF Page 44
3.1.84 phy
"interfaces to a service delivery subsystem" Please confirm
intent that phy is outside the SDS.

intel023
PDF Page 44
3.1.98 response
response: Confirm intent that this be interchangable with 'request'

intel024
PDF Page 44
3.1.83 (Page 9) pathway
"A set of physical links between a SAS initiator port and a
SAS target port"
Use defn from 4.1.12:

"A pathway is the physical route of a connection."

intel025
PDF Page 44
3.1.91 (Page 9) primitive sequence
"A set of primitives" change to
"A set of one or more consecutive primitives"

intel026
PDF Page 44
3.1.96 (Page 9) request:
"request" has the same definition as "response"
Clarify the differenence between the two.

intel027
PDF Page 44
3.1.100 (Page 9) SAS device
"an ATA device" - Change 'device' to 'object'

intel028
PDF Page 45
3.1.104 SAS port
an expander port is also a SAS port, although it doesn't have a
SAS address. Add 'expander port'.

intel029
PDF Page 45
3.1.102 (Page 10) SAS initiator device:

a SMP initiator device is also a SAS initiator device

intel030
PDF Page 45
3.1.106 (Page 10) SAS target device:

Add SSP, SMP, STP target devices, and initiators.

intel031
PDF Page 46
3.1.127 service delivery subsystem
'service requests' SDS defn appears to be at odds with that
implied by 'phy' defn wrt abstraction level. Clarify.

intel032
PDF Page 46
3.1.129 spread spectrum clocking
increase -> widen

intel033
PDF Page 46
3.1.129 spread spectrum clocking
peaks -> peak amplitude

intel034
PDF Page 46
3.1.141 task
"linked commands" - remove if linked cmds not supported

intel035
PDF Page 46
3.1.128 (Page 11) speed negotiation sequence
"determine the highest common supported physical link rate"
change to
"negotiate the operational physical link rate"
'where' s/b 'by which'

intel036
PDF Page 48
3.2 symbols and abbreviations

The lower-case greek letter "rho" is normally used to
represent the "absolute" reflection coefficient (real
ratio of incident to reflected voltage). It looks
like an italics lower-case roman letter 'p'.

intel037
PDF Page 52
3.5.3 Parameters, requests, indications, confirmations, and responses
"Parameters": Incorrect use of the term 'parameter' to mean 'signal',
'notification', or 'indication' (in the generic sense). Replace
with one of these or an appropriate term that better reflects what's
really being passed. If nothing else, call it a 'message' or an
'object', so that it can carry multiple parameters, as is the actual case.

intel038
PDF Page 54
4.1.1 (Page19) Architecture overview
"A SAS device (see 4.1.4) is an ATA device or SCSI
device with ports in a SAS domain:"
Expander device is also a SAS device as defined
on page 9, 3.1.100 SAS device.

intel039
PDF Page 54
4.1.1 (Page 19) Architecture overview
"The service delivery subsystem in a SAS domain
may include expander devices"

Expander devices are not part of the "service delivery subsystem.
Expander device interfaces to the SAS service delivery subsystem.
This is also shown in Figure 4 on page 20.

intel040
PDF Page 56
4.1.3 (Page 21) Ports (narrow ports and wide ports)

"A port may contain one or more phys."
A port contains one or more phys.

intel041
PDF Page 56
4.1.3 Ports (narrow ports and wide ports)
***
Clarify whether the SAS address of the port or the device.

intel042
PDF Page 58
4.1.5 Initiator devices
"Initiator ports may support SSP and/or STP and/or SATA."

SAS initiator does not support native SATA as stated below -
"Initiator ports supporting SATA are outside the scope of
this standard."

intel043
PDF Page 59
4.1.6 Target devices
Figure 9
Target device: Figure doesn't match text. Figure should show
SATA target device/port, perhaps as a separate block attached
to the Service delivery subsystem.

intel044
PDF Page 59
4.1.6 Target devices
SAS target device does not support SATA, it can support ATA target.
Confusing.

intel045
PDF Page 60

4.1.8.2 Edge expander device set
This sentence needs to be clarified in terms of the phys of other edge expander devices that the phys that support table routing can be attached to (eg., direct routing, subtractive routing, table routing, or all of the above) Figure 11 implies that it would only attach to a subtractive port.

intel046
PDF Page 60
4.1.8.1 Expander device overview
"Expander devices are part of the service delivery subsystem" appears to be in conflict with glossary defn for phy. Clarify SDS model.

intel047
PDF Page 60
4.1.8.1 Expander device overview
subtractive routing attribute defined in Clause 3 and general concept is clear; however, the delineation between edge/fanout due to subtractive routing is unclear. Conflicts with defn for 'edge expander device'. Please clarify.

intel048
PDF Page 60
4.1.8 (Page 25) Expander device overview

"Expander devices are part of the service delivery subsystem."
- expander is not part of the service delivery subsystem as shown in Fig. 4 on page 20. Expander interface to the service delivery subsystem.

intel049
PDF Page 60
4.1.8.1 Expander device overview
Fig 10 (Pae 25) Expander device
Expander only interface to SATA target. The diagram is not clear that it seems it also allows the expander device interface to SATA initiators, SATA expander ports.

intel050
PDF Page 60
4.1.8.1 Expander device overview
"There are two types of expander devices differentiated by the routing attributes of their phys, edge expander devices and fanout expander devices."

The expander device which is not the leaf edge expander within the edge expander set behaves differently than an edge expander and fanout expander. It has the routing capability as the fanout expander but it also has a subtractive port which fanout expander does not have. Thus, there are THREE types.

intel051
PDF Page 60
4.1.8.2 (Page 25) Edge expander device set
"attached to the phys supporting subtractive routing on another edge expander device set;"
change to
"attached to the phys supporting subtractive routing on another edge expander or edge expander device set;"
to make it clear even an edge expander is a subset of edge expander set

intel052
PDF Page 61
4.1.8.3 (Page 26) Configurable expander device
"Expander devices with a configurable route table [MAY] depend on the application client within one or more initiator devices to use the discover process (see 4.6.11.5) to configure the expander route table."

The edge expander set can self-initialize itself.

intel053
PDF Page 62
4.1.9 Domains
Figure 12
Add 'STP' targ port.

intel054
PDF Page 62
4.1.9 Domains
Figure 12
Also need to show SMP connections in the SAS domain.

intel055
PDF Page 62
4.1.9 (Page 27) Domains

"The expander port attached to a SATA target port
translates STP to SATA;"

It should also mention the case where the expander attached to a
STP target port where the expander only need to pass thru STP traffic.

intel056
PDF Page 63
4.1.10 (Page 28) Expander device topologies

Clarify:
Is edge expander device set a _single_ SAS device?
Probably not because edge expander device set has one or more
device name?

intel057
PDF Page 64
4.1.11 (Page 29) Connections
"A connection is an association between an initiator port and
a target port."

A "connection" is a physical path that is logically established and
has the right to pass information between the initiator and the
target as only as the logical establishment is maintained. Clarify.

intel058
PDF Page 65
4.1.11
Connections "to pathway" changed to "the pathway"

intel059
PDF Page 66
4.1.12 Pathways
"the pathway consists of all the physical links required to route
dwords between the initiator phy and the target phy"

Definition is not quite the same as defined in 3.1.83 on page 9

intel060
PDF Page 66
4.1.10 Expander device topologies
Figure 17 - Multiple connections on wide ports
Initiator
***
This Initiator shows two ports. The Expander device has two
corresponding Expander ports. CLARIFY how the expander can determine
there are two ports if the initiator reports the same "device"
SAS address in the Identify address frame on all 6 phys?

Need an overview of multi-ported devices and usage of
device & port SAS addresses.

intel061
PDF Page 68
4.2.2 SAS addresses
***
Specify which one is reported when device has multple ports in the
same domain.

intel062
PDF Page 69
4.2.5 Port identifiers
***
Clarify whether this is the SAS address reported in the Identify
message, or is it the "device" SAS address?

intel063
PDF Page 84
4.6.1 Expander device model overview
bullet a).C)
Is this the "Broadcast" Primitive Processor? If so, I think the
original "Broadcast" was clearer. If not, then
the "BPP" acronym doesn't match. Other places including
the Acronym glossary in section 3.2, and section 4.6.5,
"BPP" continues to be referred to as the "Broadcast Primitive Processor".

intel064
PDF Page 84
4.6.1 Expander device model overview (c):
***
Clarify how the expander determines how to group phys
under ports. If it's based on the SAS address reported in the
Identify address frame, all phys attached to the same "device"
must form a single port?

intel065
PDF Page 86
4.6.5 Broadcast primitive processor (BPP):
I don't believe "SL_IR primitive requests" has been defined anywhere.
Does it include RESET? ALIGN? BROADCAST primitives? If there is a
subset of all the primitives that applies that's different from
the BROADCAST primitives defined in section 7.1, they ought to be
so designated as SL_IR primitive requests in section 7.1. If
"SL_IR primitive requests" are the same thing as "Broadcast
Primitives", then the text here should use the same term.

intel066
PDF Page 90
4.6.9 Expander connection router interface
Table 24
Transmit Close
Replace "an CLOSE" with "a CLOSE"

intel067
PDF Page 92
4.6.11.1
Define a method for identifying/reporting this case for
self-initialized.

intel068
PDF Page 94
4.6.11.4 Expander route index order
change "has" to "have"

intel069
PDF Page 96
4.6.11.4 Expander route index order
"U" should be changed to "V" ***

intel070
PDF Page 111
5.7.3.3 Jitter Tolerance Masks

change "Z1" to "Z1tol"

intel071
PDF Page 112
5.7.4 Transmitted Signal Characteristics

General comment: A 3Gb PHY hitting maximum specs for compliance point CT will not be able to pass both bit rate r/f times. Reduce min r/f time for 1,5 from 133 to 67ps.

intel072
PDF Page 116
5.7.9 Impedence specifications
Table 39 - Impedance requirements footnote f:
The text uses an upper-case greek letter "gamma" that normally represents a complex number. To represent the "magnitude" of the reflection coefficient, use the lower-case greek letter "rho".

intel073
PDF Page 116
5.7.9 Impedance specifications
Table 39 - Impedance requirements footnote f:
The text uses an upper-case greek letter "gamma" that normally represents a complex number. To represent the "magnitude" of the reflection coefficient, use the lower-case greek letter "rho".

intel074
PDF Page 117
5.7.11 Transmitter characteristics
Clarify whether both cases must pass, or whether one or the other is sufficient.

intel075
PDF Page 139
6.6.4.2
table 49 Footnoote
The reference doesn't appear to be applied to anything.
In any case the comment doesn't belong with this table as it is defined as the SAS speed negotiation.
Correct ref or delete.

intel076
PDF Page 143
6.8.1 Overview

"SP0:SAS_PowerOn state" is not defined anywhere within the document. Define this state.

intel077
PDF Page 143
6.8.1 Overview
Define 'DWS' in clause 3

intel078
PDF Page 144
6.8.2 OOB sequence states
Fig 56

Entry action is not listed as described in 6.8.2.2.1 on page 110.

intel079
PDF Page 144
6.8.2 OOB sequence states
Fig 56
"Transmit COMSAS"
When should this action be executed? Clarify.

intel080
PDF Page 144
6.8.2 OOB sequence states
Fig 56

SP7:OOB_AwaitCOMSAS entry action is not listed as
described in 6.8.2.7.1 on page 111

intel081
PDF Page 144
6.8.2 OOB sequence states
Fig 56

The "Broadcast Event Notify" transition looks like an
unconditional jump in the state diagram, but it
actually only transit if all the conditions list
in 6.8.2.7.2 are true.

It is very misleading as shown in the state diagram.

intel082
PDF Page 144
6.8.2 OOB sequence states
Fig 56 SAS phy (SP) state machine - OOB sequence states

With all the missing transition conditions and entry action
conditions, it makes this state diagram practically useless.
Add complete details or remove so as not to cause confusion.

intel083
PDF Page 144
6.8.2 OOB sequence states
Fig 56

"Transmit COMINIT"

When should this action be executed? When entering SP1?

intel084
PDF Page 144
6.8.2 OOB sequence states
Fig 56

"PhyNotReady"
When should this action be executed?
When entering SP1?

intel085
PDF Page 145
6.8.2.1.2 Transition SP1:OOB_COMINIT to SP2:OOB_AwaitCOMX

"a COMINIT Transmitted parameter and does not receive
a COMINIT Detected parameter."

In Fig 56 on page 109, the transition condition
only listed "COMINIT Transmitted"parameter"

intel086
PDF Page 145
6.8.2.1.3 (

"a COMINIT Detected parameter and does not receive a
COMINIT Transmitted parameter"

In Fig 56 on page 109, the transition condition only
listed " COMINIT Detected"

intel087
PDF Page 145
6.8.2.2.1 State description

Ambiguous: COMINIT and COMSAS could be read as modifiers for 'timeout'.
Add 'detect' after each.

intel088
PDF Page 145
6.8.2.3.1 State description

"but the COMINIT initiated in
SP1:OOB_COMINIT has not been completely transmitted."

This condition is not shown in state diagram Fig 56 on page 109.

intel089
PDF Page 145
6.8.2.4.2 Transition SP4:OOB_COMSAS to SP5:OOB_AwaitCOMSAS_Sent

"and does not receive a COMSAS Transmitted parameter."

This condition is not listed in the transition in Fig. 56 on 109,
which may cause race condition in SM.

intel090
PDF Page 146
6.8.2.4.4

"and does not receive a COMSAS Detected parameter."

This transition condition is not listed in Fig 56 on page 109

intel091
PDF Page 146
6.8.2.6.2 (Page 111)

"The COMSAS Completed parameter may be received before
this state is entered."

How long does this COMSAS Completed
or other completed/transmitted/detected) signal stay valid
after the event?

Since this is the only place in this state machine description
where receiving "before" the state is OK. Does it mean that all
other detection/transmitted/etc. paramters are required to be valid
only after the corresponding state has been entered?

intel092
PDF Page 146
6.8.2.7.1 State description

In Fig 56 on page 109, it states "COMSAS detected",
is "received" the same as "detected?

intel093
PDF Page 147
6.8.2.7.5 Transition SP7:OOB_AwaitCOMSAS to SAS_AwaitNoCOMX

Change "SAS_AwaitNoCOMX" to "SP2:SAS_AwaitNoCOMX"

intel094
PDF Page 148
Figure 57 (Page 113)
   When should "Transmit ALIGN1" should be sent?
   The text in 6.8.3.4.1 says "repeatedly send", but this is not
reflected in this state diagram.

intel095
PDF Page 148

6.8.3 SAS speed negotiation states
Figure 57

"No more rates" is not even close to what is
described in 6.8.3.7.2 on page 116. Clarify.

intel096
PDF Page 149
6.8.3.1.1 (Page 114)
"During this state idle shall be transmitted."

This requirement is not listed in the state diagram
state SP8 in Fig 57 on page 113

intel097
PDF Page 149
6.8.3.2.1 (Page 114)

Clarify:
Is "enabled" the same as "started"?

intel098
PDF Page 149
6.8.3.2.1
"During this state idle shall be transmitted."

This requirement is not listed in the state diagram state
SP8 in Fig 57 on page 113

intel099
PDF Page 149
6.8.3.3.1 (Page 114)

Need clarification:
Is "enabled" the same as "started"?

intel100
PDF Page 149
6.8.3.3.1 (Page 114) State description
"if synchronization occurs before the SNLT expires."
     Need to clarify what "synchronization" means, I think it is trying
to say either "ALIGN0 Detected" or "ALIGN1 Detected". Usually
the word "synchronizatin" means something else. This sentence
can be deleted because the same action is clearly described in
6.8.3.3.2 and 6.8.3.3.3 .
   Also, missing transition if only SNLT expires and
no "synchronization" in this state?

intel101
PDF Page 150
6.8.3.4.1
"This state is exited when the SNTT expires or when ALIGN (1)
primitives are received before the SNLT timer
expires."

This same information is repeated at 6.8.3.4.2

intel102
PDF Page 150
6.8.3.5.1 (Page 115)
"This state is reached after ALIGN (1) has been both
transmitted and received."
    This sentence is not describing the same behavior as
shown in the state diagram - Fig 57 on page 113.
    Change to:
"This state is reached after ALIGN(1) has been recovered before
the SNLT timer expires"

intel103
PDF Page 151

6.8.3.8.1
"While in this state dwords from the link layer are transmitted
at the negotiated physical link rate."

Who (in what state/state machine) is responsible to tell the
PHY what the negotiated link rate is? Clarify.

intel104
PDF Page 153
6.8.4 SATA host emulation states
Figure 58
SP16:SATA_COMWAKE
Missing input parameter "COMWAKE Transmitted" with dotted
line unfilled arrow into SP16.

intel105
PDF Page 153
6.8.4 SATA host emulation states
Figure 58 - SAS phy (SP) state machine - SATA host emulation states
SP20: SATA_AdjustSpeed
dotted unfilled arrow with parameter (Transmit D10.2)
and
dotted unfilled arrow with parameter (Set Rate)
It seems it may have to send "Set Rate" parameter before
"Transmit D10.2", please clarify.

intel106
PDF Page 154
6.8.4.4.1 State description
"a) repeatedly send a Transmit D10.2 parameter to the SP transmitter"
"repeatedly send" is not shown in the state diagram in Fig 58
as a condition required for transmitting D10.2

intel107
PDF Page 154
6.8.4.4.1 State description
***
GLOBAL
"b) start the ALIGN detect timeout timer"
It looks like this is a state entry action and it
is not listed in the state diagram in Fig 58
THIS IS one of a pattern of incomplete definitions due to the
assumption of hidden, underlying state machines. Need to explicitly
identify these implicit state machines and the signals/messages they
exchange with other SMs.

intel108
PDF Page 154
6.5.4.4.1 State description
"The SAS device shall start transmitting D10.2 characters no
later than 20 G1 dwords (i.e. 533 ns) after COMWAKE was deasserted"
Use of COMWAKE is confusing - sometimes parms are received,
sometimes CW is 'deasserted' - what is it?
This seems as a state entry action and it does not show the
relation of transmitting D10.2 characters no later than 20 G1
dwords after COMWAKE was deasserted in the state diagram in Fig 58.
Since not all SAS implementation required to support G1 speed,
this state should not specify requirement in "G1 dwords", instead
it should just specify time - 533 ns.

intel109
PDF Page 172
7.1.4.4 BROADCAST
If an expander's routing tables are configured by initiators,
how does an expander know the initialization sequence has
completed? Clarify.

intel110
PDF Page 173
7.1.4.9 NOTIFY
NOTIFY (ENABLE_SPINUP)
Add correct reference.

intel111
PDF Page 173
7.1.4.9 Notify
Meaning of 'accept' here requires clarification.

intel112
PDF Page 176
7.1.5.3 DONE
Table 63
Ack/NAK TIMEOUT
"is going to" Sentence s/b xref to where the behavior is defined

intel113
PDF Page 177
7.1.6.3 SATA_HOLD and SATA_HOLDA

"...transmitting a SATA_HOLD." should be changed to
"...receiving an SATA_HOLD"

intel114
PDF Page 197
7.12.2.1 Connection Request

"If none of the prospective intermediate physical links [does not]
support the requested connection rate, ..."
   Remove "does not"

intel115
PDF Page 201
7.12.4.2 Edge Expander Devices
Par. 5, last sentence
"When a fanout expander device is in the domain, an
OPEN_REJECT (NO DESTINATION) is returned."

"is returned" - who returns?

intel116
PDF Page 201

7.12.4.2 Edge expander devices

The simple edge expander device routing table described
in table 80 needs to be reconciled with the expander
routing table described in "4.6.11.3 Expander route table."

Text needs to describe when it's appropriate to use the simpler
table vs. the more complex table and what the restrictions are
if a simpler approach is used.

intel117
PDF Page 209
7.13.3.1 State Description
par. 7 . (i.e) Explanation missing regarding what should be done about
data dwords transmitted between consecutive EOAFs. SOAFs is clear.
(Multiple occurrences)

intel118
PDF Page 226
7.16.3 SSP frame transmission
"Every frame shall be acknowledged" By whom? Place the requirement

on something.

intel119
PDF Page 226
7.16.3 SSP frame transmission
Create new subclause for frame reception.

intel120
PDF Page 226
7.16.3 SSP frame transmission
   "Every frame shall be acknowledged" conflicts with
7.16.7.9, which describes some frames that are dropped.
Qualify with 'valid' or something.

intel121
PDF Page 233
7.16.7.2 SSP_TIM1:Tx_Interlock_Monitor state

'When the number of EOF Transmitted parameters received' - These
are signals, indications, something. They are not parameters.
Use an appropriate term, see ANSI IT Dictionary.

intel122
PDF Page 248
8.1 Overview
"PC_OC" s/b replaced with "PL_OC"

intel123
PDF Page 248
8.1 Overview
'establish port connections and disconnections' - Sounds awk
to establish a disconn. Reword.

intel124
PDF Page 248
8.2 Overview
'pass transmit data, receive data'   AWK - reword.
Suggest 'data for transmission, received data'

intel125
PDF Page 248
8.1 Overview
'...form the port layer' AWK. Rearrange sentence.
Suggest 'The port layer consists of...'

intel126
PDF Page 249
8.2.2 Bus inactivity time limit timer
ALL OTHER TIMERS
'The timer shall count down' - specify when
(or include xref to spec, here, 8.4.4.1)it starts.
(For this and all other defined timers)

intel127
PDF Page 252
8.3.2.2 Transition PL_OC1:Idle to PC_OC2:Overall_Control

In this heading, the heading number is duplicated and PC_OC2
should be changed to PL_OC2

intel128
PDF Page 252
8.3.3.1.1 State Description Overview

PM_PM should change to PL_PM

intel129
PDF Page 252
8.3.3.1.1 State description overview
The Tx Frame parameter

"following arguments: Balance Required or Balance Not Required"
BR and BNR are not arguments, they are possible values of an argument
that should be called 'Balance Requirement' or something similar.
Correct.

intel130
PDF Page 252
8.3.3.1.1 State description overview
GLOBAL
"parameter" s/b 'request' as per 4.3.3.2 .

intel131
PDF Page 252
8.3.3.1.2 Keep track of connections/frame requests

"Keep track of connections/frame requests" is the first
time I've seen an imperative used as a subclause title.
Replace with   "Connection frame/request tracking"

intel132
PDF Page 252
8.3.3.1.2 Keep track of connections/frame requests

"A phy is available if it is not processing a Tx Frame"
What if it has lost sync, etc? Add defn for 'available'
or qualify. Clarify.

intel133
PDF Page 252
8.3.3.1.1 State description overview
GLOBAL

The information ("parameters/arguments" to/from
various state machines and layers) discussed throughout
this clause needs to be defined as per 3.7.

Very confusing: for example, "parameter shall include as arguments:"

intel134
PDF Page 253
8.3.3.1.4 SSP wide port rules
Multiple in subclause
"An initiator port shall not transmit ...for which...transmitting
a frame [ ]" Add "on another phy".

intel135
PDF Page 253
8.3.3.1.3 Select a request to process and the phy on which to process it
GLOBAL
"Tx Frame request" Elsewhere, Tx Frame is called a
parameter. Change all occurences to 'request'.

intel136
PDF Page 253
8.3.3.1.3 Select a request to process and the phy on which to process it
1)
Is 'Tx Frame request' the same as 'Transmit Frame request' above?
If so, be consistent in usage, if not, add some modifier to
one to make the distinction clear.

intel137
PDF Page 253
8.3.3.1.3 Select a request to process and the phy on which to process it
"A destination is considered the same" - AWK
suggest:
  "Destinations are considered to be identical if they have

the same protocol and SAS address."

intel138
PDF Page 253
8.3.3.1.2 Keep track of connections/frame requests

"This state shall consider a phy as having an active connection"
Drop "shall consider" and define it:
"A phy has an active connection when..."

intel139
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments
3d para
"Balanced" Remove 'd'

intel140
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments
3d para
"argument" -> 'value'

(This appears to be redundant to 8.3.3.1.1)
Confusing use of 'argument' and 'parameter'

intel141
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments
"are transferred to the selected PL_PM's AWT timer and
PBC counter" By whom? The PL_PM, or the PL_OC2? Clarify.

intel142
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments
"are not received" Place reqmt on sender that it not
send, or clarify that these are not present within TxFrame,
or are ignored on receipt.

intel143
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments
"are received as arguments"
   s/b
"are present in "

intel144
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments
"a corresponding PL_OC Retry Frame AWT timer"
Provide separate text listing all architectural timers and their
functions.

intel145
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments
The I_T nexus loss
"The selected PL_PM timer shall be set" Express in
active voice (who shall?).

intel146
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments
"state (i.e, either stopped,"
Clarify that you are defining the possible states or ref
where defined. "i.e." is a bit too casual.

intel147
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments

'are read from' Use active voice.

intel148
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments

"is updated" Use active voice.

intel149
PDF Page 255
8.3.3.1.6 Confirmations
"to finish servicing each Transmit Frame request." Unclear -
is this how THIS state completes the request, or does it
tells the Transport layer to do so? Clarify.

intel150
PDF Page 255
8.3.3.1.6 Confirmations
"Since the transport layer responses ...are instantaneous"
'are returned immediately' seems better if the intent is
(response returned as soon as request received). Clarify.

intel151
PDF Page 255
8.3.3.1.6 Confirmations
Need comma after e.g.
"to continue" may be clearer.

intel152
PDF Page 255
8.3.3.1.6 Confirmations
"parameter" -> "confirmation"?

intel153
PDF Page 255
8.3.3.1.6 Confirmations
Table 86 header
"parameter" s/b 'value' or 'code'

intel154
PDF Page 256
8.3.3.1.7 Handling Cancel requests
"Cancel request for a specific Transmit Frame request"
There is no listing I could find of the arguments to a
Cancel request. Add xref to that defn. Clarify the means
by which a specific TF request is identified.

intel155
PDF Page 256
8.3.3.1.7 Handling Cancel requests
"send a Cancel Acknowledge...and terminate"
Either change order to (terminate, ack), or add prohibition
on beginning TF processing.

intel156
PDF Page 256
8.3.3.1.7 Handling Cancel requests

"layer, this frame is currently" Ambig.
s/b " layer and the specified frame "? Clarify.

intel157
PDF Page 256
8.3.3.1.7 Handling Cancel requests

"layer, this frame is currently" AMBIG
s/b " layer and the specified frame "? Clarify.

intel158
PDF Page 260

8.4.3.1.4 Open Failed handling
"parameter" - confirmation?

intel159
PDF Page 262
9.1 Transport layer overview
clarify:
 "only receives from the link layer those frames that are to be ACKed."

intel160
PDF Page 264
9.2.1 SSP frame format
RETRANSMIT
"may be set to one"
Add xref or "shall be set to one" when a RESP frame is a retrans.

intel161
PDF Page 264
9.2.1 SSP frame format
For DATA
"to that" s/b "to the tag"

intel162
PDF Page 264
9.2.1 SSP frame format
TP Xfer Tag
"need" s/b "use"
(We don't care if they NEED it, just whether they use it)

intel163
PDF Page 264
9.2.1 SSP frame format
TPXfer Tag
"do not need this field" Clarify whether TP can
use it sometime, but not other times. or say "use"

intel164
PDF Page 264
9.2.1 SSP frame format
Table 89 - FRAME TYPE field
***
Max data frame size is inefficient for block-sizes greater
than 512 bytes. This is a serious problem for systems that
use data-integrity guards on a block-by-block basis. Recommend
the max DATA IU payload accommodate two blocks with a
generously-sized block-guard (16-bytes). Change (1 024) to (1 056).

intel165
PDF Page 265
9.2.1 SSP frame format
DATA frames
"each DATA frame shall begin on a dword boundary"
  It's the TRANSFER, frame. Drop (i.e.)

intel166
PDF Page 265
9.2.1.1 COMMAND information unit
"SPC-2" if referencing SAM-3, why not SPC-3, especially
when ref'd on next page. Be consistent. Suggest SPC-3.

intel167
PDF Page 265
9.2.1 SSP frame format
The INFORMATION UNIT field

1
024   - Make space non-breaking (ctrl-space)

intel168
PDF Page 266

9.2.2.2 TASK information unit
"request a" s/b "request that a"

intel169
PDF Page 268
9.2.2.3 XFER_RDY information unit
"each DATA frame shall begin on a dword boundary"
Remove (ie)

intel170
PDF Page 268
9.2.2.3 XFER_RDY information unit
"non-dword aligned write data length"
A length does not have alignment.
Remove the paren statement.

intel171
PDF Page 268
9.2.2.3 XFER_RDY information unit
GLOBAL
"frame for a given command shall set"
Frames don't set themselves. Place the reqmt on some port.

intel172
PDF Page 270
9.2.2.5.1 RESPONSE information unit overview
Table 96 - RESPONSE information unit
STATUS - Following text does not give ref to where
STATUS values defined. (make sure for all fields)

intel173
PDF Page 271
9.2.2.5.3 RESPONSE information unit RESPONSE_DATA format
"The SENSE DATA field shall not be present."
Make clear that this and related reqmts are conditional
on the DATAPRES == RESP_DATA, and not global. Suggest
unordered list under "If the DATAPRES..."

intel174
PDF Page 272
Table 99
9.2.2.5.3 RESPONSE information unit RESPONSE_DATA format
"NO FAILURE, when responding to a COMMAND frame"
Response data would not be returned if there was no
error. Remove this.

intel175
PDF Page 272
9.2.2.5.4 RESPONSE information unit SENSE_DATA format
"The RESPONSE DATA LIST LENGTH field shall be set to zero"
Make clear that thes reqmts are conditional on DATAPRES value.

intel176
PDF Page 274
9.2.4.1 COMMAND frame

"whether ...received or not" 'Whether' is sufficient to
cover both cases. Drop "or not".

intel177
PDF Page 274
9.2.4.1 COMMAND frame
"command [ ] was ACKed" add "frame"

intel178
PDF Page 274
9.2.4.3 XFER_RDY frame
"close the connection ..return a [ ] CHECK CONDITION status"

Does this mean "generate a UA"?

Add "a RESPONSE FRAME with" (MULTIPLE places)

Does it establish a new connection to send the RESPONSE? Clarify.

intel179
PDF Page 274
9.2.4.3 XFER_RDY frame
"does not receive an ACK or NAK"
   Over what time period? Clarify.

intel180
PDF Page 275
9.2.5.1 Target port error handling
"too short to contain a LUN field"
   Be explicit - state number of bytes.

intel181
PDF Page 275
9.2.5.1 Target port error handling
"contains a LUN field but is too small to contain a CDB"
If frame is malformed, how could you say it has LUN but not CDB?
Replace this with a list of sizes, in bytes, and the appropriate
responses.

intel182
PDF Page 275
9.2.5.1 Target port error handling
"OVERLAPPED COMMANDS DETECTED"
   State (non) requirements on checking.

intel183
PDF Page 275
9.2.5.1 Target port error handling
'TAG that is already in use' - Should be small caps only if
referring to the field, but not to the value. Correct.

intel184
PDF Page 276
9.2.5.1 Target port error handling
ILLEGAL TARGET PORT TRANSFER TAG - Although the tag may be
invalid, there's no indication that it's illegal.
Rename ASC - use INVALID.

****

Comments attached to Yes ballot from Dennis Moore of
KnowledgeTek, Inc.:

KnowledgeTek #1
PDF Page 43
3.1.62 indication:
The definition says < passed from lower layer... >
3.5.1 State machine convetions overview, Figure 3 shows < indication from
upper layer... >

KnowledgeTek #2
PDF Page 44
3.1.98 response:
definition says < passed from a higher layer...>
3.5.1 State machine conventions overview, figure3
says < to upper layer...>

KnowledgeTek #3
PDF Page 88
4.6.7 Expander device interface detail
Figure 27
'Link Status' sb 'Phy Status' or Table 23 needs to change its entries to
'Link Status'

KnowledgeTek #4
PDF Page 88
4.6.7 Expander device interface detail
Figure 27
All of the requests and indications using "Send" sb "Transmit" or Table 24 should change its entries to "Send".
There are eight occurences of "Send" in this figure that should change to "Transmit"

KnowledgeTek #5
PDF Page 88
Send

KnowledgeTek #6
PDF Page 88
Send

KnowledgeTek #7
PDF Page 88
Send

KnowledgeTek #8
PDF Page 88
Send

KnowledgeTek #9
PDF Page 88
Send

KnowledgeTek #10
PDF Page 88
Send

KnowledgeTek #11
PDF Page 88
Send

KnowledgeTek #12
PDF Page 92
4.6.11.1 Routing attributes and methods
4th paragraph
The following paragraph implies that the routing will be either table OR direct, not both:
"A phy that has the table routing attribute allows the expander connection manager to use one of the following methods to route connection requests:
a) the table routing method if attached to an expander device; or
b) the direct routing method if attached to an end device."
4.6.11.2 Expander device connection request routing
2nd paragraph
This paragraph says that if the "DISABLE ROUTE ENTRY bit" is set the entry is ignored (I assume that means the connection request will get an OPEN_REJECT response???):
"If the destination SAS address of a connection request matches the attached SAS address of an expander route entry and the DISABLE ROUTE ENTRY bit is set to one in the expander route entry, then the expander connection manager shall ignore the expander route entry."
4.6.11.3 Expander route table
10th paragraph
This paragraph states that the"attached" expander's entry is disabled(I assume this means directly attached and not cascaded expanders beyond the one directly attached???):
"If the discover process detects an expander route table entry that references the SAS address of an attached edge expander device, it shall set the DISABLE ROUTE ENTRY bit to one in the expander route table entry."
Given the above, how can access to internal devices (i.e., SMP Target function) that share the expanders SAS address be accomplished?

KnowledgeTek #13
PDF Page 96
4.6.11.4 Expander route index order

Table 26 - Expander route table levels.
The first entry in the table for level one should be the expander SAS address of expander N. Level two entries should begin with the device SAS addresses attached to phy0 of expander N. etc....
There is only one Level 1 entry per phy. I believe the whole table is wrong...
(I'm assuming the text is correct in paragraph 2, including numbered list, of the same clause???).
That text follows here:
For purposes of configuring the expander route table, the edge expander devices attached to the phy are assigned levels:
1) the attached edge expander device is considered level 1;
2) devices attached to it are considered level 2;
3) devices attached to level 2 edge expander devices are considered level 3; and
4) etc.

KnowledgeTek #14
PDF Page 98
4.6.11.4
Table 27 - Expander route table entries for edge expander E0 phy 0
see comments for table 26
The level 1 entries should be the devices attached to the E0 phy 0, that is edge expander E1.
Level 2 entries are the devices attached to edge expander E1 (i.e., D1,1... D1,Y)
I'm assuming the text is correct in the 2nd paragraph, including numbered list, of the same clause.

KnowledgeTek #15
PDF Page 98
4.6.11.4
Table 28 - Expander route table entries for fanout expander device F phy 0
See comment on table 27, same type of errors apply to this table.

KnowledgeTek #16
PDF Page 99
4.6.11.5 Discover process
1st paragraph
"The order of traversal shall be to discover:
1) the expander device to which the initiator port is attached;
2) every device attached to that expander device; and
3) as each expander device is found, every device attached to that expander device."
The above requires traversal to go down each phy to end before moving to the next phy. This seems to complicate the process of building the routing table entries since the order is based on level. Why the requirement as stated???

KnowledgeTek #17
PDF Page 134
6.6.2.2 SATA speed negotiation sequence (informative)
Figure 49
Time reference is incorrect. 533 ns sb 53,3 ns

KnowledgeTek #18
PDF Page 143
6.8.1 Overview
A reference is made to "SP0:SAS_PowerOn state" in the thrid paragraph. This state does not appear in the state figures nor is there a state description of function or how it transistions to other states. Nor is it listed in the preceeding paragraph of SP states.

KnowledgeTek #19
PDF Page 145
6.8.2.3 SP3:OOB_AwaitCOMINIT_Sent state
6.8.2.5 SP5:OOB_AwaitCOMSAS_Sent state
6.8.2.6 SP6:OOB_AwaitNoCOMSAS state
The above states have only one way out. If that event doesn't occur it appears the only way out is reset. Is that the intent???

KnowledgeTek #20
PDF Page 149
6.8.3.1.1 State description.4th paragraph, item b)
states:
"to the value of the speed negotiation window received as an argument."
This "argument" is not shown in the state diagram figure 57 nor is there an indication of where it comes from.

KnowledgeTek #21
PDF Page 150
6.8.3.6.2 Transition SP13:SAS_Pass to SP8:SAS_Start
1st paragraph, item a)
SN_start state sb SP8:SAS_Start state.

KnowledgeTek #22
PDF Page 152
6.8.4 SATA host emulation states
1st paragragh
states:
...(an initiator device...
Is this allowed????

KnowledgeTek #23
PDF Page 250
PM1:

KnowledgeTek #24
PDF Page 250
8.3.1Overview
Paragragph 3
Sentence 2
PL_PM1:Idle sb PL_OC1:Idle

KnowledgeTek #25
PDF Page 251
Clause 8.3.2.1 & 8.3.2.2
8.3.2.1 & 8.3.2.2 is repeated in the clause heading

KnowledgeTek #26
PDF Page 251
8.3.2 repeated

KnowledgeTek #27
PDF Page 252
Clause 8.3.2.1 & 8.3.2.2
8.3.2.1 & 8.3.2.2 is repeated in the clause heading

KnowledgeTek #28
PDF Page 252
8.3.3.1.1 State description overview
1st paragraph
PM_PM sb PL_PM

KnowledgeTek #29
PDF Page 268
2nd paragraph, last sentence states:
"The minimum size of the data IU is one byte."
9.2.1 SSP frame format
Table 89 states:
"0 - 1024 bytes" under infomation unit size.
Assumming text takes precedence over tables and the text is correct, Table 89 needs to be fixed.

KnowledgeTek #30
PDF Page 295
9.4.2 SMP_Request Frame
1 023 bytes sb 1 024 bytes.

KnowledgeTek #31

PDF Page 296
9.4.3 SMP_RESOPONSE Frame
1 023 bytes sb 1 024 bytes

KnowledgeTek #32
PDF Page 333
10.3.1.3 REPORT MANUFACTURER INFORMATION function.
This paragraph does not apply and should be deleted or the field does apply and needs to be added to table 133.
The ADDITIONAL LENGTH field indicates the length in bytes of the parameters, including the ADDITIONAL LENGTH field. If the ADDITIONAL REQUEST BYTES of the SMP_REQUEST is too small to transfer all of the parameters, the ADDITIONAL LENGTH shall not be adjusted to reflect the truncation.

KnowledgeTek #33
PDF Page 340
10.3.1.5 REPORT PHY ERROR LOG function
None of the following fields indicates if the field wraps or freezes at max count.
INVALID DWORD COUNT
DISPARITY ERROR COUNT
LOSS OF DWORD SYNCHRONIZATION COUNT
PHY RESET PROBLEM COUNT

KnowledgeTek #34
PDF Page 350
10.3.1.9 PHY CONTROL function
PARTIAL PATHWAY TIMEOUT VALUE description does not state if this value is always update or not regardless of phy operation requested..

****

Comments attached to No ballot from John Lohmeyer of
LSI Logic Corp.:

LSI #1 [JL]
PDF Page 3
Abstract

The abstract is incomplete. SAS also defines a physical layer and a management protocol (SMP).
Consider replacing the existing abstract with:
This standard specifies the functional requirements for the Serial Attached SCSI (SAS) physical interconnect, which is compatible with the Serial ATA physical interconnect. It also specifies three transport protocols, one to transport SCSI commands, another to transport Serial ATA commands to multiple target devices, and a third to support interface management.

LSI #2 [JL]
PDF Page 9
1.19 Revision Information

sas-r02c in 1.19 should be sas-r03, but all of the revision history needs to be removed for public review anyway.

LSI #3 [JL]
PDF Page 33
Foreword

I think it is appropriate to give a credit to the Serial Attached SCSI Working Group, which did the initial SAS proposal. This credit should go after the T10 member list.

Possible wording:
The Serial Attached SCSI Working Group provided the initial proposal for this standard. This Working Group consisted of the following member companies: <<<This list needs to be reviewed for accuracy>>>

Adaptec Corp.
Amphenol
BREA Technologies
Compaq Computer Corp.
Crossroads Systems, Inc.
Cypress Semiconductor
Data Transit Corp.
Dell
Eurologic Systems Limited
FCI
Fujitsu Limited
Hewlett Packard Co.
Hitachi America, Ltd.
IBM Corp.
I-TECH Corp.
KnowledgeTek, Inc.
LSI Logic Corp.
Marvell Technology Group Ltd.
Maxtor Corp.
Molex Inc.
NEC Electronics
QLogic Corp.
Seagate Technology
Serverworks
Sierra Logic
Silicon Image
Western Digital

LSI #4 [JL]
PDF Page 40
3.1.8 ATA target device and 3.1.9 ATA target port

Since both ATA target device and ATA target port are equivalent to a device in ATA, does this mean that ATA target devices and ATA target ports are equivalent? If not, then one of these things is not equivalent to an ATA device.

LSI #5 [JL]
PDF Page 40
3.1.8 ATA target device and 3.1.9 ATA target port

See previous comment.

LSI #6 [JL]
PDF Page 41
3.1.32 downstream phy

Replace "direction frame transmission" with "direction of frame transmission"

LSI #7 [JL]
PDF Page 41
3.1.37 end device

Delete "that is not contained within an expander device".

This is the first of several comments on "internal devices" and "internal ports". The current working draft does not use this terminology consistently and needs a number of changes no matter how the problem is solved.

I prefer a solution that acknowledges that internal devices are just like external devices except for their lack of phys and does not attempt to merge internal devices into the expander device definition.

Places I addressed in my comments:
3.1.37 end device
3.1.40 expander device
3.1.43 expander port
3.1.66+ internal device
3.1.70 link
3.1.73+ logical link
3.1.82 partial pathway
3.1.83 pathway
4.1.3 Ports (narrow ports and wide ports)
4.6.1 Expander device model overview
4.1.8.1 Expander device overview.4.1.8.2 Edge expander device set: 3rd paragraph. Is 64 the maximum number of phys or devices?
4.1.8.2 Edge expander device set, Figure 11 - Edge expander device set
4.1.12 Pathways
4.4.2 Hard reset - fifth paragraph
5.3.2.1 SAS plug connector overview

Places possibly needing additional changes:
4.1.8.2 Edge expander device set: 1st paragraph; 2nd sentence. Address internal devices?
4.1.8.3 Configurable expander device: 1st paragraph; last sentence. Does the ECM route requests to non-phys?
4.1.9 Domains, Figure 12 - Domains and connections. Should internal devices be shown?
4.1.10 Expander device topologies: 3rd paragraph.
4.1.10 Expander device topologies, Figures 14-16 Should internal devices be shown?
4.1.11 Connections, Figure 17 Should internal devices be shown?
7.7.2 IDENTIFY address frame, Table 73 - Device types and paragraph above the table
7.12.4.2 Edge expander devices, Table 80
10.3.1 SMP functions. We may need to revise or add functions to properly support internal devices.
10.3.1.2 REPORT GENERAL response (in particular, the NUMBER OF PHYS field may need clarification and we may need to add a field for the number of internal ports).
10.3.1.4 DISCOVER function, Table 138 may need a clarification

LSI #8 [JL]
PDF Page 42
3.1.55 hash function

Replace "and that reduces" with "reducing"

LSI #9 [JL]
PDF Page 42
3.1.40 expander device

Replace the last sentence with:
"An expander device supports SMP via an internal SMP target device. However, this internal device is logically considered outside the expander device. Other internal devices (e.g., a SCSI device supporting enclosure services) may also be packaged with expander devices, however these devices are also logically considered outside the expander device."

LSI #10 [JL]
PDF Page 42
3.1.43 expander port

Replace "physical links or to internal initiator ports and/or target ports. Contains one or more phys." with "links. Contains zero or more phys."

LSI #11 [JL]
PDF Page 43
After 3.1.66

Add a new definition:
"3.1.66+ internal device: An end device that is physically packaged with an expander device and uses a logical link."

LSI #12 [JL]
PDF Page 43
3.1.70 link

Replace "physical link" with "physical or logical link".

LSI #13 [JL]
PDF Page 43
After 3.1.73

Add a new definition:
"3.1.73+ logical link: For internal devices, the virtual link from the expander port to the internal device port. Contains no phys."

LSI #14 [JL]
PDF Page 44
3.1.81 OOB signal

Replace "out-of-band (OOB)" with "OOB".

LSI #15 [JL]
PDF Page 44
3.1.80 OOB sequence

Replace "OOB" with "out-of-band (OOB)".

LSI #16 [JL]
PDF Page 44
3.1.82 partial pathway

Delete "physical".

LSI #17 [JL]
PDF Page 44
3.1.83 pathway

Delete "physical".

LSI #18 [JL]
PDF Page 45
3.1.101 SAS domain
Global

Replace "an ATA domain and/or a SCSI domain" with an ATA domain, a SCSI domain, or both domains".

This comment applies to all occurrences of and/or.

LSI #19 [JL]
PDF Page 45
3.1.122 Serial ATA (SATA)

Add "(see 2.4)" to the end of the definition.

LSI #20 [JL]
PDF Page 46

3.1.124 Serial Attached SCSI (SAS)

This definition is confusing in that this standard defines three protocols (SSP, STP, and SMP) plus a physical transport. It may be easiest just to delete this definition.

LSI #21 [JL]
PDF Page 47
3.2 Symbols and abbreviations

Add:
EMI electromagnetic interference

EMI is referenced in 7.15.

LSI #22 [JL]
PDF Page 50
3.4 Editorial conventions

The first sentence after Table 2 is redundant with the last sentence of the third paragraph. Delete one of these sentences.
Why does one have NAME in small caps and the other is lower-case?

LSI #23 [JL]
PDF Page 52
3.5.2 Transitions

In the last paragraph of this subclause, replace "valid in entry" with "valid upon entry".

LSI #24 [JL]
PDF Page 52
3.5.3 Parameters, requests, etc.

In the last paragraph of this subclause, replace "onto" with "to".

LSI #25 [JL]
PDF Page 52
3.6 Bit and byte ordering

In the fourth paragraph, replace "non-monotonically" with "non-sequentially".

LSI #26 [JL]
PDF Page 53
3.7 Notation for procedures and functions

In the first procedure (Procedure Name), the parenthesis do not match. If the Search example below is correct, then there is an extra right parenthesis after input-2.

LSI #27 [JL]
PDF Page 56
4.1.3 Ports (narrow ports and wide ports)

In the third paragraph, replace "with one phy" with "with only one phy".

LSI #28 [JL]
PDF Page 56
4.1.3 Ports (narrow ports and wide ports)

Rename this subclause:

4.1.3 Ports (narrow ports, wide ports, and internal ports)
Add the following paragraph:
"An internal port in an expander device does not contain a phy and is used to connect to an internal device."

LSI #29 [JL]
PDF Page 59
4.1.6 Target devices

Figure 9 - Target device
The text "STP and SMP" is too close to the line.

LSI #30 [JL]
PDF Page 59
4.1.6 Target devices

Figure 9 - Target device
Don't most ATA targets use SATA protocol instead of STP protocol?
Also, see the related comment at 4.1.11 Connections.

LSI #31 [JL]
PDF Page 60
4.1.8.1 Expander device overview

Figure 10 - Expander Device
Modify the figure to show the required SMP target port. The internal expander ports should be included in the Expander device (shaded box) while the target and initiator internal ports should be outside the shaded box.

LSI #32 [JL]
PDF Page 60
4.1.8.1 Expander device overview

Replace the second sentence of the first paragraph with:
"Expander devices include one or more internal expander ports connected to internal devices. These internal ports use a logical link that does not contain phys. All expander devices have one internal expander port connected to an internal SMP target port. They may have additional internal expander ports connected to internal initiator ports or internal target ports (e.g., a SCSI enclosure services target device)."

LSI #33 [JL]
PDF Page 60
4.1.8.2 Edge expander device set

Third paragraph. Should this maximum be the number of devices or phys?

LSI #34 [JL]
PDF Page 61
4.1.8.2 Edge expander device set
Figure 11 - Edge expander device set

Show the internal target port outside the Edge expander device set box.

LSI #35 [JL]
PDF Page 65
4.1.11 Connections

In the first list, it appears that a connection type has been omitted:
d) ATA initiator port(s) using STP to ATA target port(s) using STP.
If this connection type is not intended to be supported, then delete STP target ports from the second paragraph in 4.1.6 and from Figure 9

LSI #36 [JL]
PDF Page 66
4.1.11 Connections

In the third list, why does item d) appear on the next page? There is plenty of room to place it on the same page with the first three list items.

LSI #37 [JL]
PDF Page 66
4.1.12 Pathways

Is there a pathway to an internal target device? If so, then the first paragraph needs some changes to accommodate targets without phys. I suggest re-wording the second paragraph of this paragraph as follows:
"In the case where there are expander devices between an initiator and a target, the pathway consists of all the links required to route dwords between the initiator and the target."

LSI #38 [JL]
PDF Page 67
4.1.12 Pathways
Figure 18 - Pathways

The pathway lines and arcs obscure the physical link lines. Consider moving them a bit above or below the physical link lines.

LSI #39 [JL]
PDF Page 67
4.1.12 Pathways

Add a forward reference from the e.g. in the first paragraph under Figure 18 to the subclause on connections: (see 7.12).

LSI #40 [JL]
PDF Page 67
4.1.12 Pathways

Delete "physical" from the paragraph after figure 18.

LSI #41 [JL]
PDF Page 84
4.4.2 Hard Reset

The second paragraph, first sentence is ambiguous. What exactly does "stop transmitting" mean? Is this the Tx Off Voltage in table 35? If so, add a forward reference. What are the timing requirements to stop transmitting?

LSI #42 [JL]
PDF Page 84
4.4.2 Hard Reset

Delete the second sentence of the fifth paragraph and add the following two paragraphs after the fifth paragraph:

"If the port is an internal port within an expander device and the internal port is connected to an internal SCSI device, this causes a Transport Reset event notification to the SCSI application layer (see 10.1.4); the SCSI device shall perform the actions defined for hard reset in SAM-3.

If the port is an internal port within an expander device and the internal port is connected to an internal ATA device, the ATA device shall perform the actions defined for power-on or hardware reset in ATA."

LSI #43 [JL]
PDF Page 84
4.6.1 Expander device model overview

First list, item d). Replace "internal" with "internal expander port providing a connection for an internal SMP target port."

LSI #44 [JL]
PDF Page 85
4.6.1 Expander device model overview
Figure 25

Is there some reason that only one SATA port is shown? Don't ports automatically configure to the protocol of the attached device?

LSI #45 [JL]
PDF Page 85
4.6.1 Expander device model overview

Replace "the following:" with "additional internal expander ports providing connections for:"

LSI #46 [JL]
PDF Page 101
5.2 SAS cables and connectors
Figure 33

Where SAS uses the same connector as in SATA, the color and size should match the corresponding connector in figure 31. Thus the SATA-style host plug connector should be dark green and be the same size as the dark green signal host plug connector in figure 31.

The signal portions of the SAS internal cable connectors need to be shown in pink (just like the SATA internal cable) and the end that plugs into the target device needs to be the same width as the SAS plug connector.

LSI #47 [JL]
PDF Page 102
5.2 SAS cables and connectors
Table 29 - Connectors

Add rows for the SATA-style host plug connector and the SATA-style signal cable receptacle.

References should be to SATA for the connector drawings and to 5.4.1 for pin assignments.

LSI #48 [JL]
PDF Page 102
5.2 SAS cables and connectors

Penultimate paragraph. Replace "second" with "secondary".

LSI #49 [JL]
PDF Page 102
5.3.2.1 SAS plug connector overview

This subclause uses "internal ports" for a different concept than used elsewhere in the standard. I recommend replacing "internal ports" with "internal connections".

LSI #50 [JL]
PDF Page 102
5.3.3 SAS internal cable receptacle connector

In list item b, delete "only".

LSI #51 [JL]
PDF Page 102
5.3.4 SAS backplane receptacle connector

In list item b, delete "only".

LSI #52 [JL]
PDF Page 102
5.3.2.1 SAS plug connector overview

Since 5.3.2.1 is the only subclause under 5.3.2, promote this subclause.

LSI #53 [JL]
PDF Page 103
5.3.5 SAS internal connector pin assignments

In the first paragraph under table 30, the second sentence is either not true or misleading. The Rx and Tx signals are not crossed in the SAS internal cable assembly using the SATA-style signal cable receptacle on one end and the SAS internal cable receptacle on the other end (see figure 34).

LSI #54 [JL]
PDF Page 104
5.3.8 SAS external connector pin assignments

We should recommend that external cables be labeled to indicate how many physical links are included (e.g., X1, X2, X3, and X4 on each connector's overmolding).

LSI #55 [JL]
PDF Page 106
5.6 READY LED pin

Replace "shall" with "should". The visual output color is not important to the operation of the interface.

LSI #56 [JL]
PDF Page 106
5.6 READY LED pin
Global

List item d), last sentence. Replace "vendor-specific" with "vendor specific".

Global comment: There is no hyphen if these words are not used as an adjective modifying a noun. There are also many places in the document where the hyphen needs to be added because vendor-specific is used as an adjective modifying a noun.

LSI #57 [JL]
PDF Page 121
6.2.1 Encoding overview
Global

Replace "10 bit" with "10-bit" whenever this phrase is used as an adjective to modify characters or bytes.

This comment also applies to the occurrences of "8 bit", which should be changed to "8-bit".

LSI #58 [JL]
PDF Page 135
6.6.3 SAS to SATA phy reset sequence

The text (two paragraphs above Figure 50 - SAS to SATA OOB sequence) says that the SAS phy responds with COMRESET. However figure 50 shows a COMWAKE at this point.

LSI #59 [JL]
PDF Page 135
6.6.4.1 SAS OOB sequence

Add forward reference in first paragraph: "hot-plug timeout (see table 49)".

LSI #60 [JL]
PDF Page 136
6.6.4.1 SAS OOB sequence

In the first list, shouldn't item a) be: "... has not yet transmitted a COMINIT, followed by a COMSAS; or"

LSI #61 [JL]
PDF Page 139
6.6.4.2 SAS speed negotiation sequence
Table 49 - SAS speed negotiation sequence tieing specs (last row)

What is a SATA speed negotiation parameter doing in a SAS speed negotiation table? Either put this parameter in a different table or name of this table appropriately (e.g., delete "SAS").

LSI #62 [JL]
PDF Page 144
6.8.2 OOB sequence states
Figure 56 - SAS phy (SP) state machine - OOB sequence states

The "COMSAS Transmitted" parameter into the SP3:OOB_AwaitCOMINIT_Sent should be "COMINIT Transmitted".

LSI #63 [JL]
PDF Page 146
6.8.2.7.2 Transition SP7:OOB_AwaitCOMSAS to SP1:OOB_COMINIT

List item a) is missing the verb "is". It should read: "a) this device is in..."

LSI #64 [JL]
PDF Page 147
6.8.2.7.5 Transition SP7:OOB_AwaitCOMSAS to SAS_AwaitNoCOMX

Where does this transition really go? The subclause title is missing the state descriptor. Figure 56 shows this transition going to SP2:OOB_AwaitCOMx.

LSI #65 [JL]
PDF Page 149
Editor's Notes
Global

Obviously, the four editor's notes need to be resolved and removed.

LSI #66 [JL]
PDF Page 150
6.8.3.4.1 State description

Second paragraph should read: "This state shall repeatedly send a Transmit ALIGN1 parameter..."

LSI #67 [JL]
PDF Page 150
6.8.3.4.3 Transition SP11:SAS_AwaitALIGN1 to SP14:SAS_ AwaitSNW

Replace "SNTT" with "SNLT".

Should we add a note to clarify that this transition is not taken if ALIGN1 is detected after SNLT expires and before SNTT expires?

LSI #68 [JL]
PDF Page 150
6.8.3.5.2 Transition SP12:SAS_AwaitALIGN1 to SP13:SAS_Pass

Replace "if" with "after".

LSI #69 [JL]
PDF Page 150
6.8.3.6.2 Transition SP13:SAS_Pass to SP8:SAS_Start

The term "fallen back" is not defined. Should it be defined as an SP14 to SP2 transition?

"Fallen back" also appears in 6.8.3.6.3.

LSI #70 [JL]
PDF Page 151
6.8.3.8.1 State description

The last sentence of the last paragraph is redundant with the previous paragraph.

LSI #71 [JL]
PDF Page 153
6.8.4 SATA host emulation states

Third paragraph: Replace "specification" with "standard".

LSI #72 [JL]
PDF Page 153
6.8.4 SATA host emulation states
Figure 58 - SAS phy (SP) state machine - SATA host emulation states

State SP16 needs a COMWAKE Transmitted input parameter (see 6.8.4.1.2).

LSI #73 [JL]
PDF Page 153
6.8.4 SATA host emulation states
Figure 58 - SAS phy (SP) state machine - SATA host emulation states

State SP17 needs a COMWAKE Detected input parameter (see 6.8.4.2.2).

LSI #74 [JL]

PDF Page 153
6.8.4 SATA host emulation states
Figure 58 - SAS phy (SP) state machine - SATA host emulation states

State SP18 needs a COMWAKE Completed input parameter (see 6.8.4.3.2).

LSI #75 [JL]
PDF Page 154
6.8.4.4.1 State description

In list item c, replace "ALIGN" with "ALIGN0".

LSI #76 [JL]
PDF Page 154
6.8.4.4.1 State description

Should the last word of this subclause be "completed"? If not, define "deasserted".

LSI #77 [JL]
PDF Page 155
6.8.4.6.1 State description

Replace "ALIGN0s" with "ALIGN0".

LSI #78 [JL]
PDF Page 155
6.8.4.7.3 Transition SP22:SATA_PHY_Ready to SP24:SATA_PM_Partial

Change this subclause name to "Transition SP22:SATA_PHY_Ready to SP23:SATA_PM_Partial" (i.e., SP24 should be SP23).

LSI #79 [JL]
PDF Page 155
6.8.4.7.4 Transition SP22:SATA_PHY_Ready to SP23:SATA_PM_Slumber

Change this subclause name to "Transition SP22:SATA_PHY_Ready to SP24:SATA_PM_Slumber" (i.e., SP23 should be SP24).

LSI #80 [JL]
PDF Page 155
6.8.4.7.2 Transition SP22:SATA_PHY_Ready to SP1:Reset

Change this subclause name to "Transition SP22:SATA_PHY_Ready to SP1:OOB_COMINIT" (i.e., Reset should be OOB_COMINIT).

LSI #81 [JL]
PDF Page 155
6.8.4.8.2 Transition SP23:SATA_PM_Partial to SP16:SATA_COMWAKE

Change the name of this subclause to "Transition SP23:SATA_PM_Partial to SP17:SATA_AwaitCOMWAKE".

LSI #82 [JL]
PDF Page 155
6.8.4.8.1 State description
6.8.4.9.1 State description

Replace "Exit from this state is driven from" with "This state is exited upon".

LSI #83 [JL]
PDF Page 158
6.9.2.1 State description

Replace "upon power on loss or previous dword synchronization" with "upon power on or loss of previous dword synchronization."

LSI #84 [JL]
PDF Page 158
6.9.3.3 Transition SP_DWS1:Valid1 to SP_DWS0:AcquireSync

This transition needs to be added to the text:
"This transition shall occur when an invalid dword is detected."

LSI #85 [JL]
PDF Page 158
6.9.5.1 State description

The text refers to a PhyReady (SAS) parameter and to a PhyReady (SATA) parameter as being inputs to this state. However, neither is shown in figure 59. These parameters should be added to the figure.

LSI #86 [JL]
PDF Page 159
6.9.7.1 State description
6.9.9.1 State description
6.9.11.1 State description

Replace the first sentence with: "This state is reached if a valid dword is received while in the previous state. Receiving another valid dword in this state nullifies the previous invalid dword. "

LSI #87 [JL]
PDF Page 163
7.1.2 Primitive summary
Table 51
Table 52
Table 53

Note c in the three primitive tables omits single primitive from the list of primitive types. Add "as a single primitive," to the list in note c for each table.

LSI #88 [JL]
PDF Page 172
7.1.4.4 BROADCAST
Table 59 - BROADCAST primitives

Replace "process the same" with "process this primitive the same".

LSI #89 [JL]
PDF Page 173
7.1.4.6 EOAF (End of address frame)

The link to 7.4 is wrong. Replace it with a link to 7.7.

LSI #90 [JL]
PDF Page 173
7.1.4.9 NOTIFY

Last sentence of third paragraph. Delete "as described in TBD" or fill in a valid TBD.

LSI #91 [JL]
PDF Page 173
7.1.4.9 NOTIFY

In the fourth paragraph, replace "while" with "only while".

LSI #92 [JL]
PDF Page 175
7.1.4.11 OPEN_REJECT
Table 62 - OPEN_REJECT retry primitives

The wording in the description of OPEN_REJECT (NO DESTINATION) is confusing. I think you should replace "devices" with "device" in the third line, but perhaps there is a better change.

LSI #93 [JL]
PDF Page 176
7.1.4.12 SOAF (Start of address frame)

The link to 7.4 is wrong. Replace it with a link to 7.7.

LSI #94 [JL]
PDF Page 177
7.1.6.1 SATA_ERROR

In the first paragraph, isn't SATA_ERROR also sent when forwarding dwords from a SATA link to a SAS link and an invalid dword is received?

LSI #95 [JL]
PDF Page 177
7.1.6.2 SATA_PMACK, SATA_PMNAK, SATA_PMREQ_P, and SATA_PMREQ_S (Power management acknowledgements and requests)

The link to 7.4 is not correct. I think 7.9 is the correct link.

LSI #96 [JL]
PDF Page 178
7.2 Clock skew management

In the second paragraph, replace "To solve this," with "To solve this problem,".

LSI #97 [JL]
PDF Page 178
7.2 Clock skew management

In the second paragraph, replace "strip it out" with "strip them out".

LSI #98 [JL]
PDF Page 178
7.2 Clock skew management

In the second paragraph, replace "make it to" with "are placed into".

LSI #99 [JL]
PDF Page 179
7.2 Clock skew management

Paragraph above Table 66. Change "(i.e., that is not..." to "(i.e., not...".

LSI #100 [JL]
PDF Page 181
7.4.2 CRC generation

In the sentence above 7.4.3, the link to 6.5 is wrong. I think it should be to 7.6, Bit order of CRC and Scrambler.

LSI #101 [JL]
PDF Page 182
7.4.3 CRC checking

In the penultimate paragraph, the link to 6.5 is wrong. I think it should be to 7.6, Bit order of CRC and Scrambler.

LSI #102 [JL]
PDF Page 182
7.4.3 CRC checking

In the last paragraph, the link to Annex B is wrong. I think it should be to Annex C, CRC.

LSI #103 [JL]
PDF Page 182
7.5 Scrambling

In the paragraph above table 69, the reference to 6.5 is wrong. I think it should be to 7.6, Bit order of CRC and Scrambler.

LSI #104 [JL]
PDF Page 182
7.5 Scrambling

In the first paragraph, second sentence, replace "issues" with "EMI issues".

LSI #105 [JL]
PDF Page 185
7.7.1 Address frames overview

In the paragraph below table 71, replace "entire address frame" with "address frame (bytes 0 through 27)".

LSI #106 [JL]
PDF Page 187
7.7.3 OPEN address frame

The descriptions of the fields in table 74 should be re-ordered to match the order of the fields in the table.

LSI #107 [JL]
PDF Page 189
7.8.1 Overview

In the penultimate paragraph, replace "it" with "the additional IDENTFY address frame".

LSI #108 [JL]
PDF Page 189
7.8.2 Initiator device specific rules
7.8.3 Fanout expander device specific rules
7.8.4 Edge expander device specific rules

Delete "specific" from each of these subclause titles.

LSI #109 [JL]
PDF Page 190
7.8.2 Initiator device specific rules

Replace the second paragraph with "When the discover process is done after a link reset sequence, the application client within an initiator device discovers all the devices in the SAS domain. When the discover process is done after a BROADCAST (CHANGE), the application client within an initiator device determines what has changed in the SAS domain.".

LSI #110 [JL]
PDF Page 190
7.8.4 Edge expander device specific rules

Assuming my previous comment on the 7.8.2 title is accepted, delete "specific" in the second paragraph of this subclause.

LSI #111 [JL]
PDF Page 190
7.8.5.1 Overview

Delete reference to 7.8; we are already in subclause 7.8.

LSI #112 [JL]
PDF Page 192
7.8.6 SL_IR transmitter and receiver

In the paragraph below the list, what should the SL_IR transmitter do if a primitive is requested to be transmitted while sending an IDENTIFY address frame? Discard the primitive or store it until the EOAF?

LSI #113 [JL]
PDF Page 192
7.8.6 SL_IR transmitter and receiver

The last sentence of the last paragraph is not clear. We need to explain what is magical about the 8th data dword.

LSI #114 [JL]
PDF Page 193
7.8.6.1.4.2 Transition SL_IR_TIR3:Transmit_Hard_Reset to SL_IR_TIR3:Completed

Replace "SL_IR_TIR3:Completed" with "SL_IR_TIR4:Completed" in the title of this subclause.

LSI #115 [JL]
PDF Page 194
7.8.6.2.3.1 State description

In the last paragraph, replace "illegal" with "invalid".

LSI #116 [JL]
PDF Page 194
7.8.6.3.2 SL_IR_IRC1:Idle state

The state diagram (figure 67) shows an identify 'Timeout' parameter confirmation leaving this state, but it is not described. I think it was moved to the SL_IR_IRC2 state and should be deleted from this state in the

state diagram.

LSI #117 [JL]
PDF Page 195
7.8.6.3.3.1 State description

The first list item talks about an "Identify Sequence Complete confirmation". However this confirmation does not appear in figure 67. Please add it to the figure.

LSI #118 [JL]
PDF Page 195
7.8.6.3.3.1 State description

The penultimate paragraph talks about an "Identify Received parameter". However this parameter does not appear in figure 67. Please add it to the figure.

LSI #119 [JL]
PDF Page 195
7.8.6.3.3.1 State description

The penultimate paragraph talks about an "HARD_RESET Received confirmation". However this confirmation appears under the SL_IR_IRC1:Idle state in figure 67. Please move it to the SL_IR_IRC2:Wait state in the figure.

LSI #120 [JL]
PDF Page 195
7.9 Power management

Replace the last sentence of the third paragraph with "If one of these primitives arrives while an STP connection is open, it may forward the primitive to the STP initiator port.".

LSI #121 [JL]
PDF Page 196
7.11 Domain changes

Assuming my previous comment regarding the title of subclause 7.8.2 is accepted, delete "specific" from the 5th paragraph.

LSI #122 [JL]
PDF Page 196
7.11 Domain changes

Assuming my previous comment regarding the title of subclause 7.8.3 is accepted, delete "specific" from the 6th paragraph.

LSI #123 [JL]
PDF Page 196
7.11 Domain changes

Assuming my previous comment regarding the title of subclause 7.8.4 is accepted, delete "specific" from the 7th paragraph.

LSI #124 [JL]
PDF Page 197
7.12.2.1 Connection request

In the last paragraph, second sentence, replace "does not support" with "supports".

LSI #125 [JL]
PDF Page 198
7.12.2.2 Connection request responses
Table 78 - Connection request responses

In the description of AIP, the sentence beginning with "While the expander..." is not worded correctly. The number of expander devices (plural) does not match it (singular). Replace "it returns an AIP" with "they return AIPs".

LSI #126 [JL]
PDF Page 198
7.12.2.2 Connection request responses

Is there an order of precedence to the list future connection rates in the penultimate paragraph?

LSI #127 [JL]
PDF Page 198
7.12.2.2 Connection request responses

Last paragraph. Shouldn't the list of reasons to transmit OPEN_ACCEPT include that the INITIATOR bit is in an acceptable state as documented in 7.7.3?

LSI #128 [JL]
PDF Page 198
7.12.3 Arbitration fairness

Fourth paragraph, last word. The term "livelocks" should either be eliminated (it is only used here) or a definition should be included.

LSI #129 [JL]
PDF Page 199
7.12.3 Arbitration fairness

Paragraph 6. Do we also need to specify that the INITIATOR field is compatible with the role we were requesting?

LSI #130 [JL]
PDF Page 203
7.12.5 Abandoning a connection request

The paragraph just below table 81 and above figure 69 breaks unnaturally across a page boundary, with the last two lines on the next page even though there is plenty of space on the previous page.

LSI #131 [JL]
PDF Page 209
7.13.2 SL transmitter and receiver

The last two paragraphs of this subclause are nearly identical to the last two paragraphs in 7.8.6 and thus have the same issues identified there. These paragraphs need similar changes.

LSI #132 [JL]
PDF Page 209
7.13.3.1 State description

In the third paragraph, neither of the confirmations listed are shown in figure 72. Please add them to the figure.

LSI #133 [JL]
PDF Page 212
7.13.5.1 State description

Replace "by by" by "by" in the second paragraph.

LSI #134 [JL]
PDF Page 212
7.13.5.2 Transition SL2:Selected to SL0:Idle

Each of the 4 conditions has an English problem with the phrase ", then after". The problem can be corrected by replacing ", then" with " and" in four places.

LSI #135 [JL]
PDF Page 213
7.13.6.1 State description

Add either "(see SATA)" or "(see 7.17.4)" at the end of the fourth paragraph.

LSI #136 [JL]
PDF Page 215
7.14.1 Overview

In the paragraph after the first list, delete "an after receiving".

LSI #137 [JL]
PDF Page 219
7.14.2.2 Transition XL0:Idle to XL1:Request_Path

Item b) references a Transmit Break indication, but the indication does not appear as an input to the XL0:Idle state in figure 74. Please add it.

LSI #138 [JL]
PDF Page 219
7.14.2.2 Transition XL0:Idle to XL1:Request_Path

Item a) references a Transmit Open indication, but the indication does not appear as an input to the XL0:Idle state in figure 74. Please add it.

LSI #139 [JL]
PDF Page 219
7.14.3.1 State description

Should the second list include the INITIATOR bit?

LSI #140 [JL]
PDF Page 220
7.14.4.1 State description

In the second paragraph, the Transmit Idle Dword parameter is referenced, but it does not appear for this state in figure 75. Please add it to the figure.

LSI #141 [JL]
PDF Page 220
7.14.4.1 State description

In the third paragraph, the Transmit Open request is referenced, but it

does not appear for this state in figure 75. Please add it to the figure.

LSI #142 [JL]
PDF Page 222
7.14.7.1 State description

In the first paragraph, the Transmit Open indication is referenced, but it does not appear in figure 75 for this state. Please add it to the figure.

LSI #143 [JL]
PDF Page 223
7.14.8.2 Transition XL6:Open_Response_Wait to XL0:Idle

The link (see 7.12.3) does not work.

LSI #144 [JL]
PDF Page 223
7.14.8.3 Transition XL6:Open_Response_Wait to XL2:Request_Open

The link (see 7.12.3) does not work.

LSI #145 [JL]
PDF Page 223
7.14.9.1 State description

In the fourth paragraph, replace "section 7.12.4" with "subclause 7.12.4." Also, make the link work.

LSI #146 [JL]
PDF Page 228
7.16.6 Preparing to close an SSP connection

The last two sentences of the last paragraph are run together. Add a space.

LSI #147 [JL]
PDF Page 229
7.16.7.1 Overview

In the paragraph beginning with "The SSP_TF state machine's...", replace "it" with "is".

LSI #148 [JL]
PDF Page 229
7.16.7.1 Overview

In the paragraph beginning with "The SSP_RF state machine's...", replace "successful or unsuccessful received." with "successfully or unsuccessfully received.".

LSI #149 [JL]
PDF Page 230
7.16.7.1 Overview
Figure 82
(and Global)

The SSP_TF3 state is split between two figures (not even consecutive figures). This is very confusing because there is no visual clue in the figure that the state is continued elsewhere. We should add some clue that it is continued somewhere else (perhaps the horizontal bar under the state name or the vertical bar should be dashed).

LSI #150 [JL]
PDF Page 237
7.16.7.11 SSP_RIM1:Rcv_Interlock_Monitor state

In the fourth paragraph, replace "Received Frames" with "Frame Received".

LSI #151 [JL]
PDF Page 239
7.17.1 STP frame transmission
Table 84 - SATA target port transmitting a frame

It the title of the second column, replace "or STP" with "or to STP".

LSI #152 [JL]
PDF Page 239
7.17.1 STP frame transmission
Table 84 - SATA target port transmitting a frame
Table 85 - STP initiator port transmitting a frame

"<repeats>" needs a better definition. If it means that the SATA_X_RDY primitive repeats, then replace it with "<SATA_X_RDY repeats>".

LSI #153 [JL]
PDF Page 240
7.17.1 STP frame transmission

Last paragraph, third sentence.
Replace "...involved." with "...involved (except to repeat dwords)."

LSI #154 [JL]
PDF Page 242
7.17.3 Preparing to close an STP connection

Second paragraph.
Replace "SCSI domain" with SAS domain".

LSI #155 [JL]
PDF Page 246
7.18.4.3.1.1 State description

Third paragraph. Replace "dword" with "dwords".

LSI #156 [JL]
PDF Page 246
7.18.4.3.1.2 Transition SMP_TL1:Wait_originate_frame to SMP_TL2:Wait_transmit_frame

The first sentence of the first paragraph would be clearer if another "after" were included after the "and" as follows: "...after a valid SMP request frame is received and after sending..."

LSI #157 [JL]
PDF Page 249
8.2.4 I_T nexus loss timer

In list item a), replace "counting and assigned an expired status;" with "counting and shall be assigned an expired status;"

LSI #158 [JL]
PDF Page 249
8.2.4 I_T nexus loss timer

In list item b), replace "and assigned" with "and shall be assigned".

LSI #159 [JL]
PDF Page 249
8.2.4 I_T nexus loss timer

First paragraph, first sentence. Replace "is" with "shall be" or "may be", depending on whether this timer is mandatory or optional. Depending on this choice, the second sentence of this paragraph should start with "It shall be:" or "If implemented, it is:".

LSI #160 [JL]
PDF Page 250
8.3.1 Overview

In the second list (of states), add references to 8.3.2 for the PL_OC1:Idle state and to 8.3.3 for the PL_OC2:Overall_Control state.

LSI #161 [JL]
PDF Page 250
8.3.1 Overview

In the last paragraph, last sentence. How can the Overall_Control state machine transition to the PL_PM1:Idle state, which is in another state machine? Should this sentence read, "The state machine shall transition to the PL_OC2:Overall_Control state after receiving a Phy Enabled confirmation from any phy assigned to the port."?

LSI #162 [JL]
PDF Page 251
8.3.2 8.3.2 PL_OC1:Idle state

Delete redundant subclause number.

LSI #163 [JL]
PDF Page 251
8.3.2.1 8.3.2.1 State description

Delete redundant subclause number.

LSI #164 [JL]
PDF Page 252
8.3.3.1.1 State description overview

The example in the first line is an exhaustive list. Replace "e.g.," with "i.e.,".

LSI #165 [JL]
PDF Page 252
8.3.2.2 8.3.2.2 Transition PL_OC1:Idle to PC_OC2:Overall_Control

Delete redundant subclause number.

LSI #166 [JL]
PDF Page 253
8.3.3.1.4 SSP wide port rules

First paragraph. Add forward reference to COMMAND frames subclause after "COMMAND frames". That is, "(see 9.2.4.1)".

LSI #167 [JL]

PDF Page 253
8.3.3.1.4 SSP wide port rules

Second paragraph. Add forward reference to TASK frame subclause after "TASK frame". That is, "(see 9.2.4.2)".

LSI #168 [JL]
PDF Page 253
8.3.3.1.4 SSP wide port rules

Fifth paragraph. Add forward reference to DATA frame subclause after "DATA frame". That is, "(see 9.2.4.4)".

LSI #169 [JL]
PDF Page 253
8.3.3.1.4 SSP wide port rules

Sixth paragraph. Add forward reference to RESPONSE frame subclause after "RESPONSE frame". That is, "(see 9.2.4.5)".

LSI #170 [JL]
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments

In list item a), shouldn't "should" be "shall"?

LSI #171 [JL]
PDF Page 256
8.3.3.1.6 Confirmations
Global

In the last paragraph of this subclause, replace "running" with "running,".
Global: While English allows the last comma before an "and" or "or" to be omitted, it is less ambiguous to include the comma. This is especially true for lists within lists. This comment may apply elsewhere.

LSI #172 [JL]
PDF Page 256
8.4.1 Overview

In the second list (of states), add references:
a) PL_PM1:Idle (see 8.4.2);
b) PL_PM2:ReqWait (see 8.4.3);
c) PL_PM3:Connected (see 8.4.4); and
d) PL_PM4:Wait_For_Close (see 8.4.5).

LSI #173 [JL]
PDF Page 259
8.4.3.1.2 PL_PM I_T nexus loss timer

First paragraph. This paragraph deals with SSP ports. Why is item d), which is an STP confirmation, in the list?

LSI #174 [JL]
PDF Page 260
8.4.3.1.4 Open Failed handling

In the first paragraph, fourth line, replace "Open Failure confirmation" with "Open Failed confirmation".

LSI #175 [JL]
PDF Page 260

8.4.3.1.4 Open Failed handling
Table 87 - Retry Frame conditions

In Table 87, is it obvious what is done if the I_T nexus loss timer has expired and an Open Failed (Pathway Blocked) confirmation is received? If not, add a row to this table describing this case.

LSI #176 [JL]
PDF Page 261
8.4.4.1 State description

The eighth paragraph refers to a DONE (ACK/NAK TIMEOUT) Received confirmation, which does not appear in figures 92 nor 93. Should the "DONE Transmitted" confirmation in figure 93 be "DONE Received"? If so, fix figure 93 and change the confirmation in this paragraph to be "DONE Received (ACK/NAK TIMEOUT) confirmation".

LSI #177 [JL]
PDF Page 261
8.4.4.1 State description

Ninth paragraph. This paragraph refers to a DONE Received confirmation going to the application layer and to a DONE Received confirmation coming from the link layer. Neither appears in figures 92 and 93.

LSI #178 [JL]
PDF Page 261
8.4.4.1 State description

Tenth paragraph. The "Close Connection request" in the third sentence does not appear in figures 92 nor 93.

LSI #179 [JL]
PDF Page 261
8.4.4.1 State description

Last paragraph. The "Close Connection request" in the second sentence does not appear in figures 92 nor 93.

LSI #180 [JL]
PDF Page 263
9.2.1 SSP frame format
Table 88 - SSP frame format

Byte 10 includes a TIMEOUT bit that is not described.

LSI #181 [JL]
PDF Page 264
9.2.1 SSP frame format

The fourth paragraph below Table 89 refers to a RETRANSMIT bit, but this bit does not appear in Table 88. Where does it go?

LSI #182 [JL]
PDF Page 265
9.2.1 SSP frame format

Penultimate paragraph. Find some way to prevent the 1 024 from wrapping from one line to the next line.

LSI #183 [JL]
PDF Page 268

9.2.2.3 XFER_RDY information unit

First paragraph under table 94. The reference to 10.1.1.1.5 is wrong and the link does not work. I think this reference should be to 10.1.6.1.5.

LSI #184 [JL]
PDF Page 268
9.2.2.3 XFER_RDY information unit

Last paragraph. The reference to 10.1.1.1.5 is wrong and the link does not work. I think this reference should be to 10.1.6.1.5.

LSI #185 [JL]
PDF Page 279
9.2.6.2.1 Overview

The penultimate paragraph wraps unnaturally to the top of a new page when there is plenty of room for it on the previous page.

LSI #186 [JL]
PDF Page 279
9.2.6.2.1 Overview

Figure 98 - SSP transport layer (ST) state machines - initiator device
Replace "DONE (ACK/NAK TIMEOUT) Received" with "DONE Received (ACK/NAK TIMEOUT)".

LSI #187 [JL]
PDF Page 281
9.2.6.2.2.1 State description

In item e) describing the XFER_RDY Arrived parameter, replace "ACK Transmitted" with "ACK Received".

LSI #188 [JL]
PDF Page 282
9.2.6.2.2.3 Transition ST_ISF1:Send_Frame to ST_ISF3:Prepare_Send_Data_Out

In item b) of the list, replace "ACK Transmitted" with "ACK Received".

LSI #189 [JL]
PDF Page 282
9.2.6.2.3.1 State description

In the second paragraph, replace "the following received" with "the following fields received".

LSI #190 [JL]
PDF Page 282
9.2.6.2.3.1 State description

In the third paragraph, replace "the following received" with "the following fields received".

LSI #191 [JL]
PDF Page 282
9.2.6.2.3.1 State description

In the fourth paragraph, replace "the following" with "the following fields".

LSI #192 [JL]
PDF Page 282
9.2.6.2.4.1 State description

In the first paragraph, replace "the following" with "the following fields".

LSI #193 [JL]
PDF Page 282
9.2.6.2.4.1 State description

In the second paragraph, replace "the following" with "the following fields".

LSI #194 [JL]
PDF Page 283
9.2.6.2.5.2 Transition ST_IRD1:Receive_Data_In to ST_IRD2:Process_Received_Data_In

Don't we only want to make this transition after verifying that everything is correct with the received DATA frame?
Replace "...any value...has..." with "...all values...have...".

LSI #195 [JL]
PDF Page 284
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state

First paragraph, item d). Replace "a hard reset occurs" with "a HARD_RESET Received indication is received".

LSI #196 [JL]
PDF Page 285
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state

Third paragraph. Replace "Frame Received (Frame Failed) or a hard reset," with "Frame Received (Frame Failed) indication or a HARD_RESET Received indication,".

LSI #197 [JL]
PDF Page 285
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state

Fourth paragraph. How shall this state "notify the application layer"? I presume it needs to send a some kind of confirmation to the application layer.

LSI #198 [JL]
PDF Page 285
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state

Item c) in the last list. Replace "Data-in parameter" with "Data-in Arrived parameter"

LSI #199 [JL]
PDF Page 287
9.2.6.3.2 ST_TFR1:Target_Frame_Router state

First paragraph, item c). Replace "a hard reset occurs" with "a HARD_RESET Received indication is received".

LSI #200 [JL]
PDF Page 287

9.2.6.3.2 ST_TFR1:Target_Frame_Router state

Third paragraph. Replace "a hard reset" with "a HARD_RESET Received indication".

LSI #201 [JL]
PDF Page 289
9.2.6.3.4.1 State description

Second paragraph. Minimally, delete "this state" as the Send Data-In transport protocol service request was not received by this state. However, this correction implies that the ST_TTS2 state magically knows how the ST_TTS1 state got started. It is probably better to say, "If this state was entered from the ST_TTS1:Request_Response_Router state, ..."

LSI #202 [JL]
PDF Page 289
9.2.6.3.4.1 State description

Fifth paragraph. Replace "ACK Transmitted" with "ACK Received".

LSI #203 [JL]
PDF Page 289
9.2.6.3.4.1 State description

Seventh paragraph. It seems odd to say this state shall receive a Transmission Status confirmation from another state machine. Perhaps we should say "this state shall wait to receive".

LSI #204 [JL]
PDF Page 289
9.2.6.3.4.1 State description

Tenth paragraph. Same problem with "this state shall receive".

LSI #205 [JL]
PDF Page 291
9.2.6.3.6.1 State description

Second paragraph. Replace "ST_TS1" with "ST_TTS1".

LSI #206 [JL]
PDF Page 291
9.2.6.3.6.1 State description

First paragraph, item a). Replace "ST_TS1" with "ST_TTS1".

LSI #207 [JL]
PDF Page 294
9.3.2 SATA tunneling for multiple STP initiator ports

Second paragraph, item d). Replace "CLOSE CLEAR AFFILIATION)" with "CLOSE (CLEAR AFFILIATION)".

LSI #208 [JL]
PDF Page 299
9.4.4.2.3.2 Transition MT_ID2:Send to MT_ID1:Idle

Replace "and sending" with "and after sending".

LSI #209 [JL]

PDF Page 299
9.4.4.3.1 Overview

Replace "MT_TD2:Send" with "MT_TD2:Respond".

LSI #210 [JL]
PDF Page 304
10.1.1.5 Command Complete Received transport protocol service

First paragraph. Replace "not" with "to".

LSI #211 [JL]
PDF Page 307
10.1.1.10 Send Task Management Request transport protocol service

Replace the service request with the correct one:
"Send Task Management Request (IN (Nexus, Function Identifier))"

LSI #212 [JL]
PDF Page 308
10.1.1.11 Task Management Request Received transport protocol service

Replace the service indication with the correct one:
"Task Management Request Received (IN (Nexus, Function Identifier))"

LSI #213 [JL]
PDF Page 309
10.1.1.12 Task Management Function Executed transport protocol service

Replace the service response with the correct one:
"Task Management Function Executed (IN (Nexus, Service Response))"

LSI #214 [JL]
PDF Page 309
10.1.1.13 Received Task Management Function-Executed transport protocol service

Replace the service confirmation with the correct one:
"Received Task Management Function Executed (IN (Nexus, Service Response))"

LSI #215 [JL]
PDF Page 311
10.1.3 Application client error handling

Third paragraph. The "()" should not be allowed to wrap onto a new line. Does Frame have an equivalent function to Word's non-breaking space?

LSI #216 [JL]
PDF Page 312
10.1.6.1.1 Disconnect-Reconnect mode page overview

First paragraph. Replace "(e.g., as if the mode page is implemented and the field is set to zero)" with "(i.e., as if the field in the mode page is implemented and the field is set to zero)".

LSI #217 [JL]
PDF Page 322
10.1.8 SCSI power condition states

To be consistent with the other subclauses in this standard, add forward references (with links) to the relevant subclauses in the second list

(items a through g should point to 10.1.8.1 through 10.1.8.7).

LSI #218 [JL]
PDF Page 323
10.1.8 SCSI power condition states
Figure 103 — SCSI application layer power condition (SA_PC) state machine for SAS

This state machine looks different from the other state machines. Minimally add the gold box.

LSI #219 [JL]
PDF Page 324
10.1.8.2.2 Transition SA_PC_1:Active to SA_PC_2:Idle

Item c). Replace "Power Condition mode page idle timer expires" with "Power Condition mode page idle condition timer (see SPC-3) expires".

LSI #220 [JL]
PDF Page 324
10.1.8.2.3 Transition SA_PC_1:Active to SA_PC_3:Standby

Item c). Replace "Power Condition mode page standby timer expires" with "Power Condition mode page standby condition timer (see SPC-3) expires".

LSI #221 [JL]
PDF Page 324
10.1.8.3.3 Transition SA_PC_2:Idle to SA_PC_3:Standby

Item c). Replace "Power Condition mode page standby timer expires" with "Power Condition mode page standby condition timer (see SPC-3) expires".

LSI #222 [JL]
PDF Page 326
10.1.8.6.3 Transition SA_PC_5:Active_Wait to SA_PC_3:Standby

Item c). Replace "Power Condition mode page standby timer expires" with "Power Condition mode page standby condition timer (see SPC-3) expires".

LSI #223 [JL]
PDF Page 326
10.1.8.6.5 Transition SA_PC_5:Active_Wait to SA_PC_6:Idle_Wait

Item c). Replace "Power Condition mode page idle timer expires" with "Power Condition mode page idle condition timer (see SPC-3) expires".

LSI #224 [JL]
PDF Page 326
10.1.8.7.3 Transition SA_PC_6:Idle_Wait to SA_PC_3:Standby

Item c). Replace "Power Condition mode page standby timer expires" with "Power Condition mode page standby condition timer (see SPC-3) expires".

LSI #225 [JL]
PDF Page 334
10.3.1.4 DISCOVER function

Second paragraph below table 134. Why not use a FUNCTION RESULT of PHY DOES NOT EXIST, which we define in table 136?

LSI #226 [JL]

PDF Page 337
10.3.1.4 DISCOVER function

The paragraph between tables 138 and 139 wraps onto the next page even though there is room on the previous page for the whole paragraph.

LSI #227 [JL]
PDF Page 346
10.3.1.8 CONFIGURE ROUTE INFORMATION function

Second paragraph below table 150. The link to 9.4.4.2 is wrong and does not work.

LSI #228 [JL]
PDF Page 347
10.3.1.8 CONFIGURE ROUTE INFORMATION function

Third paragraph below table 150. Either find the subclause number for the see 4.x.x.x reference or delete it.

LSI #229 [JL]
PDF Page 347
10.3.1.8 CONFIGURE ROUTE INFORMATION function

Paragraph between tables 151 and 152. The reference to table 149 should be to table 152.

LSI #230 [JL]
PDF Page 359
B.1 SAS phy reset sequence examples

In the first paragraph, replace "Figure A.1" with "Figure B.1".

LSI #231 [JL]
PDF Page 359
B.1 SAS phy reset sequence examples

In the first paragraph below figure B.1, replace "Figure A.2" with "Figure B.2".

LSI #232 [JL]
PDF Page 359
B.1 SAS phy reset sequence examples

First paragraph, last sentence. This sentence does not make sense. Consider replacing "...(invalid), that phy then selects..." with "...(invalid). Both phys then select...".

LSI #233 [JL]
PDF Page 360
B.1 SAS phy reset sequence examples

Paragraph above Figure B.2, last sentence. This sentence does not make sense. Consider replacing "...invalid), that phy then selects..." with "...invalid). Both phys then select...".

LSI #234 [JL]
PDF Page 412
Annex I
Global

There are several places where C comments wrap to the next line. This code

will not compile correctly. We need to correct these wrapping comments.

LSI #235 [JL]
PDF Page 417
Annex J

We should change this logo to match the one selected by the SCSI Trade Association.

LSI #236 [TH]
Global

There are many places which state that K28.5 and K28.3 are the only two control characters used by SAS. SATA_ERROR has been defined using K28.6. Globally add K28.6 as a legal control character.

LSI #237 [TH]
3.1.35 edge expander device; page 6

Definition suggests subtractive routing ports are required by edge expander - this is not the case. A simple expander may only support direct attachment.

LSI #238 [TH]
3.1.39 expander connection router; page 7

typo: acronym (ER) should be (ECR)

LSI #239 [TH]
4.1.11 Connections; page 30

abc list of connection types is incomplete - either remove or add all possible types, i.e SMP initiator port to expander SMP target port (or SMP through expander to another expander, etc)

LSI #240 [TH]
4.3.3.1 Table 10; page 40

Broadcast Event Notify (type) list incomplete (should be consistent with Table 25).

LSI #241 [TH]
4.6.1 Expander device model overview; page 49

a) C) SL_IR primitive processor - typo: should be broadcast primitive processor

also, c) an expander port available per phy - what does this mean? is this necessary? either clarify or remove.

LSI #242 [TH]
4.6.5 Broadcast primitive processor; page 51

typo: replace SL_IR with broadcast (twice).

LSI #243 [TH]
4.6.7 Figure 27; page 53

update diagram text:
change Link Status to Phy Status
change Send Open to Transmit Open
change Send Close to Transmit Close
change Send Break to Transmit Break
change Send Dword to Transmit Dword

LSI #244 [TH]
6.8.3.3 SP10:SAS_AwaitALIGN state; page 114

Agree with editor's note regarding the closer coordination between SP and DWS
state machines to detect ALIGNs and ALIGN1s. Prefer that more than a single
ALIGN or ALIGN1 required to advance SP, i.e. use filtering provided by the DWS
process.

LSI #245 [TH]
6.8.3.4 SP11:SAS_AwaitALIGN1 state; page 114

Same comment as for 6.8.3.3.

LSI #246 [TH]
7.1.4.11 OPEN_REJECT; page 140

Priority list for expander devices transmitting OPEN_REJECT is ambiguous.
Clarify using the following priorities:
1) OPEN_REJECT(BAD DESTINATION)
2) OPEN_REJECT(NO DESTINATION)
3) OPEN_REJECT(CONNECTION RATE NOT SUPPORTED)
4) OPEN_REJECT(STP RESOURCES BUSY)
5) OPEN_REJECT(PATHWAY BLOCKED)

LSI #247 [TH]
7.12.3 Arbitration fairness; pages 163-164

Resolve apparent inconsistency between Paragraph 2 which states expander port
may include an arbitration wait timer and Paragraph 5 which states that expander
ports shall include arbitration wait timers.

LSI #248 [TH]
7.12.3.1.3 Partial Pathway Timer; page 165

Partial Pathway Timeout timers are maintained by each expander phy, not by the
expander connection manager. Replace expander connection manager with expander
phy.

LSI #249 [TH]
7.17.1 STP frame transmission; page 204

Tables 84 and 85 should show where OPEN_ACCEPT occurs relative to the frame
transmission.

LSI #250 [TH]
7.17.2 STP flow control; page 205

Text description correlates well with Figure 86 as far as getting into the HOLD

condition but recommend including more text describing the process of releasing
the HOLD condition.

LSI #251 [TH]
7.17.3 Preparing to close an STP connection; page 207

Remove Paragraph 2, starting with "In a SCSI domain." - it is misleading and provides no normative content.

Recommend restricting when expander device may issue CLOSE to only include the
first three cases listed (end of each frame, timeout waiting for another frame,
after every n frames).

LSI #252 [TH]
9.3.1 Initial FIS

typo: SMP REPORT SATA PORT should be SMP REPORT PHY SATA.

LSI #253 [BD]
4.1.11 Connections; page 30

In second paragraph from end, should read "...links that make up the pathway..." (change "to" to "the")

LSI #254 [BD]
7.1.4.9 NOTIFY; page 138.

The NOTIFY does not have a table as the other primitives, and should be added.

LSI #255 [BD]
7.1.6.3 SATA_HOLD and SATA_HOLDA; page 142

The first sentence is incorrect. Replace sentence with "An expander device running SATA protocol shall transmit a SATA_HOLDA within 20 dwords of receiving a SATA_HOLD when it is the source of the data dwords of the frame."

LSI #256 [BD]
7.1.6.4 SATA_R_RDY and SATA_X_RDY page 143

Last sentence should start "Expander or initiator devices..."

LSI #257 [BD]
7.7.1 Address frame overview; page 149.

Only ALIGNS should be allowed inside address frames. Change third sentence to "Except for ALIGN, primitives may not be inserted in the address frame."

LSI #258 [BD]
7.7.3 OPEN address frame; page 153.

Middle of page, sentence starting "When requesting a connection to a target port..." conflicts with section 7.15. Change sentence to "When requesting a connection to a target port, an initiator port shall set the CONNECTION RATE field to the slowest negotiated physical link rate on any potential intermediate physical link."

LSI #259 [BD]
7.8.6 SL_IR transmitter and receiver; page 157

ALIGNs are allowed inside of address frames.
Change wording in second paragraph to "... a primitive other than ALIGN is requested ...".
Change wording in third paragraph to "... shall ignore any primitive other than ALIGN received inside ..."

LSI #260 [BD]
7.12.3 Arbitration fairness; page 163

AWT is mandatory. Change start of second paragraph to "Each initiator port, target port, and expander port shall include an arbitration wait timer ..."
Change start of third paragraph to "Initiator ports and target ports shall implement arbitration wait timers. They shall set the timer ..."

LSI #261 [BD]
7.13.2 SL transmitter and receiver; page 174

ALIGNs are allowed inside of address frames.
Change wording in second paragraph to "... a primitive other than ALIGN is requested ...".
Change wording in third paragraph to "... shall ignore any primitive other than ALIGN received inside ..."

LSI #262 [BD]
7.13.4.1 State description; page 175

Last paragraph has a misformatted sentence with c).

LSI #263 [BD]
7.15 Rate matching; page 190

Last paragraph should read "... port discovers a SATA target ..." (change "an" to "a")

LSI #264 [BD]
7.16.6 Preparing to close an SSP connection; page 193

Last paragraph needs to include CREDIT_BLOCKED. Change wording to "... may transmit ACK, NAK, RRDY, and CREDIT_BLOCKED ..."

LSI #265 [BD]
7.16.7.1 Overview; page 194

Sentence starting with "The SSP_RF state machine ..." should read "... if those frames were successfully or unsucessfully received." (Add "ly")

LSI #266 [BD]
7.16.7.8 SSP_TF4:Indicate_Done_Tx state; page 201.

Item c) should start "Wait For DONE (Credit Timeout) ...".

LSI #267 [BD]
7.16.7.12.2 Transition SSP_TC1:Idle to SSP_TC2:Indicate_Credit_Tx; page 202

Add another sentence "This transition shall pass a CREDIT_BLOCKED argument to the Indicate_Credit_Tx state if a Rx Credit Status (Blocked) parameter was received."

LSI #268 [BD]
7.13.3 Preparing to close an STP connection; page 207

In second paragraph, expander behavior regarding multi initiator ports is incorrect or misleading. Replace entire paragraph with

"In a SCSI domain with a single initiator port, when a SATA target port transmits an SATA_X_RDY, the expander device may use the time between SATA_X_RDY and SATA_R_RDY to insert an OPEN address frame to open a connection to the initiator port. In a SAS domain with multiple initiator ports, the expander device manages the STP connection requests (see 9.3.2). Only data FISes are subject to flow control, so the expander device shall be capable of accepting a whole register FIS frame."

LSI #269 [BD]
7.13.3 Preparing to close an STP connection; page 207

Third paragraph starting "An expander device may issue CLOSE ..." conflicts with first paragraph. Remove entire paragraph.

LSI #270 [BD]
8.2.1 Timers and counters overview; page 214

Parentheses in item c) conflicts with section 4.5. Remove words in parentheses.

LSI #271 [BD]
8.2.5 Arbitration wait time (AWT) timer; page 215

Add sentence at end "The AWT timer shall not be incremented past 7FFFh."

LSI #272 [BD]
Figure 91; page 216

Arrowhead missing between PL_OC1 and PL_OC2

LSI #273 [BD]
8.3.3.1.1 State description overview; page 217

Replace "PM_PM" with "PL_PM".

LSI #274 [BD]
8.3.3.1.3 Select a request to process and the phy on which to process it; page 218

Second paragraph, should also take the initiator bit into account. Change sentence to "A destination is considered the same if it has the same SAS address, initiator bit, and protocol."

LSI #275 [BD]
8.4.1 Overview; page 221.

Last sentence on page. Change "PL_PM1" to "PL_PM1:Idle".

LSI #276 [BD]
8.4.4.1 State Description; page 226.

Fifth paragraph on page is incorrectly issuing Disable Tx Frames for any DONE Received. Correct condition is already covered in fourth paragraph. Remove entire paragraph.

LSI #277 [BD]
9.2.1 SSP Frame Format; page 228

Replace "TIMEOUT" with "RETRANSMIT" in table 88.

LSI #278 [BD]
9.2.1 SSP Frame Format; page 229

Change Information unit size in table 89 for DATA from
"0 to 1024" to "1 to 1024"

LSI #279 [BD]
9.2.6.2.2.1 State Description; page 246

Seventh paragraph (starting with "After receiving ...") and eighth
paragraph (starting with "If the transmitted frame ...") are
redundant, and transport should wait for port layer confirmation
regardless of whether it is data-out or data-in operation.
Change 7th paragraph to read as
"After receiving a Transmission Status (Frame Transmitted) confirmation
for a COMMAND or TASK frame, this state shall then wait for one of
the following confirmations from the port layer state machine
before transitioning from this state:"
Remove eighth paragraph.

LSI #280 [BD]
9.4.4.2.3.1 State description; page 264

Add INITIATOR field into sentence, to read "... CONNECTION RATE,
INITIATOR, INITIATOR CONNECTION TAG, ..."

LSI #281 [BD]
9.4.4.2.4.2 Transition MT_ID3:Receive to MT_ID1:Idle; page 264

Change all occurances of "has sent" to "shall send" in items
a), b), and c).

LSI #282 [BD]
9.4.4.3.1 Overview; page 264

Change item b) from "MT_TD2:Send" to "MT_TD2:Respond"

LSI #283 [BD]
10.1.3 Application client error handling; page 276

Last paragraph implies a specific implementation, and
does not cover the cases when the connection is broken.
Recommend to remove last paragraph.
Alternately say that the method the application client uses
to reuse tags is outside the scope of this standard.

LSI #284 [BD]
Annex B; page 324

Replace references to figures A.1 and A.2 to B.1 and B.2
respectively. In Figure B.1, sequence for Phy A Tx/
Phy B Rx should say "Not supported by phy A".
For consistency, swap the sequences so that Figures
B.1 and B.2 are consistent as far as which Rx/Tx is
shown on top. (In B.1, Phy A Rx is shown on top, where
in B.2 Phy A Tx is shown on top).

LSI #285 [MJ]
PDF Page 107
5.7 Driver and receiver electrical characteristics

For what it's worth, an acquaintance of mine who was not involved with the drafting of the SAS spec reviewed this document on behalf of another company. He offered the unsolicited comment that this was a quite well written specification. ...Just thought I'd pass that along.

LSI #286 [MJ]
PDF Page 112
5.7.4 Transmitted signal characteristics
Table 35 — Transmitted signal characteristics at Tx compliance points

133 ps (0.2 UI) provides no overlap with required 3Gbps max rise time. I believe the initial intent was to track SATA. However, the SATA min risetime at 1.5Gbps is being changed to 100 ps (0.15 UI). I propose that SAS change this value to 67 ps (0.1 UI) at 1.5 Gbps, allowing extra room for higher performance devices.

I also propose that the minimum rise/fall time of 67 ps (0.2 UI) at 3 Gbps be changed to 50 ps (0.15 UI) for similar reasons.

LSI #287 [MJ]
PDF Page 113
5.7.4 Transmitted signal characteristics
Table 36 — Delivered signal characteristic at Rx compliance points (part 2 of 2)

"OOB detect guaranteed on (eye opening) ... OOB detect guaranteed off signal level "

It is unclear to me a) how to interpret these values, and b) how they are meant to line up (if at all) with the SATA spec values. The signal characteristic names suggest that the first spec is the eye opening of a minimum valid signal, while the second spec is the absolute peak-peak voltage of noise which must be ignored. This is fine, but it is unclear how this relates to footnote c which seems to be describing something different.

Regarding lining up with SATA, that document specifies "squelch detector threshold" with a min/max of 50/200 mVp-p.
Apologies for having no clear recommended change, but it seems that a 120 mV required noise tolerance does not compare well with SATA's threshold range of 50 to 200 mV.

LSI #288 [BD]
PDF Page 285
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
Fourth paragraph beginning with "If the frame type is correct relative to the confirmation...".

The phrase at the end of this sentence "used to open the connection." is misleading in that either device may have opened the connection. Please clarify.

****

Comments attached to Yes ballot from Mark Evans of
Maxtor Corp.:

Maxtor Corporation
500 McCarthy Boulevard
Milpitas, CA 95035

To: T10 SAS Protocol Working Group

From: Mark Evans
Phone: 408-894-5310
Email: mark_evans@maxtor.com
Date: 20 December 2002

Subject: SAS letter ballot comments

Introduction: The following are Maxtor's letter ballot comments against SAS-r03.

Maxtor Corporation, Comment 1
PDF Page 1, Global
Replace "Enable Disable SAS Link (Enable)" with "Enable Disable Link Layer (SAS Enable)".

Maxtor Corporation, Comment 2
PDF Page 1, Global
Replace "Enable Disable SAS Link (Disable)" with "Enable Disable Link Layer (Disable)".

Maxtor Corporation, Comment 3
PDF Page 1, Global
Replace "indicate" and all of its forms by the correct form of "specify" when the value or action originates with the initiator.

Maxtor Corporation, Comment 4
PDF Page 10, Table of contents, 4.3.3.4 Signals between link layer, port layer, and management application layer for all protocols Align the page number properly.

Maxtor Corporation, Comment 5
PDF Page 16, Table of contents, 7.8.6.2.3.2 Transition SL_IR_RIF2:Receive_Identify_Frame to SL_IR_RIF3:Completed
Align the page number properly.

Maxtor Corporation, Comment 6
PDF Page 19, Table of contents, 7.18.4.2.2.2 Transition SMP_IL2:Indicate_frame_tx to SMP_IL3:Rcv_response_frame
Align the page number properly.

Maxtor Corporation, Comment 7
PDF Page 20, Table of contents, 9.2.6.2.2.2 Transition ST_ISF1:Send_Frame to ST_ISF2:Prepare_Command_Request
Align the page number properly.

Maxtor Corporation, Comment 8
PDF Page 21, Table of contents, 9.2.6.2.3.2 Transition ST_ISF2:Prepare_Command_Request to ST_ISF1:Send_Frame
Align the page number properly.

Maxtor Corporation, Comment 9
PDF Page 21, Table of contents, 9.2.6.3.6.3 Transition ST_TTS4:Receive_Data_Out to ST_TTS5:Prepare_XFER_RDY
Align the page number properly.

Maxtor Corporation, Comment 10
PDF Page 21, ST_TTS4:Receive_Data_Out
Align the page number properly.

Maxtor Corporation, Comment 11
PDF Page 41, 3.1.24 deterministic jitter
Rewrite this definition to be something like: "Jitter from all sources for which the probability of a variation in interval occurring outside the specified bounds is zero. These sources include duty cycle distortion, data dependent jitter, sinusoidal dependent jitter, and jitter uncorrelated to the data."

Maxtor Corporation, Comment 12
PDF Page 43, 3.1.62 indication

In this standard an indication is passed from a transport layer to an application layer only.

Maxtor Corporation, Comment 13
PDF Page 44, 3.1.98 response
In this standard a response is passed from an application layer to a transport layer only.

Maxtor Corporation, Comment 14
PDF Page 46, Definitions, 3.1.x
Add a definition for pathway blocked count something like the following, "Pathway blocked count (PBC): the number of times that a pathway has been blocked when attempting to open a connection."

Maxtor Corporation, Comment 15
PDF Page 52, 3.5.2 Transitions, third paragraph
Delete the word "fully".

Maxtor Corporation, Comment 16
PDF Page 56, 4.1.3 Ports (narrow ports and wide ports), NOTE 6
In the first sentence replace "primarily" with "e.g.,"

Maxtor Corporation, Comment 17
PDF Page 69, 4.2.3 Hashed SAS address
Add the following paragraph at the end of this clause: "Annex D contains information on SAS address hashing."

Maxtor Corporation, Comment 18
PDF Page 74, 4.3.3 Signals between state machines
Replace this clause with T10/03-023r0.

Maxtor Corporation, Comment 19
PDF Page 84, 4.5 I_T nexus loss, first paragraph
Change the first sentence from, "When a port receives OPEN_REJECT (NO DESTINATION), OPEN_REJECT (CONNECTION RATE NOT SUPPORTED), or an open connection timeout in response to a connection request, it shall retry the connection request until:" to something like, "When a port receives OPEN_REJECT (NO DESTINATION), OPEN_REJECT (CONNECTION RATE NOT SUPPORTED), or an open connection timeout in response to a connection request, it shall retry the connection request. After receiving an OPEN_REJECT (NO DESTINATION) or after an open connection time out, the port shall use the same OPEN address frame to retry the connection. After receiving an OPEN_REJECT (CONNECTION RATE NOT SUPPORTED), the port shall send a new OPEN address frame with the connection rate changed as described in 7.12.2.2. The connection request shall be retried until:"

Maxtor Corporation, Comment 20
PDF Page 100, 5.1 SATA cables and connectors (informative), first paragraph
Figure 31 doesn't really show the cables and connectors, so the first sentence should be changed to something like, "Figure 31 shows a schematic representation of the cables and connectors defined by SATA (for reference)."

Maxtor Corporation, Comment 21
PDF Page 100, 5.1 SATA cables and connectors (informative), first paragraph
The second sentence implies too much of a similarity between SATA and SAS devices. Either delete this sentence or change it to something like, "A SATA host is an analogue to a SAS initiator device; a SATA device is an analogue to a SAS target device.

Maxtor Corporation, Comment 22
PDF Page 101, 5.2 SAS cables and connectors
As above, Figure 32 doesn't really show the cables and connectors, so the sentence should be changed to something like, "Figure 32 shows a schematic representation of the cables and connectors defined in this standard to support an external environment."

Maxtor Corporation, Comment 23
PDF Page 106, 5.6 READY LED pin, first paragraph
Change "turn on" to "activate".

Maxtor Corporation, Comment 24
PDF Page 106, 5.6 READY LED pin, second paragraph
In the second sentence change "when the READY LED signal is raised" to "when the READY LED signal is asserted."

Maxtor Corporation, Comment 25
PDF Page 106, 5.6 READY LED pin, third paragraph
Change the second sentence to: "The READY LED circuitry in the target device shall be ground tolerant since this pin may be connected by a system directly to power supply ground."

Maxtor Corporation, Comment 26
PDF Page 106, 5.6 READY LED pin, fifth paragraph
Change "turn on" to "activate".

Maxtor Corporation, Comment 27
PDF Page 106, 5.6 READY LED pin, bulleted list, item a)
Change the second sentence to: "In this state the target device may be removed with no danger of mechanical or electrical damage;"

Maxtor Corporation, Comment 28
PDF Page 106, 5.6 READY LED pin, bulleted list, item c)
The second sentence ("When processing a command, the target device shall negate READY LED for a period long enough to be detected by an observer (i.e., LED is usually on, but flashes off when commands are processed);" is vague in the extreme. At least add some "example" times.

Maxtor Corporation, Comment 29
PDF Page 106, 5.6 READY LED pin, fifth paragraph
Change "...may optionally be driven..." to "...may be driven..."

Maxtor Corporation, Comment 30
PDF Page 106, 5.6 READY LED pin, bulleted list, item d)
The first sentence ("If the target device is formatting the media, it shall toggle READY LED between asserted and negated at significant intervals during the format operation (e.g., with each cylinder change on a disk drive)." is also vague in the extreme. What is a "significant interval". At least add some "example" times.

Maxtor Corporation, Comment 31
PDF Page 109, 5.7.3.1 Eye masks overview, first paragraph
In the last sentence change "sigma" to "standard deviations".

Maxtor Corporation, Comment 32
PDF Page 112, 5.7.4 Transmitted signal characteristics, Table 35 - Transmitted signal characteristics at Tx compliance points
In note c) change "...logically turned off..." to "...not being driven..."

Maxtor Corporation, Comment 33
PDF Page 117, 5.7.11 Transmitter characteristics, fourth paragraph
In the last sentence replace "...satisfies the following equation." with "...shall satisfy the following equation."

Maxtor Corporation, Comment 34
PDF Page 117, 5.7.11 Transmitter characteristics
Replace the equation after the fourth paragraph with:
| S21 | = -{20 log10 (e)} {[6,5 x 10^-6 (f^0,5)] + [2,0 x 10^-10 (f)] + [3,3 x 10^-20 (f^2)]} dB

Maxtor Corporation, Comment 35
PDF Page 117, 5.7.11 Transmitter characteristics, fifth paragraph
Add text at the end of the last sentence in the paragraph so that the sentence reads: "A compliance interconnect is any physical interconnect with equal or greater loss at all frequencies than that required by the TCTF and that also meets the ISI loss requirements shown in figures 42 and 43."

Maxtor Corporation, Comment 36
PDF Page 117, 5.7.10 Electrical TxRx connections, first paragraph
Change "media" to "medium" (AN electrically conductive MEDIUM).

Maxtor Corporation, Comment 37
PDF Page 121, 6.2 Encoding (8b10b), 6.2.1 Encoding overview, first paragraph
In the first sentence, change "10 bit" to "10-bit". There are four additional occurrences of different values in this clause to change. There are no other occurrences of this in the draft.

Maxtor Corporation, Comment 38
PDF Page 121, 6.2 Encoding (8b10b), 6.2.1 Encoding overview, second paragraph
Change "four byte" to "four-byte".

Maxtor Corporation, Comment 39
PDF Page 121, 6.2 Encoding (8b10b), 6.2.1 Encoding overview, third paragraph after Table 40 - Special character usage
Change "10 bit" to "10-bit".

Maxtor Corporation, Comment 40
PDF Page 121, 6.2 Encoding (8b10b), 6.2.1 Encoding overview, third paragraph after Table 40 - Special character usage
Change "8 bit" to "8-bit".

Maxtor Corporation, Comment 41
PDF Page 121, 6.2 Encoding (8b10b), 6.2.1 Encoding overview, third paragraph after Table 40 - Special character usage
Change "10 bit" to "10-bit".

Maxtor Corporation, Comment 42
PDF Page 121, 6.2 Encoding (8b10b), 6.2.1 Encoding overview, third paragraph
The term "disparity" is introduced without definition. Either add definitions for the various forms of "disparity", or reference 6.3.3 Valid and invalid transmission characters.

Maxtor Corporation, Comment 43
PDF Page 121, 6.2.2 8b10b coding introduction, second paragraph
In the second sentence, delete the word "greatly".

Maxtor Corporation, Comment 44
PDF Page 121, 6.2.2 8b10b coding introduction, second paragraph
In the third sentence, delete the word "easily".

Maxtor Corporation, Comment 45
PDF Page 122, 6.2.3 8b10b encoding notation conventions, fourth paragraph
Delete the sentence, "The control variable is typically not specified." Item a) in the following bulleted list states what the values of the control variable are.

Maxtor Corporation, Comment 46
PDF Page 132, 6.5 Out of band (OOB) signals, third paragraph after Table 48 - OOB signal receiver requirements
Delete the page break in this paragraph.

Maxtor Corporation, Comment 47
PDF Page 135, 6.6.3 SAS to SATA phy reset sequence, sixth paragraph
In the last sentence delete the word "normal" or describe an abnormal SATA reset sequence.

Maxtor Corporation, Comment 48
PDF Page 144, 6.8.2 OOB sequence states, Figure 56 - SAS phy (SP) state machine - OOB sequence states
Add a "Broadcast Event Notify" confirmation from SP1:OOB_COMINIT (this has the argument Phy Not Ready).

Maxtor Corporation, Comment 49
PDF Page 144, 6.8.2 OOB sequence states, Figure 56 - SAS phy (SP) state machine - OOB sequence states
The COMSAS detect timeout transition from SP7:OOB_AwaitCOMSAS cannot go to SP2:OOB_AwaitCOMX because this would cause another COMSAS to be transmitted. Add another state to which this transition goes where the timer resides. Then, after the timer expires, a hot-plug timeout would cause a transition

to SP1:OOB_COMINIT.

Maxtor Corporation, Comment 50
PDF Page 145, 6.8.2.1 SP1:OOB_COMINIT state, 6.8.2.1.1 State description
Change "PhyNotReady" to "Phy Not Ready".

Maxtor Corporation, Comment 51
PDF Page 145, 6.8.2.1 SP1:OOB_COMINIT state, 6.8.2.1.1 State description
Add "This state shall send a Broadcast Event Notify confirmation to the expander function."

Maxtor Corporation, Comment 52
PDF Page 147, 6.8.2.7.5 Transition SP7:OOB_AwaitCOMSAS to SAS_AwaitNoCOMX
Based on a previous comment, this transition should be deleted (also, there is no SAS_AwaitNoCOMX state).

Maxtor Corporation, Comment 53
PDF Page 150, 6.8.3.4 SP11:SAS_AwaitALIGN1 state, 6.8.3.4.1 State description, second paragraph
Change "ALIGN0" to "ALIGN1".

Maxtor Corporation, Comment 54
PDF Page 158, 6.9.3 SP_DWS1:Valid1 state
There is a transition description missing. Add: "6.9.4.3 Transition SP_DWS1:Valid1 to SP_DWS0:AcquireSync, This transition shall occur when an invalid dword is detected."

Maxtor Corporation, Comment 55
PDF Page 162, 7.1.1 Primitives overview, first paragraph
Change the second sentence to: "Primitives are neither big-endian nor little-endian; they shall be interpreted as first, second, third, and last bytes.

Maxtor Corporation, Comment 56
PDF Page 172, 7.1.4.4 BROADCAST, second paragraph after Table 59 - BROADCAST primitives
In the last sentence change "dropped" to "ignored".

Maxtor Corporation, Comment 57
PDF Page 173, 7.1.4.9 NOTIFY, first paragraph
It could be problematic to send a NOTIFY during the phy reset sequence. Therefore, change the first sentence to: "A NOTIFY may be sent in place of an ALIGN during rate matching and clock skew management (i.e., a NOTIFY shall not be sent in place of an ALIGN during character and dword alignment during the phy reset sequence."

Maxtor Corporation, Comment 58
PDF Page 174, 7.1.4.11 OPEN_REJECT, Table 61 - OPEN_REJECT abandon primitives, description for OPEN_REJECT (CONNECTION RATE NOT SUPPORTED)
Add a parenthetical something like the following to the last sentence, "(the connection shall be retried as described in 4.5)."

Maxtor Corporation, Comment 59
PDF Page 174, 7.1.4.11 OPEN_REJECT, Table 61 - OPEN_REJECT abandon primitives
In the description of OPEN_REJECT (BAD DESTINATION) change "needs to be routed" to "is to be routed".

Maxtor Corporation, Comment 60
PDF Page 177, 7.1.5.6 RRDY (Receiver ready), Table 65 - RRDY primitives
Delete RRDY (RESERVED 2) as there is no such primitive.

Maxtor Corporation, Comment 61
PDF Page 179, 7.2 Clock skew management, note 19
Delete this note. An expander device many delete all ALIGNs only so long as the rules described in Table 66 are met.

Maxtor Corporation, Comment 62
PDF Page 180, 7.4.2 CRC generation, NOTE 21
Delete the word "simply".

Maxtor Corporation, Comment 63
PDF Page 182, 7.4.3 CRC checking
Delete the last paragraph ("Annex B contains examples of CRC generation/checker implementations.") as this is already stated in the Overview clause (see 7.4.1).

Maxtor Corporation, Comment 64
PDF Page 186, 7.7.2 IDENTIFY address frame
Reorder the paragraphs below Table 73 - Device types such that the descriptions of the fields are in the common-practice order of their appearance in the table (i.e., top to bottom and left to right).

Maxtor Corporation, Comment 65
PDF Page 186, 7.7.2 IDENTIFY address frame
Add the following paragraph after Table 73 - Device types: "The ADDRESS FRAME TYPE field shall be set to 0h."

Maxtor Corporation, Comment 66
PDF Page 187, 7.7.3 OPEN address frame
Reorder the paragraphs below Table 74 - OPEN address frame format such that the descriptions of the fields are in the common-practice order of their appearance in the table (i.e., top to bottom and left to right).

Maxtor Corporation, Comment 67
PDF Page 190, 7.8.2 Initiator device specific rules, second paragraph
Reword this to: "When a discover process is performed after a link reset sequence, the application client may discover all of the devices in the SAS domain. When a discover process is performed after a BROADCAST (CHANGE), the application client may determine what has changed in the SAS domain."

Maxtor Corporation, Comment 68
PDF Page 190, 7.8.2 Initiator device specific rules, fourth paragraph
Reword this to: "If during the discover process (see 4.6.11.5) the application client detects two ports with the same SAS address, it has found a routing loop. To break the loop the application client shall use the CONFIGURE ROUTE INFORMATION function (see 10.3.1.8) to disable the expander port through which the duplicate SAS address was detected."

Maxtor Corporation, Comment 69
PDF Page 191, 7.8.5 Identification and hard reset (SL_IR) state machines, 7.8.5.1 Overview, Figure 67 - SAS link layer identification and hard reset (SL_IR) state machines
In the SL_IR_TIR1 state: delete "(SAS Enable)" as the argument for this confirmation may be either (SAS Enable) or (SATA Enable).

Maxtor Corporation, Comment 70
PDF Page 191, 7.8.5 Identification and hard reset (SL_IR) state machines, 7.8.5.1, Overview, Figure 67 - SAS link layer identification and hard reset (SL_IR) state machines
In the SL_IR_RIF1 state: delete "(SAS Enable)" as the argument for this confirmation may be either (SAS Enable) or (SATA Enable).

Maxtor Corporation, Comment 71
PDF Page 191, 7.8.5 Identification and hard reset (SL_IR) state machines, 7.8.5.1, Overview, Figure 67 - SAS link layer identification and hard reset (SL_IR) state machines
In the SL_IR_IRC1 state: delete "(SAS Enable)" as the argument for this confirmation may be either (SAS Enable) or (SATA Enable).

Maxtor Corporation, Comment 72
PDF Page 191, 7.8.5 Identification and hard reset (SL_IR) state machines, 7.8.5.1, Overview, Figure 67 - SAS link layer identification and hard reset (SL_IR) state machines
In the SL_IR_IRC2 state: Add a "HARD_RESET Received" confirmation from this state to the upper layers. This is already partly in the text for this state, and another Maxtor comment to the text clarifies this.

Maxtor Corporation, Comment 73
PDF Page 191, 7.8.5 Identification and hard reset (SL_IR) state machines,

7.8.5.1, Overview, Figure 67 - SAS link layer identification and hard reset (SL_IR) state machines
In the SL_IR_IRC2 state: add the "Identification Sequence Complete" confirmation to the management application layer. This is described in the corresponding text for this state.

Maxtor Corporation, Comment 74
PDF Page 192, 7.8.6 SL_IR transmitter and receiver, third paragraph
Reword this to: "The SL_IR receiver shall ignore any primitives received inside an OPEN address frame (i.e., after an SOAF but before the subsequent EOAF) except SOAF and BREAK. If a receiver receives a second SOAF after receiving an SOAF but before receiving a subsequent EOAF, then the receiver shall ignore the dwords before the second SOAF (i.e., the receiver shall consider the second SOAF as the start of a new IDENTIFY address frame). If a receiver receives a BREAK after receiving an SOAF but before receiving a subsequent EOAF, then the receiver shall ignore the dwords before the BREAK (i.e., ignore the IDENTIFY address frame)."

Maxtor Corporation, Comment 75
PDF Page 195, 7.8.6.3.3 SL_IR_IRC2:Wait state, 7.8.6.3.3.1 State description, fourth paragraph
Change "management application layer" to "port layer". Other Maxtor comments have the port layer sending this to the transport layer, then to the application layer.

Maxtor Corporation, Comment 76
PDF Page 196, 7.10 Near-end analog loopback test, second paragraph after Figure 68 - Test modes
Change "...device set..." to "...device to set..."

Maxtor Corporation, Comment 77
PDF Page 196, 7.10 Near-end analog loopback test, third paragraph after Figure 68 - Test modes
Change "...the application client shall transmit a BREAK or CLOSE..." to "...the application client shall request that a BREAK or CLOSE be transmitted..."

Maxtor Corporation, Comment 78
PDF Page 197, 7.12.2.1 Connection request, third paragraph
Delete the clause "but they may do so" at the end of the third sentence.

Maxtor Corporation, Comment 79
PDF Page 197, 7.12.2.1 Connection request, second paragraph
Change the last phrase in the second sentence from "...decides to abandon the connection request with BREAK." to "...abandons the connection request with BREAK."

Maxtor Corporation, Comment 80
PDF Page 197, 7.12.2.1 Connection request, fourth paragraph
The second sentence is incorrect. Change it to: "If none of the intermediate physical links support the requested connection rate, the expander device shall return OPEN_REJECT (CONNECTION RATE NOT SUPPORTED)."

Maxtor Corporation, Comment 81
PDF Page 198, 7.12.3 Arbitration fairness, second paragraph
Change "arbitration wait timer" to "AWT timer."

Maxtor Corporation, Comment 82
PDF Page 198, 7.12.3 Arbitration fairness, second paragraph
Change "arbitration wait timer" to "AWT timer."

Maxtor Corporation, Comment 83
PDF Page 198, 7.12.3 Arbitration fairness, third paragraph
Change "arbitration wait timer" to "AWT timer."

Maxtor Corporation, Comment 84
PDF Page 198, 7.12.3 Arbitration fairness, third paragraph
Change "arbitration wait timer" to "AWT timer."

Maxtor Corporation, Comment 85

PDF Page 198, 7.12.3 Arbitration fairness, fourth paragraph
Change "arbitration wait timer" to "AWT timer."

Maxtor Corporation, Comment 86
PDF Page 198, Change "...the target port shall set the connection rate for future requests..." to "...the source port shall set the connection rate for future requests..."

Maxtor Corporation, Comment 87
PDF Page 199, 7.12.3 Arbitration fairness, fifth paragraph
Change "arbitration wait timer" to "AWT timer."

Maxtor Corporation, Comment 88
PDF Page 202, 7.12.5 Abandoning a connection request, Table 81 - Abandon connection request responses, second row
Change the entry in the Response column to "Open response (see 7.12.2)".
Change the entry in the Description column to "An open response arrived after the BREAK was sent. The originator shall ignore the response."

Maxtor Corporation, Comment 89
PDF Page 202, 7.12.4.3 Fanout expander devices
There are too many "its" (and other wrongness) in this clause. Change it to be something like: "When a fanout expander device receives a connection request, the fanout expander shall determine if a pathway exists to the destination device by comparing the destination SAS address of the request to the SAS addresses of the devices to which the fanout expander's phys are attached. For all phys that are attached to edge expander devices, the fanout expander shall compare the destination SAS address to all of the enabled SAS addresses in the expander route table. [new paragraph] If the expander device discovers that there are one or more pathways to the device having the destination SAS address, then the expander device shall arbitrate for access and forward the connection request. [new paragraph] If the expander device does not discover a pathway to the device having the destination SAS address, then the expander device shall reply to the source of the connection request with OPEN_REJECT (NO DESTINATION). If the destination phy is in the same expander port as the source phy, the expander device shall reply to the source with OPEN_REJECT (BAD DESTINATION)."

Maxtor Corporation, Comment 90
PDF Page 202, 7.12.5 Abandoning a connection request, first paragraph after Table 81 - Abandon connection request responses
Change the last phrase from "...not the target port." to "...not the destination port."

Maxtor Corporation, Comment 91
PDF Page 209, 7.13.2 SL transmitter and receiver, third paragraph
Reword this paragraph to: "The SL receiver shall ignore any primitives received inside an OPEN address frame (i.e., after an SOAF but before the subsequent EOAF) except SOAF and BREAK. If a receiver receives a second SOAF after receiving an SOAF but before receiving a subsequent EOAF, then the receiver shall ignore the dwords before the second SOAF (i.e., the receiver shall consider the second SOAF as the start of a new IDENTIFY address frame). If a receiver receives a BREAK after receiving an SOAF but before receiving a subsequent EOAF, then the receiver shall ignore the dwords before the BREAK (i.e., ignore the IDENTIFY address frame)."

Maxtor Corporation, Comment 92
PDF Page 211, 7.13.4.4 Transition SL1:ArbSel to SL3:Connected, second paragraph
Delete the comma in "(STP, Source Opened)".

Maxtor Corporation, Comment 93
PDF Page 211, 7.13.4.4 Transition SL1:ArbSel to SL3:Connected, third paragraph
Delete the comma in "(SSP, Source Opened)".

Maxtor Corporation, Comment 94
PDF Page 211, 7.13.4.4 Transition SL1:ArbSel to SL3:Connected, fourth paragraph
Delete the comma in "(SMP, Source Opened)".

Maxtor Corporation, Comment 95
PDF Page 212, 7.13.5.3 Transition SL2:Selected to SL3:Connected, first bulleted list
In item b): delete the comma in "(SSP, Destination Opened)".

Maxtor Corporation, Comment 96
PDF Page 212, 7.13.5.3 Transition SL2:Selected to SL3:Connected, second bulleted list
In item b): delete the comma in "(SMP, Destination Opened)".

Maxtor Corporation, Comment 97
PDF Page 212, 7.13.5.3 Transition SL2:Selected to SL3:Connected, third bulleted list
In item b): delete the comma in "(STP, Destination Opened)".

Maxtor Corporation, Comment 98
PDF Page 225, 7.15 Rate matching, first paragraph
Change the first part of the first sentence from "Initiator ports shall use SMP to discover the negotiated physical link rate..." to "Initiator ports shall discover the negotiated physical link rate..." There are other methods besides SMP that an initiator may use, and targets are not required to support SMP.

Maxtor Corporation, Comment 99
PDF Page 229, 7.16.7 SSP link layer (SSP) state machines, 7.16.7.1 Overview, ninth paragraph
Change the first sentence to: "The SSP_RF state machine's function is to receive frames and to determine whether or not those frames were received successfully."

Maxtor Corporation, Comment 100
PDF Page 234, 7.16.7.4 SSP_D1:DONE_Wait state, 7.16.7.4.1 State description, last paragraph
Change "DONE (ACK/NAK TIMEOUT) confirmation" to DONE Received (ACK/NAK TIMEOUT) confirmation".

Maxtor Corporation, Comment 101
PDF Page 234, 7.16.7.4 SSP_D1:DONE_Wait state, 7.16.7.4.1 State description, last paragraph
Add an "i.e." in the last clause: "...other DONE Received confirmations (i.e., DONE Received (Close Connection) and DONE Received (Credit Timeout)) may be used by the application layer to decide when to reuse tags."

Maxtor Corporation, Comment 102
PDF Page 234, 7.16.7.5.2 Transition SSP_TF1:Connected_Idle to SSP_TF2:Tx_Wait, second paragraph
Change "Tx Frame (Balanced)" to "Tx Frame (Balance Required)".

Maxtor Corporation, Comment 103
PDF Page 234, 7.16.7.5.2 Transition SSP_TF1:Connected_Idle to SSP_TF2:Tx_Wait, second paragraph
Change "Tx Frame (Nonbalanced)" to "Tx Frame (Balance Not Required)".

Maxtor Corporation, Comment 104
PDF Page 236, 7.16.7.9 SSP_RF1:Rcv_Frame state, first bulleted list
Change item c) from "Received Frame" to "Frame Received".

Maxtor Corporation, Comment 105
PDF Page 245, 7.18.4 SMP link layer (SMP) state machines, 7.18.4.1 Overview, Figure 89 - SMP link layer (SMP) state machines - target device
Add a "Frame Transmitted" confirmation from the SMP_TL2 state to the port layer.

Maxtor Corporation, Comment 106
PDF Page 248, 8 Port layer
Replace this clause as described in T10/03-024r0.

Maxtor Corporation, Comment 107
PDF Page 251, 8.3 Port layer overall control (PL_OC) state machine, 8.3.1

Overview, Figure 91 - Port layer overall control (PL_OC) state machine
In the PL_OC2 state: delete the confirmation "Port Ready" as there is no text that describes what this is supposed to be.

Maxtor Corporation, Comment 108
PDF Page 251, 8.3 Port layer overall control (PL_OC) state machine, 8.3.1 Overview, Figure 91 - Port layer overall control (PL_OC) state machine
In the PL_OC2 state: add a Phy Enabled confirmation from the link layer to this state, as a second Phy Enabled may be received after transition from PL_OC1 to PL_OC2.

Maxtor Corporation, Comment 109
PDF Page 251, 8.3 Port layer overall control (PL_OC) state machine, 8.3.1 Overview, Figure 91 - Port layer overall control (PL_OC) state machine
In the PL_OC1 state: add a Enable Disable Link Layer (Enable) confirmation from the link layer to this state. This may also cause the transition to PL_OC2.

Maxtor Corporation, Comment 110
PDF Page 251, 8.3 Port layer overall control (PL_OC) state machine, 8.3.1 Overview, Figure 91 - Port layer overall control (PL_OC) state machine
In the PL_OC2 state: add a Enable Disable Link Layer (Enable)confirmation from the link layer, as a second Phy Enabled may be received after transition from PL_OC1 to PL_OC2.

Maxtor Corporation, Comment 111
PDF Page 251, 8.3 Port layer overall control (PL_OC) state machine, 8.3.1 Overview, Figure 91 - Port layer overall control (PL_OC) state machine
Add a Enable Disable Link Layer (Disable) confirmation from the link layer to this state machine (i.e., to all states in the state machine).

Maxtor Corporation, Comment 112
PDF Page 251, 8.3 Port layer overall control (PL_OC) state machine, 8.3.1 Overview, Figure 91 - Port layer overall control (PL_OC) state machine
Add a HARD_RESET Received confirmation from the link layer to this state machine (i.e., to all states in the state machine).

Maxtor Corporation, Comment 113
PDF Page 251, 8.3 Port layer overall control (PL_OC) state machine, 8.3.1 Overview, Figure 91 - Port layer overall control (PL_OC) state machine
In the PL_OC1 state: add a HARD_RESET Received confirmation going from this state to the transport layer.

Maxtor Corporation, Comment 114
PDF Page 257, 8.4 Port layer phy manager (PL_PM) state machine, 8.4.1 Overview, Figure 92 - Port layer phy manager (PL_PM) state machine (part 1)
Add a Enable Disable Link Layer (Disable) confirmation from the link layer to this state machine (i.e., to all states in the state machine).

Maxtor Corporation, Comment 115
PDF Page 257, 8.4 Port layer phy manager (PL_PM) state machine, 8.4.1 Overview, Figure 92 - Port layer phy manager (PL_PM) state machine (part 1)
Add a HARD_RESET Received confirmation received by this state machine (i.e., to all states in the state machine) from the link layer.

Maxtor Corporation, Comment 116
PDF Page 258, 8.4 Port layer phy manager (PL_PM) state machine, 8.4.1 Overview, Figure 93 - Port layer phy manager (PL_PM) state machine (part 2)
Delete the "Connection Failed" confirmation from this figure.

Maxtor Corporation, Comment 117
PDF Page 258, 8.4 Port layer phy manager (PL_PM) state machine, 8.4.1 Overview, Figure 93 - Port layer phy manager (PL_PM) state machine (part 2)
The DONE Transmitted confirmation would be better shown in part 1 as it results in a Disable Tx Frames parameter being sent to the PL_OC state machine.

Maxtor Corporation, Comment 118
PDF Page 258, 8.4 Port layer phy manager (PL_PM) state machine, 8.4.1 Overview, Figure 93 - Port layer phy manager (PL_PM) state machine (part 2)

Add a DONE Received confirmation from the link layer to this state.

Maxtor Corporation, Comment 119
PDF Page 263, 9.2 SSP transport layer, 9.2.1 SSP frame format, Table 88 - SSP frame format
Change "TIMEOUT" to "RETRANSMIT" as it is described in the text that follows the table.

Maxtor Corporation, Comment 120
PDF Page 264, 9.2.1 SSP frame format, fourth paragraph below Table 89 - FRAME TYPE field
Change the first part of the sentence to: "The RETRANSMIT bit may be set to one for RESPONSE frames (see 9.2.4.5)..." The RETRANSMIT bit SHALL be set to one in RESPONSE frames under certain conditions (see 9.2.4.5)."

Maxtor Corporation, Comment 121
PDF Page 264, 9.2.1 SSP frame format, ninth paragraph below Table 89 - FRAME TYPE field
In the first sentence delete "quickly".

Maxtor Corporation, Comment 122
PDF Page 264, 9.2.1 SSP frame format, ninth paragraph below Table 89 - FRAME TYPE field
In the fourth sentence change "Target ports that do not need this field..." to "Target ports that do not use this field... "

Maxtor Corporation, Comment 123
PDF Page 265, 9.2.1 SSP frame format
Add the following paragraph as next to last in the clause: "Fill bytes shall be included so that the CRC field is aligned on a four byte boundary. The contents of the fill bytes are vendor-specific."

Maxtor Corporation, Comment 124
PDF Page 265, 9.2.1 SSP frame format, next-to-last paragraph
Change the parenthetical to "(1 024 bytes of data plus a 24-bytes header plus a 4-byte CRC)."

Maxtor Corporation, Comment 125
PDF Page 271, 9.2.2.5.1 RESPONSE information unit overview
Add a new last paragraph in this clause: "For description of the content of the STATUS field see SAM-3. For description of the content of the SENSE DATA field see SPC-3."

Maxtor Corporation, Comment 126
PDF Page 278, 9.2.6.2 Initiator device state machines, 9.2.6.2.1 Overview
After the paragraph describing the ST_IFR state machine: there is a superfluous page break.

Maxtor Corporation, Comment 127
PDF Page 279, 9.2.6.2 Initiator device state machines, 9.2.6.2.1 Overview, Figure 98 - SSP transport layer (ST) state machines - initiator device
In the ST_ISF1 state: add an "ACK Transmitted" confirmation from the port layer. There is already text that describes this.

Maxtor Corporation, Comment 128
PDF Page 279, 9.2.6.2 Initiator device state machines, 9.2.6.2.1 Overview, Figure 98 - SSP transport layer (ST) state machines - initiator device
In the ST_IFR1 state: delete the confirmation "DONE (ACK/NAK TIMEOUT) Received" as there are no words describing this, and there is already an (ACK/NAK TIMEOUT) argument for the Transmission Status confirmation.

Maxtor Corporation, Comment 129
PDF Page 279, 9.2.6.2 Initiator device state machines, 9.2.6.2.1 Overview, Figure 98 - SSP transport layer (ST) state machines - initiator device
In the ST_ISF1 state: delete the confirmation "Nexus Lost". If there is a Transmission Status with an argument other than (Frame Transmitted), this state sends a Delivery Failure (Service Delivery Subsystem Failure) parameter to the ST_IPR state machine. This results in that state machine sending this information to the application layer.

Maxtor Corporation, Comment 130
PDF Page 280, 9.2.6.2.2 ST_ISF1:Send_Frame state, 9.2.6.2.2.1 State description, second bulleted list
Add: I_T nexus loss count.

Maxtor Corporation, Comment 131
PDF Page 284, 9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state, first bulleted list
Change "a hard reset occurs" to "a HARD_RESET Received confirmation is received." Other Maxtor proposals and comments supplement this change.

Maxtor Corporation, Comment 132
PDF Page 285, 9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state, fifth paragraph
Change "ACK/NAK balanced)" to "(ACK/NAK Balanced)".

Maxtor Corporation, Comment 133
PDF Page 285, 9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state, fifth paragraph
Change the first occurrence of "(ACK/NAK Not Balanced)" to "Received (ACK/NAK Unbalanced)".

Maxtor Corporation, Comment 134
PDF Page 285, 9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state, fifth paragraph
Change the second occurrence of "(ACK/NAK Not Balanced)" to "Received (ACK/NAK Unbalanced)".

Maxtor Corporation, Comment 135
PDF Page 285, 9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state, third paragraph
Change "hard reset" to "HARD_RESET Received confirmation." Other Maxtor proposals and comments supplement this change.

Maxtor Corporation, Comment 136
PDF Page 285, 9.2.6.3 Target device state machines, 9.2.6.3.1 Overview, first bulleted list
Item a) is missing from the list. Insert the following: "a) receives and processes data-in and data-out delivery service requests from the SCSI target application layer;"

Maxtor Corporation, Comment 137
PDF Page 286, 9.2.6.3 Target device state machines, 9.2.6.3.1 Overview, Figure 99 - SSP transport layer (ST) state machines - target device
In the ST_TTS2 state: add an "ACK Transmitted" confirmation from the port layer. There is already text that describes this.

Maxtor Corporation, Comment 138
PDF Page 286, 9.2.6.3 Target device state machines, 9.2.6.3.1 Overview, Figure 99 - SSP transport layer (ST) state machines - target device
In the ST_TTS2 state, delete the "Nexus Lost" confirmation to the application layer. This information is sent to the application layer via the Data-In Delivered confirmation.

Maxtor Corporation, Comment 139
PDF Page 287, 9.2.6.3.2 ST_TFR1:Target_Frame_Router state, fourth paragraph
Change "(ACK/NAK Not Balanced)" to "Received (ACK/NAK Unbalanced)".

Maxtor Corporation, Comment 140
PDF Page 287, 9.2.6.3.2 ST_TFR1:Target_Frame_Router state, first bulleted list
Change "a hard reset occurs" to "a HARD_RESET Received confirmation is received." Other Maxtor proposals and comments supplement this change.

Maxtor Corporation, Comment 141
PDF Page 287, 9.2.6.3.2 ST_TFR1:Target_Frame_Router state, third paragraph
Change "hard reset" to "HARD_RESET Received confirmation." Other Maxtor proposals and comments supplement this change.

Maxtor Corporation, Comment 142

PDF Page 289, 9.2.6.3.4 ST_TTS2:Send_Frame state, 9.2.6.3.4.1 State description
Delete the ninth paragraph ("If the confirmation is Transmission Status (Open Failed) and it includes an I_T Nexus Lost argument, this state shall send a Nexus Lost confirmation to the application layer.") This information is sent to the application layer via the Data-In Delivered confirmation.

Maxtor Corporation, Comment 143
PDF Page 295, 9.4.2 SMP_REQUEST frame, first paragraph after Table 102 - SMP_REQUEST frame format
Change to: "The SMP FRAME TYPE field shall be set to 40h specifying that this is an SMP_REQUEST frame. If the SMP FRAME TYPE field is not set to 40h, then the target port shall return a FUNCTION RESULT of SMP FUNCTION FAILED in the RESPONSE frame."

Maxtor Corporation, Comment 144
PDF Page 295, 9.4.2 SMP_REQUEST frame, second paragraph after Table 102 - SMP_REQUEST frame format
Change to: "The FUNCTION field specifies which function is being requested (see 10.3.1.1). If the value in the FUNCTION field is not supported, then the target port shall return a FUNCTION RESULT of SMP FUNCTION FAILED in the RESPONSE frame."

Maxtor Corporation, Comment 145
PDF Page 295, 9.4.2 SMP_REQUEST frame, fourth paragraph after Table 102 - SMP_REQUEST frame format
Change to: "Fill bytes shall be included at the end of the data in the ADDITIONAL REQUEST BYTES field so that the CRC field is aligned on a four byte boundary. The contents of the fill bytes are vendor-specific.."

Maxtor Corporation, Comment 146
PDF Page 295, 9.4.2 SMP_REQUEST frame, third paragraph after Table 102 - SMP_REQUEST frame format
Change the parenthetical to "(1 024 bytes of data plus a 24-bytes header plus a 4-byte CRC)."

Maxtor Corporation, Comment 147
PDF Page 296, 9.4.3 SMP_RESPONSE frame
Add a new second paragraph after Table 103 - SMP_RESPONSE frame format: "The FUNCTION field specifies which function is being requested (see 10.3.1.1)."

Maxtor Corporation, Comment 148
PDF Page 296, 9.4.3 SMP_RESPONSE frame, second paragraph after Table 104 - Function results
Change to: "Fill bytes shall be included at the end of the data in the ADDITIONAL REQUEST BYTES field so that the CRC field is aligned on a four byte boundary. The contents of the fill bytes are vendor-specific.."

Maxtor Corporation, Comment 149
PDF Page 296, 9.4.3 SMP_RESPONSE frame, first paragraph after Table 104 - Function results
Change the parenthetical to "(1 024 bytes of data plus a 24-bytes header plus a 4-byte CRC)."

Maxtor Corporation, Comment 150
PDF Page 313, 10.1.6.1.1 Disconnect-Reconnect mode page overview, second paragraph after Table 119 -Disconnect-Reconnect mode page for SSP
Change to: "The PAGE CODE (PS) field shall be set to 02h and the PAGE LENGTH field shall be set to 0Eh."

Maxtor Corporation, Comment 151
PDF Page 315, 10.1.6.2.2 Protocol-Specific Port mode page - short format
Add a paragraph after Table 121 - Protocol-Specific Port Control mode page for SAS SSP - short format: "The PARAMETERS SAVEABLE (PS) bit is defined in SPC-3."

Maxtor Corporation, Comment 152
PDF Page 315, 10.1.6.2.2 Protocol-Specific Port mode page - short format
Add a paragraph after the description of the SPF field after Table 121 -

Protocol-Specific Port Control mode page for SAS SSP - short format: "The PAGE CODE field shall be set to 19h."

Maxtor Corporation, Comment 153
PDF Page 315, 10.1.6.2.2 Protocol-Specific Port mode page - short format, second paragraph after Table 121 -Protocol-Specific Port Control mode page for SAS SSP - short format
Delete OPEN_REJECT (CONNECTION RATE NOT SUPPORTED). Other comments make it so that this is no longer a reason for I_T nexus loss.

Maxtor Corporation, Comment 154
PDF Page 316, 10.1.6.2.3 Protocol-Specific Port mode page - Phy Control And Discover subpage
Add a paragraph after Table 122 - Protocol-Specific Port Control mode page for SAS SSP - Phy Control And Discover subpage: "The PARAMETERS SAVEABLE (PS) bit is defined in SPC-3."

Maxtor Corporation, Comment 155
PDF Page 316, 10.1.6.2.3 Protocol-Specific Port mode page - Phy Control And Discover subpage
Add a paragraph after the description of the SPF field after Table 122 - Protocol-Specific Port Control mode page for SAS SSP - Phy Control And Discover subpage: "The PAGE CODE field shall be set to 19h."

Maxtor Corporation, Comment 156
PDF Page 316, 10.1.6.2.2 Protocol-Specific Port mode page - short format, second paragraph after Table 121 -Protocol-Specific Port Control mode page for SAS SSP - short format Delete OPEN_REJECT (CONNECTION RATE NOT SUPPORTED). See the previous comment.

Maxtor Corporation, Comment 157
PDF Page 322, 10.1.8 SCSI power condition states, first bulleted list
Add a line feed before item a).

Maxtor Corporation, Comment 158
PDF Page 322, 10.1.8 SCSI power condition states, first bulleted list
Change the text in item a) to: "After power on, if the target device has not received a START STOP UNIT command with the START bit set to zero, the target device transitions to the active power state after receiving an ENABLE SPINUP. The target device transitions to the active state after power on

Maxtor Corporation, Comment 159
PDF Page 322, 10.1.8 SCSI power condition states, first bulleted list
Change the text in item b) to: "After power on, if the target device receives a START STOP UNIT command with the START bit set to zero before receiving an ENABLE SPINUP, the target device shall wait to transition to the active power state until receiving a START STOP UNIT command with the START bit set to one and an ENABLE SPINUP. This delays the application client's request until the NOTIFY (ENABLE_SPINUP) arrives."

Maxtor Corporation, Comment 160
PDF Page 324, 10.1.8.2.2 Transition SA_PC_1:Active to SA_PC_2:Idle, and several other places in this clause
"FORCE IDLE" is named "FORCE_IDLE_0" in the proposal to include this in SBC-2 (02-464).

Maxtor Corporation, Comment 161
PDF Page 324, 10.1.8.2.3 Transition SA_PC_1:Active to SA_PC_3:Standby, and several other places in this clause
"FORCE STANDBY" is named "FORCE_STANDBY_0" in the proposal to include this in SBC-2 (02-464).

Maxtor Corporation, Comment 162
PDF Page 324, 10.1.8.2.3 Transition SA_PC_1:Active to SA_PC_3:Standby, bulleted list
Change item c) to: "the STANDBY bit is set to one in the Power Condition mode page, the standby condition timer is not disabled by a START STOP UNIT command, and the standby condition timer is zero."

Maxtor Corporation, Comment 163
PDF Page 324, 10.1.8.3.3 Transition SA_PC_2:Idle to SA_PC_3:Standby, bulleted list
Change item c) to: "the STANDBY bit is set to one in the Power Condition mode page, the standby condition timer is not disabled by a START STOP UNIT command, and the standby condition timer is zero"

Maxtor Corporation, Comment 164
PDF Page 325, 10.1.8.4.3 Transition SA_PC_3:Standby to SA_PC_5:Active_Wait, bulleted list
Add an item to the list: "a START STOP UNIT command with the START bit set to one is received."

Maxtor Corporation, Comment 165
PDF Page 325, 10.1.8.5.2 Transition SA_PC_4:Stopped to SA_PC_3:Standby, bulleted list
Add an item to the list: "a START STOP UNIT command with the POWER CONDITION field set to FORCE_STANDBY_0 is received."

Maxtor Corporation, Comment 166
PDF Page 326, 10.1.8.5.4 Transition SA_PC_4:Stopped to SA_PC_6:Idle_Wait, bulleted list
Add an item to the list: "a START STOP UNIT command with the POWER CONDITION field set to FORCE_IDLE_0 is received."

Maxtor Corporation, Comment 167
PDF Page 326, 10.1.8.6.3 Transition SA_PC_5:Active_Wait to SA_PC_3:Standby, bulleted list
Change item c) to: "the IDLE bit is set to zero in the Power Condition mode page, the STANDBY bit is set to one in the Power Condition mode page, the standby condition timer is not disabled by a START STOP UNIT command, and the standby condition timer is zero."

Maxtor Corporation, Comment 168
PDF Page 326, 10.1.8.6.3 Transition SA_PC_5:Active_Wait to SA_PC_3:Standby, bulleted list
Add item d) to the list: "the IDLE bit is set to zero in the Power Condition mode page, the STANDBY bit is set to one in the Power Condition mode page, the standby condition timer is zero, and a command completes."

Maxtor Corporation, Comment 169
PDF Page 326, 10.1.8.6.5 Transition SA_PC_5:Active_Wait to SA_PC_6:Idle_Wait, bulleted list
Add item d) to the list: "the IDLE bit is set to one in the Power Condition mode page, the idle condition timer is not disabled by a START STOP UNIT command, and the idle condition timer is zero."

Maxtor Corporation, Comment 170
PDF Page 326, 10.1.8.7.3 Transition SA_PC_6:Idle_Wait to SA_PC_3:Standby, bulleted list
Change item c) to: " the IDLE bit is set to zero in the Power Condition mode page, the STANDBY bit is set to one in the Power Condition mode page, the standby condition timer is not disabled by a START STOP UNIT command, and the standby condition timer is zero."

Maxtor Corporation, Comment 171
PDF Page 326, 10.1.8.7.3 Transition SA_PC_6:Idle_Wait to SA_PC_3:Standby, bulleted list
Add item d) to the list: "the IDLE bit is set to zero in the Power Condition mode page, the STANDBY bit is set to one in the Power Condition mode page, the standby condition timer is zero, and a command completes."

Maxtor Corporation, Comment 172
PDF Page 330, 10.3.1.2 REPORT GENERAL function
Add two paragraphs after Table 130 - REPORT GENERAL request:
1) "The SMP FRAME TYPE field shall be set to 40h (see 9.4.2)." and
2) "The FUNCTION field shall be set to 00h (see 9.4.2)."

Maxtor Corporation, Comment 173
PDF Page 331, 10.3.1.2 REPORT GENERAL function

Add two paragraphs after Table 131 - REPORT GENERAL response:
1) "The SMP FRAME TYPE field shall be set to 41h." and
2) "The FUNCTION field shall be set to 00h."

Maxtor Corporation, Comment 174
PDF Page 331, 10.3.1.2 REPORT GENERAL function, paragraph before Table 131 - REPORT GENERAL response
Remove the indent from, remove the bulleted number from, and add a line feed after this sentence.

Maxtor Corporation, Comment 175
PDF Page 332, 10.3.1.3 REPORT MANUFACTURER INFORMATION function
Add two paragraphs after Table 132 - REPORT MANUFACTURER INFORMATION request
1) "The SMP FRAME TYPE field shall be set to 40h (see 9.4.2)." and
2) "The FUNCTION field shall be set to 01h (see 9.4.2)."

Maxtor Corporation, Comment 176
PDF Page 332, 10.3.1.2 REPORT GENERAL function, fifth paragraph after Table 131 - REPORT GENERAL response
Change the first part of the sentence from, "If an edge expander device supports an expander route table, then..." to "For an edge expander device," as an edge expander shall support this field.

Maxtor Corporation, Comment 177
PDF Page 332, 10.3.1.2 REPORT GENERAL function, sixth paragraph after Table 131 - REPORT GENERAL response
Change the first part of the sentence from, "If a fanout expander device supports an expander route table, then..." to "For an fanout expander device," as a fanout expander shall support this field.

Maxtor Corporation, Comment 178
PDF Page 333, 10.3.1.3 REPORT MANUFACTURER INFORMATION function
Add two paragraphs after Table 133 - REPORT MANUFACTURER INFORMATION response
1) "The SMP FRAME TYPE field shall be set to 41h." and
2) "The FUNCTION field shall be set to 01h."

Maxtor Corporation, Comment 179
PDF Page 333, 10.3.1.3 REPORT MANUFACTURER INFORMATION function
After Table 133 - REPORT MANUFACTURER INFORMATION response: delete the paragraph describing the ADDITIONAL LENGTH field, as there is no field of this name in table 133.

Maxtor Corporation, Comment 180
PDF Page 334, 10.3.1.4 DISCOVER function
Add two paragraphs after Table 134 - DISCOVER request:
1) "The SMP FRAME TYPE field shall be set to 40h (see 9.4.2)." and
2) "The FUNCTION field shall be set to 10h (see 9.4.2)."

Maxtor Corporation, Comment 181
PDF Page 335, 10.3.1.4 DISCOVER function
Add two paragraphs after Table 134 - DISCOVER response:
1) "The SMP FRAME TYPE field shall be set to 41h." and
2) "The FUNCTION field shall be set to 10h."

Maxtor Corporation, Comment 182
PDF Page 336, 10.3.1.4 DISCOVER function, after Table 137 - Routing attributes
Move the description of the ATTACHED DEVICE TYPE field to be before the description of the ROUTING ATTRIBUTE field so that they are in the common-practice order of their appearance in the table (i.e., top to bottom and left to right).

Maxtor Corporation, Comment 183
PDF Page 336, 10.3.1.4 Discover, paragraph after Table 138 - Attached device types
The second sentence is unclear. Reword this to be something like: "The negotiated physical link rate may be less than the programmed minimum physical link rate or greater than the programmed maximum physical link rate if one of the programmed rates has been changed since the link reset

sequence."

Maxtor Corporation, Comment 184
PDF Page 337, 10.3.1.4 DISCOVER function
Part one: change the order of the following field descriptions so that they are in the common-practice order of their appearance in the table (i.e., top to bottom and left to right): PROGRAMMED MINIMUM?PHYSICAL LINK RATE, HARDWARE MINIMUM PHYSICAL LINK RATE, PROGRAMMED MAXIMUM PHYSICAL LINK RATE, and HARDWARE MAXIMUM PHYSICAL LINK RATE.

Maxtor Corporation, Comment 185
PDF Page 337, 10.3.1.4 Discover, paragraph after Table 138 - Attached device types
Part two of the previous comment, and move this part of the sentence to be with the previous part.

Maxtor Corporation, Comment 186
PDF Page 338, 10.3.1.4 DISCOVER function
Part two: change the order of the following field descriptions so that they are in the common-practice order of their appearance in the table (i.e., top to bottom and left to right): PROGRAMMED MINIMUM PHYSICAL LINK RATE, HARDWARE MINIMUM PHYSICAL LINK RATE, PROGRAMMED MAXIMUM PHYSICAL LINK RATE, and HARDWARE MAXIMUM PHYSICAL LINK RATE.

Maxtor Corporation, Comment 187
PDF Page 338, 10.3.1.5 REPORT PHY ERROR LOG function
Add two paragraphs after Table 141 - REPORT PHY ERROR LOG request:
1) "The SMP FRAME TYPE field shall be set to 40h (see 9.4.2)." and
2) "The FUNCTION field shall be set to 11h (see 9.4.2)."

Maxtor Corporation, Comment 188
PDF Page 338, 10.3.1.5 REPORT PHY ERROR LOG function, first paragraph after Table 141 - REPORT PHY ERROR LOG request
Add a sentence to the paragraph: "If the value is not within the range of zero to NUMBER OF PHYS (see 9.4.4.2), the target port shall return a FUNCTION RESULT of SMP FUNCTION FAILED in the response frame."

Maxtor Corporation, Comment 189
PDF Page 339, 10.3.1.5 REPORT PHY ERROR LOG function
Add two paragraphs after Table 142 - REPORT PHY ERROR LOG response:
1) "The SMP FRAME TYPE field shall be set to 41h." and
2) "The FUNCTION field shall be set to 11h."

Maxtor Corporation, Comment 190
PDF Page 340, 10.3.1.6 REPORT PHY SATA function
Add two paragraphs after Table 144 - REPORT PHY SATA request:
1) "The SMP FRAME TYPE field shall be set to 40h (see 9.4.2)." and
2) "The FUNCTION field shall be set to 12h (see 9.4.2)."

Maxtor Corporation, Comment 191
PDF Page 340, 10.3.1.5 REPORT PHY ERROR LOG function
Add the following paragraph after the paragraph describing the FUNCTION RESULT field: "The PHY IDENTIFIER field indicates the phy (see 4.2.6) for which physical configuration link information is being returned."

Maxtor Corporation, Comment 192
PDF Page 340, 10.3.1.5 REPORT PHY ERROR LOG function, the three paragraphs below Table 143 - Function results for REPORT PHY ERROR LOG
Delete the parentheses around the phrase "outside of phy reset sequences".

Maxtor Corporation, Comment 193
PDF Page 341, 10.3.1.6 REPORT PHY SATA function
Add two paragraphs after Table 145 - REPORT PHY SATA response:
1) "The SMP FRAME TYPE field shall be set to 41h." and
2) "The FUNCTION field shall be set to 12h."

Maxtor Corporation, Comment 194
PDF Page 341, 10.3.1.6 REPORT PHY SATA function, first paragraph after Table 144 - REPORT PHY SATA request
Add a sentence to the paragraph: "If the value is not within the range of

zero to NUMBER OF PHYS (see 9.4.4.2), the target port shall return a FUNCTION RESULT of SMP FUNCTION FAILED in the response frame."

Maxtor Corporation, Comment 195
PDF Page 342, 10.3.1.6 REPORT PHY SATA function
Add the following paragraph after Table 146 - Function results for REPORT PHY SATA: "The PHY IDENTIFIER field indicates the phy (see 4.2.6) for which physical configuration link information is being returned."

Maxtor Corporation, Comment 196
PDF Page 342, 10.3.1.7 REPORT ROUTE INFORMATION function, first paragraph
In the last sentence, delete "primarily".

Maxtor Corporation, Comment 197
PDF Page 343, 10.3.1.7 REPORT ROUTE INFORMATION function
Add two paragraphs after Table 147 - REPORT ROUTE INFORMATION request:
1) "The SMP FRAME TYPE field shall be set to 40h (see 9.4.2)." and
2) "The FUNCTION field shall be set to 13h (see 9.4.2)."

Maxtor Corporation, Comment 198
PDF Page 344, 10.3.1.7 REPORT ROUTE INFORMATION function
Add two paragraphs after Table 148 - REPORT ROUTE INFORMATION response:
1) "The SMP FRAME TYPE field shall be set to 41h." and
2) "The FUNCTION field shall be set to 13h."

Maxtor Corporation, Comment 199
PDF Page 346, 10.3.1.8 CONFIGURE ROUTE INFORMATION function
Add two paragraphs after Table 150 - CONFIGURE ROUTE INFORMATION request:
1) "The SMP FRAME TYPE field shall be set to 40h (see 9.4.2)." and
2) "The FUNCTION field shall be set to 90h (see 9.4.2)."

Maxtor Corporation, Comment 200
PDF Page 347, 10.3.1.8 CONFIGURE ROUTE INFORMATION function
Add two paragraphs after Table 151 - CONFIGURE ROUTE INFORMATION response:
1) "The SMP FRAME TYPE field shall be set to 41h." and
2) "The FUNCTION field shall be set to 90h (see 9.4.2)."

Maxtor Corporation, Comment 201
PDF Page 348, 10.3.1.9 PHY CONTROL function
Add two paragraphs after Table 153 - PHY CONTROL request:
1) "The SMP FRAME TYPE field shall be set to 40h (see 9.4.2)." and
2) "The FUNCTION field shall be set to 91h (see 9.4.2)."

Maxtor Corporation, Comment 202
PDF Page 348, 10.3.1.9 PHY CONTROL function
After Table 153 - PHY CONTROL request: move the paragraph describing the CRC field to the end of the clause so that it is in the common-practice order of its appearance in the table (i.e., top to bottom and left to right).

Maxtor Corporation, Comment 203
PDF Page 348, 10.3.1.9 PHY CONTROL function, first paragraph after Table 153 - PHY CONTROL request
Add a sentence to the paragraph: "If the value is not within the range of zero to NUMBER OF PHYS (see 9.4.4.2), the target port shall return a FUNCTION RESULT of SMP FUNCTION FAILED in the response frame."

Maxtor Corporation, Comment 204
PDF Page 350, 10.3.1.9 PHY CONTROL function
Add two paragraphs after Table 156 - PHY CONTROL response:
1) "The SMP FRAME TYPE field shall be set to 41h." and
2) "The FUNCTION field shall be set to 91h."

Maxtor Corporation, Comment 205
PDF Page 352, A.1 Compliant jitter test pattern (CJTPAT), first paragraph
In the first sentence change "low-density pattern" to "low transition density pattern" in two places.

Maxtor Corporation, Comment 206
PDF Page 352, A.1 Compliant jitter test pattern (CJTPAT), paragraph below Table A.1- CJTPAT for RD+

Change this paragraph to be something like: "If the same 8b characters are used when there is negative running disparity (RD-) and when there is positive running disparity, the resulting 10b pattern generated for each disparity type is different. 8b characters used when there is RD- may not provide the critical phase shifts as the same characters used when there is RD+. To achieve the same phase shift effects with RD- as with RD+, a different 8b pattern is required to be used for each disparity type."

Maxtor Corporation, Comment 207
PDF Page 417, Annex J, Figure J.1 - SAS logo
Replace the old logo with the new logo.

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Comments attached to No ballot from Rob Haydt of
Microsoft Corp.:

9.3.2 SATA tunneling for multiple initiator ports

The affiliation mechanism creates a policy that encourages initiators to fight over resources. The policy that multiple initiators shouldn't be actively connecting to an STP target shouldn't be enforced by hardware. It should be a useage convention.

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Comments attached to No ballot from Paul Entzel of
Quantum Corp.:

1. (T) Section 4.1.3, second paragraph (unordered list). It is unclear in the standard, but I don't think
Phys don't have SAS addresses. This wording needs improvement to indicate exactly what the SAS
Address in question is assigned to.
2. (T) Section 4.2.1, first paragraph. In FCP-2, the device (node) is allowed to share the same name as
LUN 0. Is that true for SAS also?
3. (T) Section 4.2.6, first paragraph. Should be "6-bit".
4. (T) Section 4.3, entire section. These state machines do not belong in this standard as normalized text.
The standard should be specifying observable behavior, not implementation such as this.
5. (E) Table 12, there are 2 cases of missing ")".
6. (E) Table 15, there are 2 cases of missing ")".
7. (T) Section 4.4.2, last paragraph. The additional sense code "HARD RESET OCCURRED" does not
exist.
8. (T) Section 4.6.1, first paragraph unordered list, item c. This sounds like it forbids an expander from
supporting only wide ports with multiple phys per port.
9. (E) Section 4.6.2, third paragraph. Change the second sentence to "If an expander device contains
more than one internal SMP port, more than one internal SSP port, or more than one internal STP port,
the additional ports shall include SAS addresses different from that of the expander device."
10. (E) Section 7.1.4.6, second paragraph. Reference is wrong - should be 7.7.
11. (E) Section 7.1.4.12, second paragraph. Reference is wrong - should be 7.7.
12. (T) Section 7.7.2, seventh paragraph after table 73. Shouldn't this be "the SAS Address of the port
transmitting the IDENTIFY address frame"?
13. (T) Section 7.8.1, forth paragraph. In section 7.7.2, the SAS ADDRESS field is defined as belonging

to the device, not the port. Here it looks like the port's SAS Address. If it is not the port's SAS address, but is in fact the devices SAS Address, this statement is incorrect and it is not possible to detect that multiple Phys are attached to the same port using the SAS Address. If instead a Phy is supposed to report the SAS Address of the port it is attached to, then expander devices will need to assign a unique SAS Address to each port.

14. (E) Section 7.8.6. Hanging paragraphs, add a level 3 subclause heading.

15. (E) Section 7.8.6, last paragraph. The wording of the second sentence is unclear, and it occurs at least twice in the document. I think it is trying to limit the frame length for the purpose of ignoring primitives to cover the case where the EOAF is missed. Better wording is: "For the purpose of ignoring primitives, IDENTIFY frames consist of a SOAF followed by a maximum of 8 dwords and an EOAF.

16. (T) Section 7.8.6.1.2.1. States can't take action. The state machine can take action while in a state or when entering or leaving a state. Even better, the port can take an action when the state machine is in a state, or when it (the state machine) transitions into or out of a state. This issue is prevalent in these state machine descriptions.

17. (E) Section 7.12.1, second paragraph. What about XFER_RDY?

18. (E) Section 7.12.2.1, third paragraph. The term "connection response" is used in this paragraph without definition. The term "connection request response" is defined in the next subclause. Are these the same?

19. (E) Section 7.12.2.1, third paragraph. The method of performing timeouts is vendor specific and should not be specified this way. Fix the wording so that timeout periods are used rather than timers.

20. (E) Section 7.12.2.1, forth paragraph. There is a double negative in the second sentence that confuses the meaning.

21. (E) Section 7.12.2.1, forth paragraph, last sentence. Change "Rate matching is used on any..." to "Rate matching shall be used on any..."

22. (T) Section 7.12.2.2, last paragraph. The first paragraph in subclause 7.16.1 describes another reason for sending an OPEN_REJECT.

23. (T) Section 7.13 and 7.14. The state machines described in subclauses 7.13 and 7.14 are implementation details that are vendor specific and should not be included as normative text within a T10 standard. This standard should be limited to specifying observable behavior and refrain from specifying implementation.

24. (T) Section 7.16.5, the paragraph before figure 79. The term "back channel" and "backchannel" is used here without definition.

25. (E) Section 7.16.6, unordered list. "unbalanced", "imbalanced", "nonbalanced" and "not balanced" are all terms that are used throughout the document. Should look for one consistent, defined term.

26. (T) Subclause 7.16.7 describes an implementation of subclauses 7.16.1 through 7.16.6. This is inappropriate for normative text and should be removed.

27. (T) Section 7.18.1, first paragraph. Several of the management functions may require software or firmware intervention. No provision is included to break the connection and free the resource while this intervention takes place. This could lead to serious performance degradation in SAS networks.

28. (T) Section 7.18.1, last paragraph. What is the action for frames with less than 8 bytes and good CRC?

29. (T) Section 7.18.2, second sentence. What should the source expect to receive if it transmits more than
1 request?
30. (T) Subclause 7.18.4 describes an implementation of subclauses 7.18.1 through 7.18.3. This is
inappropriate for normative text and should be removed.
31. (E) Section 9.1. Change "...that are going to be ACKed..." to "that are ACKed..."
32. (T) Table 88. TIMEOUT bit should be RETRANSMIT bit.
33. (T) Table 89. Data frames are 1 to 1 024 bytes (can't have zero length data frame).
34. (T) Section 9.1, forth paragraph after table 89. The frame can be retransmitted after receiving a NAK
also.
35. (E) Section 9.1, seventh paragraph after table 89. I don't understand the last sentence in this paragraph.
36. (E) Section 9.2.2.1, first paragraph after table 90. The rules for handling commands sent to logical
units that do not exist are defined in SAM-2, not SPC-2.
37. (T) Section 9.2.2.1. What is the correct response to a COMMAND frame with a TASK ATTRIBUTE
field value that is not supported by the logical unit?
38. (T) Section 9.2.2.1, second paragraph after table 91. Defining fields to be reserved generally means
they must be tested for zero. Change the second sentence from "Any bytes between the end of the
CDB and the end of the two fields are reserved" to "Any bytes between the end of the CDB and the
end of these two field shall be ignored". Change the last sentence to "...the remaining ten bytes shall
be ignored and the..."
39. (T) Section 9.2.2.2, paragraph preceding table 93. I could find no rules for handling task management
functions addressed to logical units that do not exist in either SPC-2 or SAM-2.
40. (E) Table 93. Why is 20h spelled out here with the "all others" below indicating "reserved"?
41. (T) Section 9.2.2.2, first paragraph after table 93. What if a valid TMF is not supported?
42. (T) Section 9.2.2.2, third paragraph after table 93. What is returned if the task with TAG OF TASK
TO BE MANAGED is in the task set?
43. (T) Section 9.2.2.3, first paragraph after table 94. This is confusing to have RELATIVE OFFSET field
in the payload of the frame and a field with exactly the same name in the header of the frame.
Recommend that this field be removed and the RELATIVE OFFSET field in the frame header be used
for this purpose.
44. (T) Section 9.2.2.3, first paragraph after table 94. Link to section doesn't work.
45. (T) Section 9.2.2.3, second paragraph after table 94. The last sentence in this paragraph should be
"...the target port shall set the WRITE DATA LENGTH field to less than or equal to the value in the
MAXIMUM BURST SIZE field times 512 (see 10.1.6.14)."
46. (T) Section 9.2.2.3, forth paragraph after table 94. Change the first sentence in this paragraph to: "...set
the relative offset to 512 times the value of the FIRST BURST SIZE field in the Disconnect-Reconnect
mode page (see 10.1.1.1.5). Fix the link to the section.
47. (E) Section 9.2.2.4, first paragraph after note 23. This paragraph is redundant with the first 2
paragraphs on this page. We get it already.
48. (T) Table 99. A command frame that does not have an invalid field value will not return a
RESPONSE IU with RESPONSE_DATA format, but will instead use the SENSE_DATA format.
This means that option 'a' under Code 0 is not required. It would also be helpful to add a paragraph

explaining this behavior to the subclause.
49. (T) Section 9.2.2.5.4, forth paragraph. Add statement that the NUMBER OF FILL BYTES field in the
frame header shall indicate the number of fill bytes added.
50. (T) Section 9.2.4.3, second paragraph. The lack of an ability to recover from these types of errors at
the link level will preclude the use of this interface on devices other than disk drives. When this
shortcoming is solved in the next generation of SAS, it will create interoperability issues that will
hinder the acceptance of this interface. Quantum has produced a proposal (02-487) that will solve this
problem that should be included before forwarding SAS.
51. (T) Section 9.2.4.4, first paragraph. The lack of an ability to recover from these types of errors at the
link level will preclude the use of this interface on devices other than disk drives. When this
shortcoming is solved in the next generation of SAS, it will create interoperability issues that will
hinder the acceptance of this interface. Quantum has produced a proposal (02-487) that will solve this
problem that should be included before forwarding SAS.
52. (T) Section 9.2.5.1, fifth paragraph. What is to be done with a COMMAND frame with an
unsupported TASK ATTRIBUTE value?
53. (E) Section 9.25.2, third paragraph. An initiator always has the option of sending a TASK frame with
an ABORT TASK or ABORT TASK SET task management function. Perhaps it would be better to
remove the recurring statements and add a paragraph that states that an initiator may use this means to
abort the task when an error is detected with it.
54. (T) Subclause 9.2.6 describes an implementation of subclauses 9.2.1 through 9.2.5. This is
inappropriate for normative text and should be removed.
55. (T) Section 9.4.2, second paragraph after table 102. Where is FUNCTION described?
56. (T) Section 9.4.2, third paragraph after table 102. Should be 1 024 bytes based on description of max
size frame?
57. (T) Section 9.4.3, first paragraph after table 104. Should be 1 024 bytes based on description of max
size frame?
58. (T) Subclause 9.4.4 describes an implementation of subclauses 9.4.1 through 9.4.3. This is
inappropriate for normative text and should be removed.
59. (T) Table 108. There is no RSPVALID field in the RESPONSE frame.
60. (T) Table 109. There is no RSPVALID field in the RESPONSE frame.
61. (T) Table 116. There are no RSPVALID or SNSVALID fields in the RESPONSE frame.
62. (T) Table 117. There are no RSPVALID or SNSVALID fields in the RESPONSE frame.
63. (T) Section 10.1.3, last paragraph and unordered list. This paragraph is placing a requirement on an
application client that involves knowledge of activities not seen at that level.
64. (T) Section 10.1.5. Without a port login, the only method available to associate persistent reservation
to an initiator port is to use the hashed source address. A statement to clarify this should be added in
this subclause. What action should be taken in cases where a conflict exists?
65. (T) Section 10.1.5. Similar to SPI, there is no port login function that can be used by a device to
manage each I_T nexus. Unlike SPI, SAS networks can be configured with hundreds of initiators.
How does a device report an error caused by receipt of a command from an initiator when no more
resources are available to manage a new I_T nexus?
66. (T) Section 10.1.6.1.1. Unfortunately, there is precedence for this.

However, mode pages are a bad
way to configure the transport layer. It requires too much information be
shared between layers and
between logical units, which should not be sharing information. A much
better method of configuring
the transport layer was introduced when port logins were added, and that is
exactly where the
parameters included in this page belong. Unfortunately again, this transport
layer does not include the
concept of a port login, a shortcoming that will undoubtedly be corrected in
future versions causing
great interoperability issues for years to come.
67. (E) Section 10.1.6.1.5, first paragraph. The wording of the last
sentence is confusing. Try replacing
"... where the transfer length is specified in the WRITE DATA LENGTH field"
with "where the
WRITE DATA LENGTH field is equal to 512 times the FIRST BURST SIZE."
68. (T) Section 10.1.6.1.5, forth paragraph. The last sentence in this
paragraph should be removed or the
term "this connection" should be clarified.
69. (T) Table 122. What happened to byte 2 and 3?
70. (T) Section 10.1.6.2.2. A description for the PAGE LENGTH field should
be added that states the
PAGE LENGTH shall be equal to the (NUMBER OF PHYS value times the SAS phy
mode descriptor
length) plus 2 and is not adjusted for truncation.
71. (E) Section 10.3.1.2, paragraph immediately preceding table 131. This
paragraph should not be
numbered.
72. (T) Section 10.3.1.4, the paragraphs below table 139 that describe the
SAS ADDRESS field.
According to the definition of SAS Address in 3.1.99, Phys don't have SAS
Addresses. These must be
either the SAS address of the Port or the device.
73. (E) Section 10.3.1.7, third paragraph below table 147. Reference numbers
need to be fixed.
74. (E) Section 10.3.1.8, third paragraph after table 150. Reference numbers
need to be fixed.
75. (T) Annex D. This annex indicates that hashed address collisions should
be very infrequent, but they
will still happen. What action is taken when a collision is detected?

****

Comments attached to No ballot from Gerald Houlder of
Seagate Technology:

Seagate #1 [JC]
PDF Page 9
1.19 Revision sas-r02c (21 November 2002)
"sas-r02c"
s.b.
"sas-r03"

Seagate #2 [GH]
PDF Page 41
3.1.25 device: A physical entity.
Delete this definition of device. SAM-x, SPC-x, SPI-x, etc. have gotten
along fine without defining
device even though they all use the word hundreds of times. The given
definition is so broad that it
isn't helpful anyway.

Seagate #3 [GH]
PDF Page 41
Synonymous with SAS domain.
The definition for domain should be more general purpose because several
types of domains are
referred to in SAS. Use the definition of domain from SAM-2 -- "An I/O

system consisting of a set of
devices that interact with one another by means of a service delivery
subsystem" with the acronym
SCSI removed so the definition can be applied to "ATA domain" which also
appears in this draft.

Seagate #4 [GH]
PDF Page 42
expander connection router (ER):
Change ER to ECR to be consistent withother references to this item.

Seagate #5 [GH]
PDF Page 43
Synonymous with
This is not accurate or useful. use the generic "initiator device"
description here (which can also be
applied to ATA initiator device) and change "SAS initiator device" to "an
initiator device in SAS
domain".

Seagate #6 [GH]
PDF Page 43
Synonymous with
This is not accurate or useful. use the generic "initiator port"
description here (which can also be
applied to ATA initiator port) and change "SAS initiator port" to "an
initiator port in SAS domain".

Seagate #7 [GH]
PDF Page 44
higher layer state machine to a lower layer
This wording is identical to "request" definition!! I think you mean "lower
layer state machine to higher
layer"

Seagate #8 [GH]
PDF Page 45
defined by SATA.
replace with "protocol defined by SATA industry group".

Seagate #9 [GH]
PDF Page 46
Synonymous with
This is not accurate or useful. use the generic "target device" description
here (which can also be
applied to ATA target device) and change "SAS target device" to "a target
device in SAS domain".

Seagate #10 [GH]
PDF Page 46
Synonymous with
This is not accurate or useful. use the generic "target port" description
here (which can also be
applied to ATA target port) and change "SAS target port" to "a target port
in SAS domain".

Seagate #11 [JC]
PDF Page 46
Global: To be compatible with ATA terminology
STP initiator port
s.b.
STP host port

Seagate #12 [JC]
PDF Page 46
Global: To be compatible with ATA terminology
STP target port
s.b.
STP device port

Seagate #13 [GH]
PDF Page 48
millisecond (10-6 seconds)
Should be 10-3 seconds.

Seagate #14 [JC]
PDF Page 48
3.2 Symbols and abbreviations
The - 3 in the abbreviation for SCSI s.b. dropped to be consistent with 1
Scope.

Seagate #15 [GH]
PDF Page 49
not::
remove the extra : after the word not.

Seagate #16 [GH]
PDF Page 50
Fields containing only one bit are usually referred to as the name bit
instead of the name field.
Remove this sentence - it is redundant with sentence 2 paragraphs earlier
(paragraph starting with
"Names of fields are ..").

Seagate #17 [JW]
PDF Page 51
3.5.1 -State Machine Conventions overview
Figure 3 - State machine conventions
Change <State designator:State_name>
to "STATE DESIGNATOR: State_Name"
also change SMP state machine names to agree with this (Fig 88, 89) and
associated text

Seagate #18 [JW]
PDF Page 51
3.5.2 Transitions
change <label, a brief>
to "label, or a breif>

Seagate #19 [JW]
PDF Page 51
State designator:State_name

Seagate #20 [JW]
PDF Page 51
State designator:State_name

Seagate #21 [JW]
PDF Page 51
State designator:State_name

Seagate #22 [GH]
PDF Page 56
8b10b coded
This term should be defined in definitions clause (3.1).

Seagate #23 [GH]
PDF Page 56
a SAS
Replace with " a different SAS".

Seagate #24 [JW]
PDF Page 56
4.1.2 Physical links and phys
change <(see 6.1)>
to ???
(the reference is to "dwords" but 6.1 is "Phy layer overview" and not about
dwords)

Seagate #25 [JC]

PDF Page 56
Change:
are
To:
is

Seagate #26 [JW]
PDF Page 59
4.1.6 Target devices
I think this wording <or STP> shouls be deleted,

Seagate #27 [JW]
PDF Page 59
4.1.6 Target devices
I think this wording <,and STP target ports> should be deleted

Seagate #28 [JW]
PDF Page 59
4.1.6 Target devices
I think this wording < ,STP> should be deleted

Seagate #29 [GH]
PDF Page 62
are not required to
Change to "do not". I contend that something that translates SSP to SATA is
a bridge device, not an
expander.

Seagate #30 [GH]
PDF Page 64
Should there be more rules to define an "edge expander device set"? For
instance, it is not clear to
me why this group of 6 edge expander devices is considered to be two edge
expander device sets
instead of one edge expander device set. I'm sure there must be a way to
connect the 6 edge
expander devices so that they are considered to be one expander device set.

Seagate #31 [GH]
PDF Page 65
port(s);
change to "port(s) using SSP;".

Seagate #32 [GH]
PDF Page 65
Should an example d) be added to describe a SCSI initiator port to expander
port(s) using SMP?
If this is inperpreted as a complete list of allowed connection types, the
example must be added.

Seagate #33 [JC]
PDF Page 65
4.1.11 Connections
Change:
to
To:
the

Seagate #34 [JW]
PDF Page 70
4.3.1 State machine overview ***
Figure 19 - State machines
Figure 20 - Transmit data path and state machines
Figure 23 - STP link STP transport and ATA application layers state
machines
For the STP paths, these state machines are only valid for the initiator
device. Also, the STP
transport layer and the STP link layer are not documented in this document,
and these layers are not
the same as the SATA defined layers because they must interface to the SAS

port layer in order to
get a port assigned for the transmit function. This is a big hole in this
document . In addition this
figure is not valid for target devices. The target device can only be a
SATA device with a SATA link
layer (which does not support sending or receiving SAS address frames -
which gets you in and out
of the SAS link layer (SL)). There is also no port layer in a SATA device.
the SATA devices have no
concept of ports or SAS addressing. Note: These comments are also
applicable to figures 20 and
23.

Seagate #35 [JW]
PDF Page 71
4.3.2 Transmit data path
Figure 20 transmit datat path and state machines
This picture should have a port layer box between each transport and link
layer box

Seagate #36 [JW]
PDF Page 72
4.3.2 Transmit data path
chnge <link, SSP>
to "link, SSP port, SSP"

Seagate #37 [JW]
PDF Page 72
4.3.2 Transmit data path
Figure 21title
change <link, SSP>
to "link, SSP port, SSP"

Seagate #38 [JW]
PDF Page 73
4.3.2 Transmit data path
chnge <link, SMP>
to "link, SMP port, SMP"

Seagate #39 [JW]
PDF Page 73
4.3.2 Transmit data path
Figure 22title
change <link, SMP>
to "link, SMP port, SMP"

Seagate #40 [JW]
PDF Page 73
4.3.2 Transmit data path
figure 22 SMP link, SMP transprt ...
Should't there be a "DONE" box and line like in figure 21 ???

Seagate #41 [JW]
PDF Page 74
4.3.2 Transmit data path
chnge <link, STP>
to "link, STP port, STP"

Seagate #42 [JW]
PDF Page 74
4.3.2 Transmit data path
Figure 23title
change <link, STP>
to "link, STP port, STP"

Seagate #43 [JW]
PDF Page 74
4.3.2 Transmit data path
Figure 23 - STP link, STP transport and ATA application layer state
machines

Only valid for initiator layer. Figure 23 states that the STP transport and link layer state machines
are "based" on the SATA state machines but are not documented - especially on how they interface
to the port layer . This figure doesn't really agree with figure 19 - State machines

Seagate #44 [JW]
PDF Page 77
4.3.3.1 Signals between phy layer and other layers
Table 13 — Confirmations between SSP link layer, port layer, and SSP transport layer
add "ACK Transmitted" as a confirmation from the link to the port layer and from the port to the
transport layer.

Seagate #45 [JW]
PDF Page 78
4.3.3.3 Signals between link layer, port layer, and transport layer for SMP
Table 15 — Confirmations between link layer, port layer, and SMP transport layer
remove <Connection Opened (SMP,Source Opened)>
(this signal is repeated in Table 16 — Confirmations between link layer and port layer

Seagate #46 [JW]
PDF Page 78
4.3.3.3 Signals between link layer, port layer, and transport layer for SMP
Table 15 — Confirmations between link layer, port layer, and SMP transport layer
remove <Connection Closed (Close Timeout)>.(this signal is repeated in
Table 16 — Confirmations between link layer and port layer

Seagate #47 [JW]
PDF Page 78
4.3.3.3 Signals between link layer, port layer, and transport layer for SMP
Table 15 — Confirmations between link layer, port layer, and SMP transport layer
remove <Connection Closed (Close Timeout)>
(this signal is repeated in Table 16 — Confirmations between link layer and port layer

Seagate #48 [JW]
PDF Page 78
Timeout)

Seagate #49 [JW]
PDF Page 78
4.3.3.3 Signals between link layer, port layer, and transport layer for SMP
Table 15 — Confirmations between link layer, port layer, and SMP transport layer
remove <CConnection Closed (Break Received)>
(this signal is repeated in Table 16 — Confirmations between link layer and port layer
Received)

Seagate #50 [JW]
PDF Page 78
4.3.3.3 Signals between link layer, port layer, and transport layer for SMP
Table 15 — Confirmations between link layer, port layer, and SMP transport layer
remove <Connection Closed (Link Broken)>
(this signal is repeated in Table 16 — Confirmations between link layer and port layer

Seagate #51 [JW]
PDF Page 78
4.3.3.3 Signals between link layer, port layer, and transport layer for SMP
Table 15 — Confirmations between link layer, port layer, and SMP transport layer

remove <Connection Closed (Normal)>
(this signal is repeated in Table 16 — Confirmations between link layer and
port layer

Seagate #52 [JW]
PDF Page 78
4.3.3.3 Signals between link layer, port layer, and transport layer for SMP
Table 15 — Confirmations between link layer, port layer, and SMP transport
layer
change <Connection Closed> to "Transmission Status (Connection Lost)

Seagate #53 [JW]
PDF Page 78
4.3.3.3 Signals between link layer, port layer, and transport layer for SMP
Table 15 — Confirmations between link layer, port layer, and SMP transport
layer
remove <Open Failed (Retry)>
(this signal is repeated in Table 16 — Confirmations between link layer and
port layer

Seagate #54 [JW]
PDF Page 78
4.3.3.3 Signals between link layer, port layer, and transport layer for SMP
Table 15 — Confirmations between link layer, port layer, and SMP transport
layer
remove <Open Failed (Port LayerRequest)>
(this signal is repeated in Table 16 — Confirmations between link layer and
port layer

Seagate #55 [JW]
PDF Page 84
4.6.1 Expander device model overview
change <SL_IR primitive processor (BPP);> to
"broadcast primitive processor (BPP);"

Seagate #56 [AC]
PDF Page 102
5.3.3 SAS internal cable receptacle connector
"only" is unnecessary in this sentence and should be removed.

Seagate #57 [AC]
PDF Page 102
5.3.4 SAS backplane receptacle connector
"only" is unnecessary in this sentence and should be removed.

Seagate #58 [GH]
PDF Page 104
Table 31 defines
change to "Table 31 in clause 5.3.8 defines .." for clarity. Change both
occurrances on this page.

Seagate #59 [GH]
PDF Page 105
itnernal
spelling should be "internal".

Seagate #60 [AC]
PDF Page 105
5.4.1 SAS internal cables
Figure 34 — SAS internal cable assembly and destination pin assignments
P11 is not bidirectional should only have one arrow on the far end.

Seagate #61 [AC]
PDF Page 105
5.4.1 SAS internal cables
Figure 34 — SAS internal cable assembly and destination pin assignments
These grounds should have an arrow on both ends as they are a shield rather
than a directional
signal or power function.

Seagate #62 [AC]
PDF Page 105
5.4.1 SAS internal cables
Figure 34 — SAS internal cable assembly and destination pin assignments
These grounds should have an arrow on both ends as they are a shield rather
than a directional
signal or power function.

Seagate #63 [AC]
PDF Page 105
5.4.1 SAS internal cables
Figure 34 — SAS internal cable assembly and destination pin assignments
These grounds should have an arrow on both ends as they are a shield rather
than a directional
signal or power function.

Seagate #64 [GH]
PDF Page 106
The LED and the current limiting resistor may be external to the target
device.
***Change this to read " The LED and the current limiting circuitry shall
be external to the target
device." The standard must definitely state where the current limiting
circuirty and the LED are
located.

Seagate #65 [JW]
PDF Page 106
5.6 READY LED pin
Table 32 — Output characteristics of the READY LED signal
change <LED off> to
"LED off / negated"

Seagate #66 [JW]
PDF Page 106
5.6 READY LED pin
Table 32 — Output characteristics of the READY LED signal
change <LED on> to
"LED on / asserted"

Seagate #67 [GH]
PDF Page 107
operate within
***Change to "meet". The word within is ambiguous.

Seagate #68 [GH]
PDF Page 107
that
Replace with "this".

Seagate #69 [AC]
PDF Page 107
5.7.2 General interface specification
Change "interoperability" to "compliance"

Seagate #70 [AC]
PDF Page 107
5.7.2 General interface specification
Change "conforming" to "compliant"

Seagate #71 [AC]
PDF Page 107
5.7.1 Compliance points
Change "physical definition" to "description" as this is consistent with
the column label in Table 33.

Seagate #72 [GH]
PDF Page 108
Figures 35 and 36 seem out of place here. Should they be moved to the Test
Loads clause or

somewhere else?

Seagate #73 [GH]
PDF Page 109
limits.
change to "limits imposed on the signal at that particular compliance point". The added clarification is considered significant by Al Kramer.

Seagate #74 [AC]
PDF Page 112
5.7.4 Transmitted signal characteristics
Table 35 — Transmitted signal characteristics at Tx compliance points
***
Change 133 to 67

Seagate #75 [GH]
PDF Page 114
***The requirements of both notes b and d should be worded the same except for the swept
frequency range (first sentence of each note). Combining requirements of both should make both
notes look like this:
The jitter values given are normative for a combination of deterministic jitter, random jitter, and
sinusoidal jitter that receivers shall be able to tolerate without exceeding a BER of 10-12. Receivers
shall tolerate sinusoidal jitter of
progressively greater amplitude at lower frequencies, according to the mask in figure 39 with the
same deterministic jitter and random jitter levels as were used in the high frequency sweep.

Seagate #76 [GH]
PDF Page 114
***Again the requirements of notes c and e should be combined and applied to both notes:
No value is given for random jitter. For compliance with this
standard, the actual random jitter amplitude shall be the value that brings total jitter to the stated
value at a probability of 10-12. The additional 0,1 UI of sinusoidal jitter is added to
ensure the receiver has sufficient operating margin in the presence of external interference.

Seagate #77 [JC]
PDF Page 123
6.3.3.1 Definitions
Change:
an primitive
To:
a primitive

Seagate #78 [AC]
PDF Page 128
6.4 Bit order
Figure 44 — SAS bit transmission logic
Correct figure so that 16 is horizontal like the rest of the numbers instead of vertical.

Seagate #79 [AC]
PDF Page 131
6.5 Out of band (OOB) signals
Change "SP" to "SAS phy (SP)", as this is the first occurence.

Seagate #80 [GH]
PDF Page 132
then
Replace with "than".

Seagate #81 [JC]
PDF Page 132
6.5 Out of band (OOB) signals
Change:
proceeding
To:
preceding

Seagate #82 [AC]
PDF Page 132
6.5 Out of band (OOB) signals
This is more clear if the two cases are put in the opposite order and "then" should be "than". Replace
the highlighted text with:
"A receiver shall not detect the same OOB signal again until it has detected lack of transitions for a
time greater than the proceeding idle time (i.e., a COMINIT negation time for a COMINIT idle time or
a COMSAS negation time for a COMSAS idle time) or has detected a different OOB signal (e.g., if the
idle time changes).

Seagate #83 [GH]
PDF Page 133
COMINIT Completed
This transition is defined here, but is not used anywhere in the SP state machine (figure 56, page
133). Why?

Seagate #84 [AC]
PDF Page 133
6.5 Out of band (OOB) signals
Change "SAS phy (SP)" to "SP"

Seagate #85 [AC]
PDF Page 133
6.5 Out of band (OOB) signals
Figure 47 — OOB signal detection
Bracket 6 is o the wrong side of the burst. It should be at the trailing edge instead of the leading edge.

Seagate #86 [AC]
PDF Page 135
6.6.3 SAS to SATA phy reset sequence
This does not have to be a "legacy" device.

Seagate #87 [JC]
PDF Page 136
6.6.4.1 SAS OOB sequence
Change:
COMSAS,
To:
COMINIT;

Seagate #88 [JW]
PDF Page 137
6.6.4.1 SAS OOB sequence
change <as SAS phy.> to
"as SAS phy B."

Seagate #89 [JC]
PDF Page 137
6.5 Out of band (OOB) signals Figure 51Scenario 2:
The figure shows a sequence, COMINIT from B to COMSAS from A to COMSAS from B. By
definition, B may send its COMSAS after seding and receiveing COMINIT. B may send COMSAS
even if it does not receive a COMSAS from A.
The figure should be changed:
Remove the arrow from A's COMSAS to B's COMSAS and

add an arrow form B's COMINIT to B's COMSAS.

Seagate #90 [JC]
PDF Page 137
6.5 Out of band (OOB) signals Figure 51Scenario 3:
This scenario is not very interesting. It is just a flip of senario 2.
Delete?

Seagate #91 [JC]
PDF Page 139
6.6.4.2 SAS speed negotiation sequence, Table 49 — SAS speed. .
The value of ALIGN detect timeout maximum needs a tolerance. A minimum
value is also required.
The current requirement would allow a phy to not wait.

Seagate #92 [JC]
PDF Page 139
6.6.4.2 SAS speed negotiation sequence, Table 49 — SAS speed. .
Note "a" is not referenced in the table.

Seagate #93 [GH]
PDF Page 141
The specification is not clear and does not have an example (either here or
in Annex B) of a Phy that
may only supports G2, but not G1. Thus, the speed negotiation window may be
as following: G2
rate, G3 rate, then G2 rate (negotiated rate). Or is this protocol allowed?

Seagate #94 [AC]
PDF Page 141
6.6.5 Phy reset sequence after device is attached
GEnder is wrong. Change "into a receptacle." to "onto a plug."

Seagate #95 [AC]
PDF Page 141
6.6.5 Phy reset sequence after device is attached
This explanation needs additional detail to be clear. Make the following
changes to the text by adding
additional information and delting "after the attachment".
In this example, SAS phy B is attached to SAS phy A some time before SAS
phy B's second hot-plug
timeout occurs, but while SAS phy A is still in a hot-plug timeout and
unable to detect a valid
COMINIT from SAS phy B. SAS phy A completes its hot-plug timeout and
transmits COMINIT. SAS
phy B's OOB detection circuitry detects a COMINIT, ...

Seagate #96 [GH]
PDF Page 142
COMINIT Completed;
This parameter is not used anywhere in SP state machine.

Seagate #97 [JW]
PDF Page 142
6.6.5 Phy reset sequence after device is attached
Figure 55 — Hot-plug and the phy reset sequence
This figure is not self explainitory. It needs some words to explain what
you are trying to portray.

Seagate #98 [AC]
PDF Page 142
6.6.5 Phy reset sequence after device is attached
Figure 55 — Hot-plug and the phy reset sequence
Change "SAS phy A attached to SAS phy B" to "SAS phy B attached to SAS phy
A. Phy A and Phy B
Rx signals are not present until this time."

Seagate #99 [AC]
PDF Page 142
6.6.5 Phy reset sequence after device is attached

Figure 55 — Hot-plug and the phy reset sequence
The "Time y" arrowhead should be on the other side of the squiggle to have the event illustrated later
in the timing sequence.

Seagate #100 [AC]
PDF Page 142
6.6.5 Phy reset sequence after device is attached
Figure 55 — Hot-plug and the phy reset sequence
The "Time y" arrowhead should be on the other side of the squiggle to have the event illustrated later
in the timing sequence.

Seagate #101 [GH]
PDF Page 144
COMSAS
Should be "COMINT".
SP3:OOB_AwaitCOMINIT_Sent state: COMSAS Transmitted should be change to COMINIT Transmitted. There is inconsistency between states: in SP1:OOB_COMINIT
state, there is an output "Transmit COMINIT" indicating to the SP transmitter to start transmit
COMINIT and wait for COMINIT to be transmitted and/or received. However, this is no output
parameter in the SP7:OOB_AwaitCOMSAS state to start the COMSAS timer, or an output parameter
in the SP2:OOB_AwaitCOMX to start the hotplug timer.

Seagate #102 [GH]
PDF Page 148
The descriptions for SP8:SAS_Start and SP9:SAS_RateNotSupported indicated that the idle shall be
transmitted during these states. Some of the other state are self-explanatory. However, clearly
defining whether idle should be transmitted for the SP14:SAS_Fail or SP13:SAS_Pass would be
helpful. Additionally, the states such as fallback state and inc_speed states defined in sas_r02.pdf
make the speed negotiation state machine a lot more clear, but these states are removed in the
current version.

Seagate #103 [JW]
PDF Page 148
6.8.3 SAS speed negotiation states
Figure 57 — SAS phy (SP) state machine - SAS speed negotiation states
change <Await_SNW> to
"AwaitSNW"
(will then be consistent with text)

Seagate #104 [GH]
PDF Page 149
(1) SP19:AwiatALIGN should be SP19:SATA_AwiatALIGN.
(2) This editor's note should be incorporated into the speed negotiation state machine. Additionally,
this statement is not very clear whether the DWS state machine should be started for the speed
negotiation window (G1 rate, G2 rate, G3 rate, G? rate (negotiated rate)), or the DWS state machine
should be started only at the negotiated rate window?

Seagate #105 [JC]
PDF Page 156
6.9 SAS phy dword synchronization (SP_DWS) state machine
The DWS state machine starts with a state 0. Other state machines start with state 1.

Seagate #106 [JC]
PDF Page 166
7.1.2 Primitive summary, Table 54

It would be better if the 2nd character of the CLS primitives were unique
from BREAK, ERROR, and
HARD_RESET. Since there are multiple CLS primitives, the 3rd and 4th
characters will be used to
distinguish the types. It would be simpler for the hardware if the 2nd
character for CLS was unique
from the other primitives.
D02.0

Seagate #107 [JC]
PDF Page 166
7.1.2 Primitive summary, Table 54
It would be better if the 2nd character of the OPEN_REJECT primitives were
the same rather than
D31.4 and D29.7.

Seagate #108 [JC]
PDF Page 168
7.1.2 Primitive summary, Table 55
It would be better if the 2nd character of the NAK primitives were unique
from ACK,
CREDIT_BLOCKED, and RRDY. Since there are multiple NAK primitives, the 3rd
and 4th characters
will be used to distinguish the types. It would be simpler for the hardware
if the 2nd character for CLS
was unique from the other primitives.

Seagate #109 [JW]
PDF Page 173
7.1.4.6 EOAF (End of address frame)
change <7.4> to "7.7"
(section 7.4 is about crc)

Seagate #110 [JW]
PDF Page 173
7.1.4.7 ERROR
change <6.9> t o ????
(6.9 about SAS DWORD synchronization)

Seagate #111 [JW]
PDF Page 173
7.1.4.9 NOTIFY
change <TBD> to a real reference
(Should be no TBD's in the spec.)

Seagate #112 [JW]
PDF Page 175
7.1.4.11 OPEN_REJECT
Table 62 — OPEN_REJECT retry primitives
change <devices> to "device"

Seagate #113 [JW]
PDF Page 176
7.1.4.12 SOAF (Start of address frame)
change <7.4> to "7.7"

Seagate #114 [JW]
PDF Page 177
7.1.6.2 SATA_PMACK, SATA_PMNAK, SATA_PMREQ_P, and SATA_PMREQ_S (Power
management
acknowledgements and requests)
change <7.4> to ????
(7.4 is about CRC)

Seagate #115 [JC]
PDF Page 178
7.2 Clock skew management
Change: "devices" to: "originating devices"

Seagate #116 [JC]

PDF Page 179
7.4.1 CRC Overview
3rd paragraph
"Annex B contains. . ."
s.b.
"Annex C contains. . ."

Seagate #117 [JC]
PDF Page 180
7.4.2 CRC generation
Add a subclause:
7.4.x CRC initial value
The CRC value shall be initialized with a value of FFFFFFFFh before the calculation begins.

Seagate #118 [JW]
PDF Page 181
7.4.2 CRC generation
(last sentence)
change <6.5> to correct reference
(reference should be to dword flow, 6.5 is about OOB signals)

Seagate #119 [JW]
PDF Page 182
7.4.3 CRC checking
change <6.5> to correct reference
(reference should be to dword flow, 6.5 is about OOB signals)

Seagate #120 [JW]
PDF Page 182
7.5 Scrambling
change <6.5> to correct reference
(reference should be to dword flow, 6.5 is about OOB signals)

Seagate #121 [JC]
PDF Page 182
7.5 Scrambling
There is no endianness to the scrambling process. Scrambling operates on the parallel 32 bits of a
dword. Both SAS and SATA process the bits of a dword without regard to the byte significates the
same way, lower 16 bits followed by the upper 16 bits.
Delete this sentence and Table 69— Scrambling endianness.

Seagate #122 [JC]
PDF Page 182
7.4.3 CRC Checking
"Annex B contains. . ."
s.b.
"Annex C contains. . ."

Seagate #123 [JC]
PDF Page 182
7.5 Scrambling
Srambling works for all repeating patterns.
Change:
long strings of zeros or ones
To:
long strings of repeating patterns, e.g., all zeros and ones,

Seagate #124 [JC]
PDF Page 182
7.5 Scrambling
change
(i.e., between
frames),
to:
(i.e., between
frames and not seding primitives)

Seagate #125 [JC]
PDF Page 182
7.5 Scrambling
The initialize value is determined by the scrambler implementation, serial or parallel. Also, a
clarification:
Change to:
The data scrambling value shall be initialized at each SOF, SOAF, and SATA_SOF by both the
transmitter and receiver. The data being transmitted shall be
XORed with the data scrambling value by the transmitter, and the data being received shall be
XORed with the data scrambling value by the receiver. The initial value is selected to produce the
required scramblilng value for the first value following a reset , e.g., any SOF or device reset (see
Annex E). For a given dword displacement from the last data scrambling value reset , the data
scrambling value is the same.

Seagate #126 [JC]
PDF Page 188
7.7.3 OPEN address frame
for clarification add:
This support may use rate matching.

Seagate #127 [JC]
PDF Page 189
7.7.3 OPEN address frame
The concept of the scale bit is confusing to implementors. Suggest dropping the scale bit and
describing the behavior of a 16 bit AWT by range:
The ARBITRATION WAIT TIME field indicates how long the port transmitting the OPEN address
frame has been waiting for a connection request to be accepted. For values from 0000h to 7FFFh
the AWT increments in 1 usec steps. For values from 8000h to FFFFh the AWT increments in 1
msec steps. The maximum value represents 32 767 ms + 32 768 µs.
Also, delete table 77, the scale bit in table 74.

Seagate #128 [JC]
PDF Page 190
7.8.3 Fanout expander device specific rules
The identify sequence completes of a port by port basis and there is no global indication of when it
complete for all ports on the expander.
Suggest:
"After completing the identify sequence on a port, the expander connection manager within a fanout
expander device shall be capable of processing connection requests from the attached device on the
port. The connection manager may return OPEN_REJECT (NO DESTINATION) if configuration is not
complete."

Seagate #129 [JC]
PDF Page 190
7.8.4 Edge expander device specific rules
same comment as for 7.8.3 -The identify sequence completes of a port by port basis and there is no
global indication of when it complete for all ports on the expander.
Suggest:
"After completing the identify sequence on a port, the expander connection manager within a edge
expander device shall be capable of processing connection requests from the attached device on the
port. The connection manager may return OPEN_REJECT (NO DESTINATION) if configuration is not
complete."

Seagate #130 [JW]
PDF Page 191
7.8.5 Identification and hard reset (SL_IR) state machines
7.8.5.1 Overview
Figure 67 — SAS link layer identification and hard reset (SL_IR) state machines
Add a pink "out arrow up" with the text "HARD_RESET Received"
This will agree with Table 18

Seagate #131 [JW]
PDF Page 191
7.8.5 Identification and hard reset (SL_IR) state machines
7.8.5.1 Overview
Figure 67 — SAS link layer identification and hard reset (SL_IR) state machines
Add a pink "out arrow up" with the text "Identify Sequence Complete"
(this will agree with the text in section 7.8.6.3.3.1 and table 18)

Seagate #132 [JW]
PDF Page 192
7.8.6 SL_IR transmitter and receiver
change <shall not transmit the indicated primitive>
to "shall transmit the indicated primitive"
(section 7.7.1says that primitives may be inserted inside an address frame)

Seagate #133 [JC]
PDF Page 196
7.10 Near-end analog loopback test
Targets should be allowed to preform loopback also.
change to:
"This test mode may be invoked in initiator or target devices using vendor-specific means."
also add a paragraph:
"Once the test is completed in a target device, the target phy shall start a phy reset sequence."

Seagate #134 [JC]
PDF Page 198
7.12.2.2 Connection request responses
The OPEN may require a rate match that is not support by the recepient.
Add: "if the requested connection rate is supported."

Seagate #135 [JC]
PDF Page 198
7.12.3 Arbitration fairness
may should be shall. Optional implementation may/will lead to non-interoperable devices. Also if optional, the behavior has to be described in the rest of the document.

Seagate #136 [JC]
PDF Page 198
7.12.3 Arbitration fairness
The AWT has to be mandatory.
Chnane to:
Initiator ports and target ports shall set the arbitration wait timer to zero for fair operation and start the timer when they transmit the first OPEN address frame for the connection request.

Seagate #137 [JC]
PDF Page 198
7.12.3 Arbitration fairness
This is duplicated in 7.7.3. Delete here.
The arbitration wait timer shall count in microseconds from 0 µs to 32 767 µs and in milliseconds from 32 768 µs to 32 767 ms + 32 768 µs.

Seagate #138 [JC]
PDF Page 198

7.12.3 Arbitration fairness
In conjunction with a comment in 7.7.3 to rmove the scale bit:
Change to:
However, unfair ports shall not set the ARBITRATION WAIT TIME field to a value greater than
7FFFh; this limits the amount of unfairness and helps prevent livelocks.

Seagate #139 [JC]
PDF Page 198
7.12.2.2 Connection request responses
***The retry delay timer greatly complicates selecting another transfer request for a queue. If a
request to a different destination has to be selected, a good deal of hardware is required. If done by a
processor, the performance would be poor.
Suggest deleting the retry delay. If the expander gets congested, buy more capacity.

Seagate #140 [JC]
PDF Page 199
7.12.2.2 Connection request responses
change:
matching PROTOCOL and CONNECTION RATE fields.
to:
a matching PROTOCOL field and a supported connection rate.

Seagate #141 [JC]
PDF Page 199
7.12.3 Arbitration fairness
Change:
the timer
To:
The arbitration wait timer

Seagate #142 [JC]
PDF Page 199
7.12.3.1.1 Arbitration overview
This subclause uses "primitive" in a different meaning than the rest of the draft. Also, it is an overview
and should not present the attribute/confirmation details. Suggest a rewrite to:
The expander connection manager shall arbitrate and assign or deny path resources for connection
attempts requested by each expander phy in response to receiving valid OPEN address frames.
Arbitration includes adherence to the SAS arbitration fairness algorithm and path recovery. Path
recovery is used to avoid potential deadlock scenarios within the SAS topology by deterministically
choosing which partial pathway(s) to tear down to allow at least one connection to complete.
The expander connection manager responds to connection request with arbitration won, lost, and
reject to the requesting phy.
Each path request contains the Arbitration Wait Time and the Source SAS Address arguments from
the received OPEN address frame.
If two path requests contend, the winner shall be determined by comparing OPEN address frame field
values in this order:
1) largest Arbitration Wait Time;
2) largest Source SAS Address; and
3) largest Connection Rate.
The expander connection shall generate the arbitration reject response when any of the following
conditions are met:
a) the request does not map to a valid phy;
b) the request specifies an unsupported connection rate; or
c) the request specifies a destination port which contains at least one partial pathway and pathway

recovery rules require this connection request to release path resources.
When two phys receive an OPEN address frame destined for each other, the
expander connection
manager shall provide an arbitration lost response to the phy that received
the lowest priority OPEN
address frame when all of the following conditions are met:
a) the request is for an available phy at a supported connection rate; and
b) the destination phy of this connection request has received a higher
priority OPEN address frame
with this phy as its destination.
The expander connection manager shall generate the arbitration won response
when all of the
following conditions are met:
a) the request maps to an available phy at a supported connection rate; and
b) no higher priority connection requests are present with this phy as the
destination.

Seagate #143 [JC]
PDF Page 199
7.12.3 Arbitration fairness
The AWT is not reset on OPEN_REJECT (PATHWAY BLOCKED). This appears to be
the only
exception to reseting the timer.
Add:
(except OPEN_REJECT (PATHWAY BLOCKED))

Seagate #144 [JC]
PDF Page 199
7.12.3.1.1 Arbitration overview
Why is largest Connection Rate used for compare? Does this mean that AWT
and Source SAS
address are the same?

Seagate #145 [JC]
PDF Page 200
7.12.3.1.2 Arbitration status
Change: value
To: type

Seagate #146 [JC]
PDF Page 205
7.13 SAS link layer state machine for initiator phys and target phys (SL)
The SL state machine starts with 0 state. Most others start with 1.

Seagate #147 [JW]
PDF Page 209
7.13.2 SL transmitter and receiver
change <shall not transmit the indicated primitive>
to "shall transmit the indicated primitive"
(section 7.7.1 says you can)

Seagate #148 [JW]
PDF Page 209
7.13.3 SL0:Idle state
7.13.3.1 State description
<After an Enable Disable SSP Link (Enable) confirmation is received this
state shall send an Enable
Disable
SSP Link (Enable) confirmation to the port layer.>
Three things:
1) Fig 72 says "SAS Link" (not SSP) and
2) these say confirmations and if so should be denoted by pink up and down
arrows in figure 72
3) This confirmation is not on the Port layer state machines or mentioned
in th eport layer writeup.

Seagate #149 [JW]
PDF Page 209
7.13.2 SL transmitter and receiver
<shall send a Change Received

confirmation>
(this confirmation is not listed in table 18 - Confirmations between ... or
application layer)

Seagate #150 [JW]
PDF Page 215
7.14 SAS link layer state machine for expander phys (XL)
7.14.1 Overview
remove <by receiving an>
(third paragraph - after k))

Seagate #151 [JC]
PDF Page 221
7.14.6.1 State description
Spelling:
Thist should be "This"

Seagate #152 [JC]
PDF Page 225
7.15 Rate matching
The termination of inserting ALIGNs is not covered.
Add a sentence:
The source shall stop inserting ALIGNs for rate matching with the first
dword of CLOSE.

Seagate #153 [JC]
PDF Page 226
7.16.3 SSP frame transmission
Delete:
NAK means the frame was received with an error;
NAK (CRC ERROR) is the only defined NAK.

Seagate #154 [JW]
PDF Page 229
7.16.7 SSP link layer (SSP) state machines
7.16.7.1 Overview
change <The SSP_TCM state machine contains the SP_TCM1:Tx_credit_monitor
state> to
"The SSP_TCM state machine contains the SP_TCM1:Tx_Credit_Monitor state"

Seagate #155 [JW]
PDF Page 229
7.16.7 SSP link layer (SSP) state machines
7.16.7.1 Overview
<The SSP_TF state machine's function it to control when the SSP_T state
machine>
two things:
1) change <it> to "is"
2) change <the SSP_T state machine> to "a SSP transmitter"
(I can not find a <SSP_T> state machine. Does it need to be defined ? We
defined for the SL state
machines in Figure 73)

Seagate #156 [JW]
PDF Page 232
7.16.7 SSP link layer (SSP) state machines
7.16.7.1 Overview
Figure 84 — SSP link layer (SSP) state machines (part 3 - primitive
transmission)
change <Frame> to
"frame"
(see text on section 7.16.7.7)

Seagate #157 [JW]
PDF Page 232
7.16.7 SSP link layer (SSP) state machines
7.16.7.1 Overview
Figure 84 — SSP link layer (SSP) state machines (part 3 - primitive
transmission)
change <Frame> to

"frame"

Seagate #158 [JW]
PDF Page 233
7.16.7.3 SSP_TCM1:Tx_credit_monitor state
change <TCM1:Tx_credit_monitor state> to
CM1:Tx_Credit_Monitor state

Seagate #159 [JW]
PDF Page 234
change <Done> to
"DONE"_

Seagate #160 [JW]
PDF Page 235
7.16.7.6.3 Transition SSP_TF2:Tx_Wait to SSP_TF4:Indicate_Done_Tx
change <Connection Closed> to "Close Connection"

Seagate #161 [JW]
PDF Page 235
7.16.7.6.3 Transition SSP_TF2:Tx_Wait to SSP_TF4:Indicate_Done_Tx
change <Done> to
"DONE"

Seagate #162 [JW]
PDF Page 235
7.16.7.6.3 Transition SSP_TF2:Tx_Wait to SSP_TF4:Indicate_Done_Tx
change <Done> to
"DONE"

Seagate #163 [JW]
PDF Page 235
7.16.7.6.3 Transition SSP_TF2:Tx_Wait to SSP_TF4:Indicate_Done_Tx
change <Done> to
"DONE"

Seagate #164 [JW]
PDF Page 235
7.16.7.6.3 Transition SSP_TF2:Tx_Wait to SSP_TF4:Indicate_Done_Tx
change <Done> to
"DONE"

Seagate #165 [JW]
PDF Page 235
7.16.7.6.3 Transition SSP_TF2:Tx_Wait to SSP_TF4:Indicate_Done_Tx
change <Done> to
"DONE"

Seagate #166 [JW]
PDF Page 235
7.16.7.8 SSP_TF4:Indicate_Done_Tx state
change <Done> to
"DONE"

Seagate #167 [JW]
PDF Page 236
7.16.7.8 SSP_TF4:Indicate_Done_Tx state
change <parameter> to
"Wait For DONE (CREDIT TIMEOUT) parameter

Seagate #168 [JW]
PDF Page 236
7.16.7.9 SSP_RF1:Rcv_Frame state
change <Received Frame> to
"Frame Received"

Seagate #169 [JW]
PDF Page 237
7.16.7.11 SSP_RIM1:Rcv_Interlock_Monitor state
change <Received Frame> to

"Frame Received"

Seagate #170 [JW]
PDF Page 237
7.16.7.11 SSP_RIM1:Rcv_Interlock_Monitor state
change <Received Frame> to
"Frame Received"

Seagate #171 [JW]
PDF Page 237
7.16.7.11 SSP_RIM1:Rcv_Interlock_Monitor state
change <Received Frame> to
"Frame Received"

Seagate #172 [JW]
PDF Page 237
7.16.7.13.1 State description
change <CREDIT_BLOCKED by sending> to
"CREDIT_BLOCKED be transmitted by sending"

Seagate #173 [JC]
PDF Page 242
7.17.3 Preparing to close an STP connection
Change:
detected, after
To:
detected or after

Seagate #174 [JW]
PDF Page 243
7.18.4 SMP link layer (SMP) state machines
7.18.4.1 Overview
change <Rcv_response_Frame> to
"Rcv_Response_Frame"
(in all other state diagrams the first letter of all state names are
capitalized - this comment applies to
all state names in the SMP section and SMP figures)

Seagate #175 [JW]
PDF Page 243
7.18.4 SMP link layer (SMP) state machines
7.18.4.1 Overview
change <(see 7.18.4.2)(initial state);> to
(see 7.18.4.2.1)(initial state);

Seagate #176 [JC]
PDF Page 244
7.18.4.1 Overview, Table 88
Round corners of white box to match format of other state machines

Seagate #177 [JC]
PDF Page 249
8.2.2 Bus inactivity time limit timer
This timer is optional by definition in SCSI.
Add text:
Support for the bus inactivity timer is optional. The Disconnect-Reconnect
mode page may be
accessed to determine support for this timer. When this timer is not
support, the bus inactivity timer
shall not be treated as expired in this standard.

Seagate #178 [JC]
PDF Page 249
8.2.3 Maximum connect time limit timer
Add text:
Support for the maximum connect time limit timer is optional. The
Disconnect-Reconnect mode page
may be accessed to determine support for this timer. When this timer is not
support, the maximum
connect time limit timer shall not be treated as expired in this standard.

Seagate #179 [JC]
PDF Page 249
8.2.4 I_T nexus loss timer
Add text:
Support for the I_T nexus loss timer is optional. The Protocol-Specific Port mode page may be
accessed to determine support for this timer see 10.1.6.2. When this timer is not support, the I_T
nexus loss timer shall not be treated as expired in this standard.

Seagate #180 [JC]
PDF Page 250
8.2.5 Arbitration wait time (AWT) timer
Add a sentence:
Support of the AWT is mandatory.

Seagate #181 [JC]
PDF Page 250
8.2.6 Pathway blocked count (PBC) counter
Add a sentence:
Support of the PBC is mandatory.

Seagate #182 [JW]
PDF Page 252
8.3.3 PL_OC2:Overall_Control state
8.3.3.1 State description
8.3.3.1.1 State description overview
Delete <a) I_T nexus loss time;>
and reorder the following arguments restarting at a)

Seagate #183 [JW]
PDF Page 253
8.3.3.1.4 SSP wide port rules
(delete all of the following text. these are not wide port rules and none of the terms i.e., COMMAND,
QUERY TASK, have been defined and are out of context)
<An initiator port that is a wide port may transmit COMMAND frames on multiple links simultaneously.
An initiator port shall not transmit a TASK frame requesting a task management function that only
affects a
single I_T_L_Q nexus (e.g., ABORT TASK or QUERY TASK; see SAM-3) specifying an I_T_L_Q
nexus for
which the initiator port is transmitting a frame or is waiting for a link layer acknowledgement for a
frame.
An initiator port shall not transmit a TASK frame requesting a function that only affects an I_T_L
nexus (e.g.,
ABORT TASK SET, CLEAR TASK SET, CLEAR ACA, or LOGICAL UNIT RESET; see SAM-3)
specifying an
I_T_L nexus for which the initiator port is transmitting a frame or is waiting for a link layer
acknowledgement
for a frame.
An initiator port shall not transmit a TASK frame requesting a function that only affects an I_T nexus
(see
SAM-3) specifying an I_T nexus for which the initiator port is transmitting a frame or is waiting for a
link layer
acknowledgement for a frame.>

Seagate #184 [JW]
PDF Page 254
8.3.3.1.5 Filling in the Tx Frame arguments
4th paragraph (about I_T nexus loss arguments.

add
"For each destination, the PL_OC_I_T nexus loss timer is is stopped, set to zero,and asssigned a
stopped status after each Connection Opened confirmation is received and after each power-on reset
or hard reset function is completed "

Seagate #185 [JW]
PDF Page 256
8.4 Port layer phy manager (PL_PM) state machine
8.4.1 Overview
change <PL_OC state machine;> to
"transport layer;"

Seagate #186 [JW]
PDF Page 258
8.4 Port layer phy manager (PL_PM) state machine
8.4.1 Overview
Figure 93 — Port layer phy manager (PL_PM) state machine (part 2)
add a pink "In Arrow" here with text of "DONE Received"

Seagate #187 [JW]
PDF Page 258
8.4 Port layer phy manager (PL_PM) state machine
8.4.1 Overview
Figure 93 — Port layer phy manager (PL_PM) state machine (part 2)
add a pink "out Arrow " here with text of "DONE Received"

Seagate #188 [JW]
PDF Page 258
8.4 Port layer phy manager (PL_PM) state machine
8.4.1 Overview
Figure 93 — Port layer phy manager (PL_PM) state machine (part 2)
add a pink down arrow with a "Close Connection" text

Seagate #189 [JW]
PDF Page 259
8.4.3.1.3 Connection Opened handling
change <Tx Frame,> to
"Tx Frame parameter,"

Seagate #190 [JW]
PDF Page 260
8.4.4 PL_PM3:Connected state
8.4.4.1 State description
change <This state shall generate a Tx Frame request to the link layer when a Tx Frame parameter is
received from the PL_OC state machine.> to
"This state shall generate a Tx Frame (Balanced) request to the link layer when a Tx Frame
parameter with a Balance Required argument is received from the PL_OC state machine.
This state shall generate a Tx Frame (Nonbalanced) request to the link layer when a Tx Frame
parameter with a Balance Not Required argument is received from the PL_OC state machine."

Seagate #191 [JW]
PDF Page 260
8.4.3.1.4 Open Failed handling
change <Tx Frame> to
"Tx Frame parameter"

Seagate #192 [JW]
PDF Page 261
8.4.4.1 State description (-- for PL_PM3: Connected state)
in the area started by <for SSP ports> add " For SSP and SMP ports, this state shall send a
Transmission Status (Connection Lost) confirmation to the transport layer if a Connection Closed

(Break Received), Connection Closed (Close Timeout) , or Conection Closed
(Link Broken)
confirmation is received from the link layer."

Seagate #193 [JW]
PDF Page 261
8.4.4 PL_PM3:Connected state
8.4.4.1 State description
insert between c) and d)
"d) DONE Received"

Seagate #194 [JW]
PDF Page 261
8.4.4 PL_PM3:Connected state
8.4.4.1 State description
change <d)> to "e"

Seagate #195 [JW]
PDF Page 261
8.4.4 PL_PM3:Connected state
8.4.4.1 State description
change <e)> to "f"

Seagate #196 [JW]
PDF Page 261
8.4.4 PL_PM3:Connected state
8.4.4.1 State description
change <Tx Frame> to
"Tx Frame Request"

Seagate #197 [JW]
PDF Page 261
8.4.4 PL_PM3:Connected state
8.4.4.1 State description
change <Tx Frame> to
"Tx Frame Request"

Seagate #198 [JC]
PDF Page 261
8.4.4.1 State description
second to last paragraph
The shall in the following sentence is misleading for an optional timer.
the bus inactivity time limit timer shall be initialized
suggest:
the bus inactivity time limit timer if supported shall be initialized

Seagate #199 [JC]
PDF Page 261
8.4.4.1 State description
last paragraph
The shall in the following sentence is misleading for an optional timer.
the maximum connect time timer shall be initialized
suggest:
initializedthe maximum connect time timer if supported shall be initialized

Seagate #200 [JW]
PDF Page 263
9.2.1 SSP frame format
Table 88 — SSP frame format
change <TIMEOUT> to
"RETRANSMIT"
(will make definitions on next page and later text consistent)

Seagate #201 [JC]
PDF Page 264
9.2.1 SSP frame format
The RETRANSMIT bit is in the text but not in Table 88. Is the function out?

Seagate #202 [JC]
PDF Page 265

9.2.1 SSP frame format
Delete. This sentence is redundant with the last paragragh in 9.2.2.4 DATA information unit.

Seagate #203 [JC]
PDF Page 268
9.2.2.3 XFER_RDY information unit - Table 94 — XFER_RDY information unit
The use of the same field name, RELATIVE OFFSET, in the header and XFR_RDY is confusing.
Suggest:
XFR_RDY_OFFSET,
REQUEST_OFFSET,
STARTING_OFFSET,
etc.
RELATIVE OFFSET

Seagate #204 [JC]
PDF Page 268
9.2.2.3 XFER_RDY information unit
reference to 10.1.1.1.5
should be 10.1.6.1.5

Seagate #205 [JC]
PDF Page 268
9.2.2.3 XFER_RDY information unit
reference to 10.1.1.1.5
should be 10.1.6.1.5

Seagate #206 [JC]
PDF Page 269
9.2.2.4 DATA information unit
Delete: This sentence is redundant with the first paragraph on the page.

Seagate #207 [JC]
PDF Page 274
9.2.4.1 COMMAND frame
Delete:
in the next connection
This would mean the initiator would have to shutdown any queued transfer request to satisfy the next
connection requirement.

Seagate #208 [JW]
PDF Page 279
9.2.6.2 Initiator device state machines
9.2.6.2.1 Overview
Figure 98 — SSP transport layer (ST) state machines - initiator device
remove (ACK/NAK TIMEOUT)

Seagate #209 [JW]
PDF Page 279
TIMEOUT)

Seagate #210 [JW]
PDF Page 279
9.2.6.2 Initiator device state machines
9.2.6.2.1 Overview
Figure 98 — SSP transport layer (ST) state machines - initiator device
add a pink in arrow with the nomenclature of "ACK Transmitted"on it
(i.e. add a "ACK Transmitted " received confirmation here)

Seagate #211 [JW]
PDF Page 285
9.2.6.2.8 ST_IFR1:Initiator_Frame_Router state
change <Data-in parameter> to
"Data-in Arrived parameter"

Seagate #212 [JW]
PDF Page 285
9.2.6.3 Target device state machines

9.2.6.3.1 Overview
change <Data-Out
Received> to
"Data -Out Arrived or Response Data"
(to be consisten with figure 99 - SSP Transport layer state machine -
target device)

Seagate #213 [JW]
PDF Page 286
9.2.6.3 Target device state machines
9.2.6.3.1 Overview
Figure 99 — SSP transport layer (ST) state machines - target device
add a pink in arrow with the nomenclature of "ACK Transmitted"on it
(i.e. add a "ACK Transmitted " received confirmation here)

Seagate #214 [JW]
PDF Page 291
9.2.6.3.6 ST_TTS4:Receive_Data_Out state
9.2.6.3.6.1 State description
change <ST_TS1:L to
"ST_TTS1"

Seagate #215 [JC]
PDF Page 295
9.4.2 SMP_REQUEST frame
Why is this not 1 024?

Seagate #216 [JC]
PDF Page 296
9.4.3 SMP_RESPONSE frame
Why is this not 1 024?

Seagate #217 [JW]
PDF Page 298
9.4.4.2.1 Overview (for Initiator device state machine)
Figure 101 - SMP transport layer state machine - initiator device
change <Connection Closed> to "Transmission Status"

Seagate #218 [JW]
PDF Page 298
9.4.4.2 Initiator device state machine
9.4.4.2.1 Overview
Figure 101 — SMP transport layer state machine - initiator device (MT_ID)
remove <Connection
Closed> and th pink arrow

Seagate #219 [JC]
PDF Page 298
9.4.4.2.2.2 Transition MT_ID1:Idle to MT_ID2:Send
Why is the initiator connection tag included when the SMP transfer is
interlocked?

Seagate #220 [JW]
PDF Page 299
9.4.4.2.3.2 Transition MT_ID2:Send to MT_ID1:Idle
change <Connection Closed> to "Transmisssion Status (Connection Lost)"

Seagate #221 [JW]
PDF Page 299
9.4.4.2.4.2 Transition MT_ID3:Receive to MT_ID1:Idle
change <Connection Closed> to "Transmission Status (Connection Lost)"

Seagate #222 [JW]
PDF Page 300
9.4.4.3.3.2 Transition MT_TD2:Respond to MT_TD1:Idle
change <Connection Closed> to "Transmission Status (Connection Lost)"

Seagate #223 [JW]
PDF Page 300
9.4.4.3.1 Overview

Figure 102 — SMP transport layer (MT) state machines - target device
Remove <Connection> and the input arrow

Seagate #224 [JW]
PDF Page 300
Closed

Seagate #225 [JW]
PDF Page 301
This section does not talk about receiving from the transport layer the I_T Nexus loss timer expired
or not arguments or the connection lost arguments and what to do with them.
It should be added.

Seagate #226 [JC]
PDF Page 322
10.1.8 SCSI power condition states
SA_PC state machine numbering is not consistent with other state machines.
SA_PC state machine
start with "0", others start with "1".

Seagate #227 [JW]
PDF Page 323
10.1.8.1.3 Transition SA_PC_0:Powered_On to SA_PC_5:Active_Wait
change <SA_PC_5:Active state.> to
"SA_PC_5:Active_Wait state."

Seagate #228 [JW]
PDF Page 333
10.3.1.3 REPORT MANUFACTURER INFORMATION function
the <ADDITIONAL LENGTH field> location is not listed in table 133 - report manufacture information
response

Seagate #229 [JC]
PDF Page 340
10.3.1.5 REPORT PHY ERROR LOG function
The meaning of "outside of phy reset sequences" is not specific.
Suggest substituting:
"while PhyReady is valid from the SP state machine" each counter in this clause to be more specific.

Seagate #230 [AC]
PDF Page 356
A.1 Compliant jitter test pattern (CJTPAT)
Case of the next to the last character is incorrect. 35B5A9Edh should be 35B5A9EDh

Seagate #231 [AC]
PDF Page 357
A.1 Compliant jitter test pattern (CJTPAT)
Case of the next to the last character is incorrect. 8CF328Eah should be 8CF328EAh

Seagate #232 [AC]
PDF Page 358
A.1 Compliant jitter test pattern (CJTPAT)
Case of the next to the last character is incorrect. AFF087Ebh should be AFF087EBh

Seagate #233 [AC]
PDF Page 358
A.1 Compliant jitter test pattern (CJTPAT)
Case of the next to the last character is incorrect. E21035Efh should be E21035EFh

Seagate #234 [JW]
PDF Page 359
B.1 SAS phy reset sequence examples
change <phy B> to

"phy A" ?????

Seagate #235 [JC]
PDF Page 359
B.1 SAS phy reset sequence examples
Figure A.1
S.B.
Figure B.1

Seagate #236 [JC]
PDF Page 359
B.1 SAS phy reset sequence examples
Figure A.2
S.B.
Figure B.2

Seagate #237 [JC]
PDF Page 362
C.3 CRC implementation with XORs
Change:
These equations generate the 32 bit CRC for frame transmission.
To:
These equations generate the multiplier function shown in figures C.1 and
C.2.

Seagate #238 [JC]
PDF Page 374
F.1 STP differences from SATA
Add:
h) BIST activated frames not supported.

Seagate #239 [JC]
PDF Page 376
F.3 Byte and bit ordering, Figure F2
change byte order to:
(4th : 3rd : 2nd : 1st)
to match Figure F.3

Seagate #240 [JC]
PDF Page 376
F.3 Byte and bit ordering, Figure F2
change byte order to:
(1st : 2nd : 3rd : 4th)
to match Figure F.3

Seagate #241 [JC]
PDF Page 378
G.1 Overview, Table G.1
For completeness, continue table to include representations for PHYs W &
Z.should be a
cut-and-paste of what's there with a replacement of X->W and Y->Z plus
device A -> C and B->D.

Seagate #242 [JC]
PDF Page 380
G.2 Connection request - Open accept, Figure G.2
Add reference Fig 26 and Fig 27 to help the reader understand how to
interpret req/rsp and cnf/ind
columns in the figures.

Seagate #243 [JC]
PDF Page 406
I.3 Source file
Should:
header file
Be:
code file

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Comments attached to Yes ballot from Paul D. Aloisi of
Texas Instruments:

SAS Letter ballot Comments
Texas Instruments
Paul Aloisi

1. Editorial 4.1.4 last sentence needs work.
In figures that show ports but no phys, the ports still contain phys and may or may not be wide ports.

In figures that show ports but no phys, the phy level of detail is not shown,
the ports actually contain one or more phys.

2. Editorial 4.1.5 and 4.16 first sentence does make sense in a SAS standard,
unless it is explained better. SCSI and ATA port that support SMP can be used
in SAS domains. If a device supports SCSI or ATA without SMP is outside of the
scope of this standard.

3. Technical 4.1.8 should have a Fan out expander section and a description of
the relationship between the expanders in a large configuration. I have seen it in presentations, but there is no clear description of it in the standard.
There should be a clear definition of a fan out expander as a section.
4.1.8.1 Expander device overview
4.1.8.2 Edge expander device set
4.1.8.3 Configurable expander device

4. Figure 34 the title has internal misspelled

5. Technical 6.8.3.3.1, 9.2.4.5 and 9.2.3.9.1 still have an editors note, this should have been addressed before the letter ballot.

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Comments attached to Abs ballot from Roger Cummings of
Veritas Software:

Not within our organization's scope of expertise

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Comments attached to Yes ballot from Kenneth Hirata of
Vixel Corp.:

Comments will be sent later this week (December 23, 2002)

********** End of Ballot Report **********