

Voting Results on T10 Letter Ballot 98-015r0 on
Forwarding RBC to first public review

| Organization | Name | S | Vote | Add'l Info |
|-------------------------------|---------------------|---|------|------------|
| Adaptec, Inc. | Lawrence J. Lamers | P | Yes | |
| AMP, Inc. | Chuck Brill | P | Yes | |
| Amphenol Interconnect | Michael Wingard | P | Yes | |
| Ancot Corp. | Bart Raudebaugh | P | Yes | |
| Apple Computer | Ron Roberts | A | Yes | |
| Berg Electronics | Doug Wagner | P | Yes | |
| Cable Design Technologies | Richard Wagner | P | Yes | |
| Ciprico Inc. | Gerry Johnsen | P | Yes | |
| Circuit Assembly Corp. | Ian Morrell | P | Yes | |
| Compaq Computer Corp. | Rob Elliott | P | YesC | Cmnts |
| Congruent Software, Inc. | Peter Johansson | P | Yes | |
| Dallas Semiconductor | | | DNV | |
| Data General / Clariion | Greg McSorley | P | Yes | |
| Distributed Processing Tech. | Roger Cummings | P | Yes | |
| Eastman Kodak Co. | Robert Reisch | P | Yes | |
| ENDL | I D Allan | P | Yes | |
| Exabyte Corp. | Tom Jackson | P | Yes | |
| Fujitsu (FCPA) | Don Vohar | P | Yes | |
| Harting, Inc. of N. America | Marcos Barrionuevo | P | Yes | |
| Hewlett Packard Co. | J. Robert Sims, III | P | Yes | |
| Hitachi Cable Manchester, Inc | Zane Daggett | P | Yes | |
| Hitachi Storage Products | Yang, Anthony | P | Yes | |
| Honda Connectors | Thomas J Kulesza | P | Yes | |
| IBM Corp. | George Penokie | P | No | Cmnts |
| Iomega Corp. | Tim Bradshaw | P | YesC | Cmnts |
| KnowledgeTek, Inc. | Dennis Moore | P | Yes | |
| Linfinity Micro | Louis Grantham | P | Yes | |
| LSI Logic Corp. | Ralph O. Weber | A | No | IV Cmnts |
| Madison Cable Corp. | Robert A. Bellino | P | Yes | |
| Maxtor Corp. | Pete McLean | P | Yes | |
| Methode Electronics, Inc. | Bob Masterson | P | Yes | |
| Molex Inc. | Joe Dambach | P | Yes | |
| Mylex Corp. | Brian McKean | P | Yes | |
| Ophidian Designs | Edward A. Gardner | P | No | IV Cmnts |
| Philips Electronics | Bill McFerrin | P | YesC | Cmnts |
| QLogic Corp. | Skip Jones | P | No | Cmnts |
| Quantum Corp. | Mark Evans | P | YesC | Cmnts |
| Seagate Technology | | | DNV | |
| Silicon Systems, Inc. | Dave Guss | P | Yes | |
| Sony Electronics, Inc. | Janek Rebalski | A | Yes | |
| Storage Technology Corp. | Erich Oetting | P | Yes | |
| Sun Microsystems Computer Co | Robert Snively | P | No | Cmnts |
| SyQuest Technology, Inc. | Pat Mercer | P | Yes | |
| Toshiba America Elec. Comp. | Tokuyuki Totani | P | Yes | |
| UNISYS Corporation | Ken Hallam | P | Yes | |
| Unitrode Corporation | Paul D. Aloisi | P | YesC | Cmnts |
| Western Digital Corporation | Jeffrey L Williams | P | Yes | |
| Woven Electronics | Doug Piper | P | Yes | |

Key:

P Voter indicated he/she is principal member
A Voter indicated he/she is alternate member
O Voter indicated he/she is observer member
? Voter indicated he/she is not member or does not know status
YesC Yes with comments vote
Abs Abstain vote

DNV Organization did not vote
IV Individual vote (not organizational vote)
Cmnts Comments were included with ballot
NoCmnts No comments were included with a vote that requires comments
DUP Duplicate ballot (last ballot received from org. is counted)
PSWD The password was not correct (vote not counted)
ORG? Organization is not voting member of T10 (vote not counted)

Ballot totals:

41 Yes
5 No
0 Abstain
2 Organization(s) did not vote
48 Total voting organizations
10 Ballot(s) included comments

This 2/3rds majority ballot passed.

Comments attached to YesC ballot from Rob Elliott of
Compaq Computer Corp.:

1. title page Revision 2 underneath 1240D should be 5
2. title page add spaces after each "(303)"
3. second page The Vice-chair has changed
4. fourth page change 1997 to 1998
5. pg i the first entry "Tables Page" should be "Tables"
6. pg i why doesn't "Annexes ... iii" show up too?
7. pg iv NCITS membership list is out of date; both Compaq and Digital reps listed no longer seem to work here

8. pg1 last line add "a" - "attached to a Serial Bus"
9. pg2 2 unitalicize via
10. pg3 3.1 add "vendor specific" keyword? It's used in tables next to "reserved" but isn't defined.
11. pg3 3.2.3 unitalicize e.g.
12. pg6 table 1 remove extra space from "3B 16"
13. pg7 4.1 first paragraph unitalicize bit in "Increment bit"
Note: SPC-2 does not italicize bit names. There seems to be a mix of conventions in this document. I've assumed italics are desired for the rest of the comments.
14. pg7 4.1 replace "FORMAT" with "FORMAT UNIT" everywhere
15. pg7 4.1 sixth paragraph add of "Sens Key of UNIT ATTENTION"
16. pg8 4.2 second paragraph italicize "Logic Block Address"
17. pg8 4.3 third paragraph italicize "Transfer Length"
18. pg9 4.3 last paragraph italicize "Block Length in Bytes"
19. pg9 4.3 last paragraph italicize "Logical Block Address"
20. pg9 4.3.1 italicize "Block Length in Bytes"
21. pg9 4.3.1 italicize "Logical Block Address"
22. pg11 table 7 change capitalization to "LOEJ"
23. pg11 4.4 last paragraph add s and italicize "Power Condition"
24. pg11 table 8 define M and O, or use Y and O which are used by most other tables
25. pg12 4.4 3rd line remove extra space in "delay ."
26. pg12 4.4.1 change "SLEEP" to "Sleep" (two places)
27. pg14 4.6 italicize all bit/field names (6 places)
28. pg15 4.7 italicize "Logical Block Address"
29. pg15 4.7 italicize "Verification Length"
30. pg16 4.8 italicize "Number of Logical Blocks" in note (twice)

31. pg17 4.8 change "effected" to "affected", or change "effected by" to "considering"
32. pg17 4.8.1 change "can not" to "cannot" (4 places)
33. pg18 table 13 widen "Removeable" column so e fits on same line as "Removabl"
34. pg18 table 13 remove extra space in "3B 16"
35. pg19 5.1 first paragraph remove "either"
36. pg19 table 14 formatting is messed up; bytes 7 and up seem broken
37. pg19 5.1 unitalicize "(AERC)"
38. pg19 5.1 italicize "Normal ACA"
39. pg20 5.2 italicize "Page Format"
40. pg20 5.2 italicize "Save Pages"
41. pg20 5.2.1 italicize "SP" (twice)
42. pg21 5.3 italicize "Disable Block Descriptors"
43. pg21 5.3 italicize "Page Control" (twice)
44. pg21 table 17 most tables use Y, N, and O, not spell out mandatory, optional, and not supported
45. pg21 table 17 italicize SP
46. pg22 5.4 italicize Prevent (3 places)
47. pg22 5.4 italicize "RMB" and "Mchngr"
48. pg23 table 20 should all of the descriptions be capitalized?
49. pg24 table 21 capitalize "Check Condition" (4 places)

50. pg24 table 31 remove comman "threshold exceeded,"
51. pg26 5.6.1 change "101 b" to "1012" (pg5 says 2 is the subscript used for binary numbers)
52. pg26 5.6.1 uncapitalize "Unit Attention" (2 times)
53. pg26 5.6.1 italicize "Parameter List Length"
54. pg27 A.1.2 change "it's" to "its"
55. pg28 A.1.2 second to last paragraph move comma after parenthesis
56. pg29 A.2.3 capitalize and italicize "logic_unit_number"
57. pg31 B.1 uncapitalize "Initiators"
58. pg31 table B.1 add periods to each description (2 missing)
59. pg31 B.1.1.1 remove commas around "that reports the unit attention condition"
60. pg33 B.2.2 remove , from ",." at end
61. pg33 B.2.3 make "Check Condition" and "Unit Attention" all caps
62. pg34 B.2.3 add period after "requested"
63. pg35 table B.5 add periods to each description (2 missing)
64. pg36 B.2.3.2 change bold bit names to italics (and leave "bit" normal) (6 places)
65. pg37 B.2.3.3 change bold "Time" to italics

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

Page 1

Note 1, George Penokie, 09/01/98 12:04:39 PM

(E)-Cover Page header - The Rev number states 2 instead of 5 and the date of the rev looks wrong.

Page 2

Note 2, George Penokie, 09/01/98 12:04:55 PM

(E)-T10 Vice-chair is now George Penokie.

Page 9

Note 3, George Penokie, 09/01/98 12:05:23 PM

(E)-The vice-chair is not George Penokie

Page 10

Note 4, George Penokie, 09/01/98 12:04:22 PM

(E)-The revision history should be removed from the final draft. Which I assume will be rev 6.

Page 14

Note 5, George Penokie, 09/01/98 01:39:57 PM

(E) - Section 2.1 - 3rd reference; The '(SBC 3)' should be '(SBC)'.

Page 15

Note 6, George Penokie, 09/01/98 01:50:12 PM

(E) section 3 - To be consistent with the other SCSI command set documents section 3 should be titled 'Definitions, symbols, and abbreviations'.
Section 3.1 should be 'Definitions'.
Section 3.2 should be 'Symbols and abbreviations'
Section 3.3 should be 'Keywords'.
Section 3.4 should be 'Conventions'.

Note 7, George Penokie, 09/01/98 01:52:01 PM

(E) - section 3.2 - This section should be titled 'Definations'.

Note 8, George Penokie, 09/01/98 01:56:35 PM

(E)- Section 3.2.3 , 2nd sentence - The statement 'Devices implement one or more logical units;' does not make sense. 'In devices that implement one or more logical units;' seems better.

Page 16

Note 9, George Penokie, 09/01/98 01:52:46 PM

(E) - Section 3.3 - This section should be titled 'Symbols and abbreviations'.

Page 17

Note 10, George Penokie, 09/01/98 02:03:06 PM

(E) - Section 3.4.2 - list entry b - Why does this standard use a notion that is defferent from every other SCSI standard? The notion for hex is 'h' in all others and should be the same for this SCSI standard.

Note 11, George Penokie, 09/01/98 02:03:33 PM

(E) - Section 3.4.2 - list entry c - Why does this standard use a notion that is different from every other SCSI standard? The notion for binary is 'b' in all others and should be the same for this SCSI standard.

Note 12, George Penokie, 09/01/98 02:16:18 PM

(E) - Why is there no model describing how RBC devices work as there is for every other command standard?

Page 18

Note 13, George Penokie, 09/01/98 02:07:59 PM

(E) - Table 1 - All the Y should be M for mandatory.

Note 14, George Penokie, 09/02/98 09:25:23 AM

(T) - Table 1 - The 'N' should be changed to 'N/A'. Saying a command 'shall not be supported' is not a good idea.

Note 15, George Penokie, 09/02/98 09:26:46 AM

(T) - Table 1 - The 'N' should be changed to 'N/A'. Saying a command 'shall not be supported' is not a good idea. It makes no sense to prohibit a device from supporting a command. What you are saying is that any device that supports it is in violation of the standard.

Note 16, George Penokie, 09/02/98 09:29:55 AM

(E) - Table 1, Note 1 - This Note is not needed. The commands are defined for this device type therefore they have to be implemented per this standard there is no need to justify the reasons.

Note 17, George Penokie, 09/02/98 09:31:27 AM

(T) - Section 4.1 - With the FORMAT UNIT name change recommended above the statement '(removable medium devices only)' is no longer needed.

Note 18, George Penokie, 09/02/98 09:22:07 AM

(E) Table 1 - Format command - This is not the same format command as defined in other command set standards. It should be renamed to avoid confusion. A suggestion would be to call it the REMOVABLE MEDIA FORMAT command.

Note 19, George Penokie, 09/02/98 09:28:10 AM

(T) Table 1 footnotes - The N=shall not be supported should be changed to N/A = Does not apply.

Page 19

Note 20, George Penokie, 09/01/98 02:19:50 PM

(E) - General - Italics are not liked by ANSII editors so don't be surprised if they disappear during the ANSII edit. I would suggest not using them in the drafts.

Note 21, George Penokie, 09/02/98 09:38:33 AM

(T) - Section 4.1 - 4th paragraph after table 2 - It states that an Increment bit of 0 specifies a device report progress in 5 percent or 5 second increments, depending on the value of the Percent/Time bit. But then it states that Vendor specific applications may vary the larger percentage increment. You cannot have it both ways either it is vendor specific or it is not.

Note 22, George Penokie, 09/02/98 09:40:35 AM

(E)-General - None of the standards call up the hex values for status, keys, ASCs, or ASCQs. There is no reason for this standard to be different than all the others.

Note 23, George Penokie, 09/02/98 09:45:42 AM

(E) - Section 4.1 - Because there is no model describing how format works. It is not clear at all how progress can be reported on a command that is in progress if that command has not ended. In the other command sets the command is ended as soon as it starts executing and request sense commands are used to determine progress.

Page 20

Note 24, George Penokie, 09/02/98 09:47:13 AM

(E) - All command tables that contain a transfer length. - Transfer Length should only be listed one time in the field not twice.

Note 25, George Penokie, 09/02/98 09:57:28 AM

(E) Section 4.2.1 - This is the kind of thing that should be described in a model section.

Page 23

Note 26, George Penokie, 09/02/98 10:06:40 AM

(E)-Section 4.4 Note under table 6 - This Note assumes an implementation or a specific protocol and should be removed.

Page 24

Note 27, George Penokie, 09/02/98 10:10:18 AM

(E) Section 4.4.1 - This is the kind of thing that should be described in a model section.

Page 27

Note 28, George Penokie, 09/02/98 10:14:38 AM

(E) Section 4.7 - table 11 - The name of the field verification length is repeated twice in the field.

Page 28

Note 29, George Penokie, 09/02/98 10:14:28 AM

(E) Section 4.8 - table 12 - The name of the field logical block size is

repeated twice in the field.

Note 30, George Penokie, 09/02/98 10:15:17 AM

(E) Section 4.8 - table 12 - The name of the field number of logical blocks is repeated twice in the field.

Page 29

Note 31, George Penokie, 09/02/98 10:19:08 AM

(E) - Section 4.8.1 - This section header is confusing and should be removed.

Page 30

Note 32, George Penokie, 09/02/98 10:27:12 AM

(E) Section 5 - 1st paragraph - The following statement: 'Support for various bits and fields contained in those commands listed in Table 13 has been restricted in order to conform to the goal of reduced complexity for RBC devices. Bit and field restrictions are described in the following clauses.' should be changed to 'Support for various bits and fields contained in those commands listed in Table 13 has been restricted as described in the following clauses.'

Note 33, George Penokie, 09/02/98 10:28:31 AM

(T) - Table 13 - The 'N' should be changed to 'N/A'. Saying a command 'shall not be supported' is not a good idea. It makes no sense to prohibit a device from supporting a command. What you are saying is that any device that supports it is in violation of the standard.

Note 34, George Penokie, 09/02/98 10:29:13 AM

(T) Table 1 footnotes - The N=shall not be supported should be changed to N/A = Does not apply.

Page 31

Note 35, George Penokie, 09/02/98 10:31:10 AM

(E) Section 5.1 - table 14 - byte 7 - bit 7 - There is a formatting problem that makes the '0' not visible in the pdf document.

Note 36, George Penokie, 09/02/98 10:33:32 AM

(E) Section 5.1 - table 14 - byte 3 - bit 7 - The AERC bit can be 0 or 1. Therefore the '=1' (which implies that it can only be a value of 1) needs to be removed.

Note 37, George Penokie, 09/02/98 10:36:26 AM

(E)- Section 5.1 - 4th paragraph after table 14 - The 1st and 2nd sentences do not belong here. Either they are in a model section or they should not be in the document at all.

Note 38, George Penokie, 09/02/98 10:39:46 AM

(E)- Section 5.1 - 4th paragraph after table 14 - last sentence - This

sentence should be change to. 'The NACA bit shall be set to zero. ACA is not supported by RBC devices.'

Note 39, George Penokie, 09/02/98 10:41:18 AM

(E)- Section 5.1 - 7th paragraph after table 14 - The statement '...are not specified in this document.' should be changed to '...are specified in the SPC-2 standard.'

Page 32

Note 40, George Penokie, 09/02/98 10:44:41 AM

(E) -Section 5.2 - 1st paragraph - 1st sentence; The statement '...parameters to the mass storage device. Devices...' should be changed to '...parameters to SCSI devices. SCSI devices...'

Note 41, George Penokie, 09/02/98 10:48:28 AM

(T) Section 5.2 and 5.2.1 - 2nd paragraph under table 15 and 1st paragraph after section 5.2.1 - There is a conflict here, In one place it is stated that the SP shall be set to one. Then in another place it states the SP bit is optional. It cannot be optional and required at the same time.

Page 33

Note 42, George Penokie, 09/02/98 11:34:48 AM

(E) - General - How does an initiator know if the RBC device has fixed or removable media? There appears to be nothing in the inquiry data.

Note 43, George Penokie, 09/02/98 11:38:34 AM

(T) - Section 5.3 - table 17 - Based on above comments I believe the Current parameter should be optional for fixed support. The reason given in the Note in table 17 is not a reason to make it not supported and depending on the answer to my comment above may not even be correct.

Note 44, George Penokie, 09/02/98 11:39:29 AM

(E) Section 5.3.1 - This section belongs in a model section.

Page 34

Note 45, George Penokie, 09/02/98 01:07:12 PM

(E) Section 5.4 - Title - There is no need to state that the command is '(removable medium devices only)'. It is obvious by the nature of the command it only applies to devices that have removable medium.

Page 35

Note 46, George Penokie, 09/02/98 01:13:05 PM

(E) -Section 5.4 - Table 20 - This table should be removed. It contains a list of key/code/qualifiers that, in many cases, applies to any command. Also, there is no way this can be a complete list as we are always adding new ASC and ASCQs and some of those many be a valid response to this command.

(E) - Section B.1.1 - Table B.1 the sense key and code values should be removed from this document.

Note 55, George Penokie, 09/02/98 01:40:35 PM

Section B.1.1 - Table B.1 ; Does this list represent the entire list that will never change? If not then wording should be added that makes it clear that this list could be added to in the future.

Page 44

Note 56, George Penokie, 09/02/98 01:43:15 PM

(E) - Section B.1.1.3 - Table 24 the ASC and ASCQ values should be removed from this table.

Note 57, George Penokie, 09/02/98 01:44:02 PM

(E) - Section B.1.1.3 - Table 24 - This should be table B.2.

Note 58, George Penokie, 09/02/98 01:44:46 PM

Section B.1.1.3 - Table 24 ; Does this list represent the entire list that will never change? If not then wording should be added that makes it clear that this list could be added to in the future.

Note 59, George Penokie, 09/02/98 01:46:08 PM

(E) - Section B.1.1.4 - Per comment above the term SMART needs to be replaced with IEC.

Note 60, George Penokie, 09/02/98 01:50:18 PM

(E) - Section B.1.1.4 ; The ASC is listed as SMART THRESHOLD EXCEED this is not correct the 5Dh ASC is FAILURE PREDICTION THRESHOLD EXCEEDED.

Note 61, George Penokie, 09/02/98 01:56:21 PM

(E) - Section B.2 - 1st paragraph - The entire paragraph should be removed as it add no value to the standard.

Page 45

Note 62, George Penokie, 09/02/98 01:53:26 PM

(E) Section B.2 - last sentence; This sentence should end as follows ' SBP-2 and RBC device that support SBP-2.'.

Note 63, George Penokie, 09/02/98 02:00:01 PM

(E) - Section B.2 - 2nd paragraph - 2nd sentence ; Should be changed from 'The initiator need only process the status block to determine the cause of the event.' to 'The initiator may then process the status block to determine the cause of the event.'.

Note 64, George Penokie, 09/02/98 02:02:38 PM

(E) - Section B.2 - 2nd paragraph - 1st sentence ; The following should be add

to the end of the this sentence; 'simply by building and transmitting a status block whenever an event occurs.'

Note 65, George Penokie, 09/02/98 02:03:12 PM

(E) - Section B.2 - 2nd paragraph - Last two sentences should be removed.

Comments attached to YesC ballot from Tim Bradshaw of Iomega Corp.:

1. Under 4.6 WRITE (10) Command, paragraph 4 currently states:
"The Logical Block Address field specifies the starting logical block address on the device for the read data to be accessed."

This should probably read:

"The Logical Block Address field specifies the starting logical block address on the device for the write data to be accessed."

Comments attached to No ballot from Ralph O. Weber of LSI Logic Corp.:

Note: It is not possible to represent subscripts in this reporting format. So, 02v16 is used to represent 02 subscript 16, 101v2 is used to represent 101 subscript 2 etc.

I have made every effort to provide comments that do not to change the functional content of RBC. It is not my goal to argue with the working group over what should or should not be in RBC.

However, I wish to propose some structural changes in RBC that reduce the dependence on SBP-2 in the RBC command set, better integrate RBC with other SCSI-3 command standards and clarify (by indirect reference to the command models in SPC-2) how someone might build an RBC device that uses FCP as the transport protocol. (Note: The requirement that RBC devices use autosense prohibits RBC devices on SPI or SPI-2. However, RBC devices could be implemented on SPI-3 using its Information Unit, a.k.a. packetized, features.) These comments start near the end of this response and have numbers such as 100, 101, etc. to make them easy to identify. In my opinion, these comments do not functionally alter the behavior of RBC devices. However, these comments are substantial to the extent that they propose pervasive changes to the RBC draft.

I also have a modest number of specific substantial (technical) and editorial comments that follow immediately and have numbers less than 100.

Substantial Comments That May Change the Technical Content of RBC

LSI#1 (T) Clause 4.1 - 1st para after table 2
Please change from:

"If this bit is set to one, then the device shall report format progress based upon the status of the Percent/Time bit, and the Increment bit."

to:

"If this bit is set to one and asynchronous event notification is enabled, then the device shall report format progress based upon the values in the Percent/Time bit, and the Increment bit."

First, it appears to this reader that reporting is to be accomplished using asynchronous event notification. So, that requirement should be stated.

Second (and editorial), if at all possible, I'd like to reserve the word status for that one byte of information that get returned when command processing is completed (e.g., home of Good, Check Condition, Reservation Conflict, etc.).

LSI#2 (T) Clause 4.1 - 4th para after table 2
Regarding, "The Increment bit default value shall be zero."

What does it mean for a bit in a CDB/ORB to have a default value? The initiator must set a value in this bit when preparing the CDB/ORB for transmission to the device. The initiator software cannot specify a default behavior in such cases, it must put either a 0 or a 1 in the bit.

Here are a couple of possible meanings that need to be stated more explicitly, if they apply. Device support for the one value in the Increment bit is optional. Initiators should use the zero value in the Increment bit to avoid performance penalties associated with the one value.

LSI#3 (T) Clause 4.1 - 5th para after table 2
Change from, "FORMAT progress (when requested by the initiator) ..." to "FORMAT progress (when requested by setting the Progress bit to one in the CDB) ...". I think this consistently reflects the ideas expressed in comment 1.

Note: Comment 102 also concerns this sentence.

LSI#4 (T) Clause 4.1 - 9th para after table 2 (last on page 7)
Regarding, "The FORMAT command shall not be interrupted by the initiator."

I would prefer to replace this sentence with:

"While a FORMAT command is in progress, the device shall respond to any command received with the progress report information described above."

Otherwise, RBC must describe in detail what actions an initiator must avoid doing so as to not interrupt a FORMAT command, and what will be the consequences of interrupting a FORMAT command.

LSI#5 (T) Clause 4.4 - Note
The following note should be removed:

"NOTE For RBC devices using SBP-2, the Immed bit has no meaning. There is no mechanism for the initiator to detect when a device has begun executing a command."

The statement is not true. Even for an RBC/SBP-2 device Immed=0 means wait until the drive has fully spun up before returning status, while Immed=1 means return status as soon as the drive starts spinning up.

LSI#6 (T) Clause 5.5 - 1st paragraph after table 21
Regarding: "The TEST UNIT READY status response shall include SMART information only after a threshold has been exceeded and Asynchronous Event

Notification has been sent to the initiator."

First, this appears to be requiring that a condition cause multiple reports (once as an Asynchronous Event Notification and again in response to TEST UNIT READY commands). Multiple reports for a single condition would be a new concept for SCSI devices.

Second, as noted in comment 11, this sentence assumes that Asynchronous Event Notification will always be enabled.

Would RBC be just as complete and correct if this sentence was deleted?

LSI#7 (T) Clause 5.6 - following table 23

Additional clarification is needed regarding the Mode field. Two possible clarification statements that could be added after table 23 are shown below. One of these two, or some other statement must be added after table 23.

"RBC devices shall support only Mode=101v2. Receipt of any other Mode value shall result in a status of CHECK CONDITION (02v16) with a sense key of ILLEGAL REQUEST (05v16)."

or

"RBC devices are required to support Mode=101v2. Support for all other modes is optional."

LSI#8 (T) Clause A.1.2

It appears to this reader that the Notify bit must be 1 in any ORBs that contain SCSI commands. Failure to set Notify to 1 (or to require equivalent behavior) gives RBC a behavior other than command-response (something more like command-silence). Such behavior would be a dramatic deviation from what I expect from a SCSI device.

This clause must be enhanced to describe how the SCSI command-response communications model is achieved by RBC on the SBP-2 transport.

LSI#9 (T) Clause A.4

The status block format at the end of A.4 contains several fields that are not defined in SBP-2 or elsewhere in RBC, specifically: sfmt, status, v, m, e, i, sense key, sense code, sense qualifier, and information. Since these fields lie in what SBP-2 describes as the "command set-dependent" part of the status block, their definitions must appear in RBC.

LSI#10 (T) Clause B.1

If I read the description of how Unsolicited Status operates correctly, it is possible for an initiator to receive an unsolicited status block even if no commands are outstanding in the device. Further, an unsolicited status block will NEVER be associated with a command. The initiator simply writes to the Unsolicited_Status_Enable CSR, and the next instant that the device has unsolicited status, it queues a suitable constructed status block (src=2) to the initiator.

If this understanding is correct, then the choice of AERC to represent it is a good one.

However, is it truly desirable that all the status information presented throughout Annex B be limited to devices that implement SBP-2? It would seem preferable to describe Unsolicited Status Operation as an SBP-2 method for performing Asynchronous Event Reporting for Unit Attention or Deferred Error information and put the majority of the Annex B information in a

(new) Clause 6 titled "Deferred Error and Unit Attention Information".

Note: This comment may belong with the lxx comments at the end, but I feel that the change is useful enough overall to justify including it here.

I have made a first pass proposal regarding the structure and content of the proposed Clause 6 as comment 200 below.

LSI#11 (T) Clause B.1

B.1 contains no discussion of what a device does if the initiator does not write to the `Unsolicited_Status_Enable` CSR, thus not enabling Unsolicited Status operation. Does the device fall-back to reporting these conditions by returning CHECK CONDITION status, as an SBC device would? Note, the choice here is not trivial. Unless this operation is very carefully specified, there will be no difference between an initiator that never writes the `Unsolicited_Status_Enable` CSR after a login and the initiator that has failed to write the `Unsolicited_Status_Enable` CSR because it's busy processing the most recent unsolicited event.

LSI#12 (T) Clause B.2

All the text in this clause should be removed from RBC. This material does not include any definitions of how event status notification works in RBC, rather it serves mostly to denigrate the event reporting mechanisms used by other command sets and protocols. Such material is not appropriate to a standard.

Substantial (Technical) Comments

LSI#13 (T) Clause 2.3

Add the following normative reference, which is required if EUI-64 is normative to RBC as appears to be the case in Annex A.

ANSI/IEEE 394-1995, Extended Unique Identifier, 64-bit

LSI#14 (T) Clause 3.2

Add the following definition:

event field: Byte 0 of the sense data Information field (see {ref sense data def}) when the EVENT STATUS NOTIFICATION additional sense code is used (see {ref Event Status Notification clause, 6.3 in comment 200})

LSI#15 (T) Clause 4 - para 1 sentence 2

Regarding, "The SCSI Primary Commands (SPC-2) and Multimedia Commands (MMC-2) required for RBC device implementation are also shown in Table 1."

I can find no MMC-2 commands referenced in table 1. Would it be appropriate to remove "and Multimedia Commands (MMC-2)" from the above sentence?

LSI#16 (T) Clause 4.3

In the last sentence of the paragraph following table 4, change from:

"The Block Length in Bytes and the Logical Block Address of the last logical block on the logical unit are returned."

to:

"The Block Length in Bytes and the Last Logical Block Address for the logical unit are returned."

In table 4, change "Logical Block Address" to "Last Logical Block Address".

Immediately following table 4, add specific definitions for the contents of the Last Logical Block Address and Block Length in Bytes fields.

Yes I know these are picky changes. Still, I don't want people looking at table 5 and thinking that the Logical Block Address field there is the same thing as the Logical Block Address field in tables 3, 10, and 11. Also, since this is a standard, one needs to specify the contents of fields and not let readers go around making up their own meanings.

LSI#17 (T) Clause 4.8 - 2nd para after table 12

Regarding, "Devices that are unable to prevent media removal (floppy drives, PCMCIA drives, Flash cards, etc.) shall not support the WCD bit."

Please specify whether the write cache shall be disabled or (gag) enabled in the case described by the sentence shown above.

LSI#18 (T) Clause 5.1

The Terminate Task has been made obsolete in SPC-2 (see revision 4 or later). Therefore, clause 5.1 should make no mention of the TrmTsk bit, either in table 14 or in the second paragraph following table 14.

LSI#19 (T) Clause 5.2

I am very confused about what is required when on the MODE SELECT(6) command. Part of my confusion comes from the organization of the clauses under clause 5.2. To my reading, the following organization clarifies the confusion without changing the intent. Please consider the following replacement for all the text following table 15 to the end of clause 5.2.

The Page Format (PF) bit shall be set to one.

The device shall ignore non-changeable parameters in the MODE SELECT parameter data.

5.2.1 MODE SELECT Restrictions for Devices with Non-Removable Medium

The Save Pages (SP) bit shall be set to one, indicating that the device shall perform the specified MODE SELECT operation and shall save, to a non-volatile vendor-specific location, all the changeable pages, including any sent with the command.

5.2.1 MODE SELECT Restrictions for Devices with Removable Medium

Support of the SP bit is optional for removable medium devices. Such devices may be unable to save changeable information to a non-volatile medium. Therefore, if the SP bit is set to one, removable medium devices may return a status of CHECK CONDITION (02v16), and a sense key of ILLEGAL REQUEST (05v16).

LSI#20 (T) Clause 5.2

There is one additional change in the text above that should be considered separately. Consider clarifying:

"The device shall ignore non-changeable parameters in the MODE SELECT parameter data."

by adding a second sentence, to whit:

"The device shall ignore non-changeable parameters in the MODE SELECT parameter data. This shall not be considered an error."

LSI#21 Clauses B.2.3, B.2.3.1, B.2.3.2, B.2.3.3

As with comment 1, I'd like to reserve the word 'status' for that one byte of information that comes with command completion. To that end, please change 'status' to 'state' as follows:

In tables B.2, B.3, B.6, and B.9, change the contents of byte 1 from 'status' to 'state'. In the titles for tables B.5, B.8, and B.11, change from "- Status field" to "- State field". In table B.4, change the 02 event field code from "... in the Power Status field" to "... in the Power State field". In table B.7, change the 00 event field code from "Media status is unchanged" to "Media state is unchanged". In paragraphs 3 and 4 after table B.8, change "... media status notification ..." to "... media state notification ...".

More sweeping changes could be requested, but I feel that these changes are sufficient.

Editorial Comments

LSI#22 (E) throughout draft

SPC-2 uses "asynchronous event reporting" to differentiate the general capability from its specific implementation in parallel SCSI, which is usually called "asynchronous event notification". RBC should change to the more general "asynchronous event reporting" nomenclature. Note, however, that this change has NOT been reflected anywhere else in these comments, several of which deal with AEN.

LSI#23 (E) Points of Contact

Lawrence J. Lamers is no longer T10 vice chair. The new vice chair is:

George O. Penokie

IBM

Dept. 2B7

3605 Highway 52 N.

Rochester, MN 55901

USA

Telephone: 507-253-5208

Facsimile: 507-253-2880

Email: gop@us.ibm.com

LSI#24 (E) Points of Contact

The T10 FTP site should be changed from:

[ftp.symbios.com/pub/standards/io/x3t10](ftp://ftp.symbios.com/pub/standards/io/x3t10)

to:

[ftp.symbios.com/pub/standards/io/t10](ftp://ftp.symbios.com/pub/standards/io/t10)

LSI#25 (E) Points of Contact

The T10 Home page should be changed from: <http://www.symbios.com/x3t10>

to: <http://www.symbios.com/t10/>

LSI#26 (E) Clause 1.2 - para 1 sentence 1

Change from:

"The purpose of this document is to provide a command set of reduced requirements and options from SCSI Block Commands for block devices."

to:

"The purpose of this standard is to provide a command set of reduced requirements and options from SCSI Block Commands (ANSI NCITS.306:1998) for block devices."

LSI#27 (E) Clause 1.2 - para 1 last sentence

Change from:

"The initial focus of this command set is rigid disks and removable media devices attached to Serial Bus and utilizing SBP-2 for command and control."

to:

"The initial focus of this command set is rigid disks and removable media devices attached to Serial Bus and utilizing SBP-2 (ANSI NCITS.???:199x) as a SCSI transport layer."

LSI#28 (E) Clause 2.1 last line in clause

Change "NCITS 306-1998, SCSI-3 Block Commands (SBC-3)" to "NCITS 306-1998, SCSI-3 Block Commands (SBC)". There is no SBC-3, yet.

LSI#29 (E) Clause 3.3 abbreviation EUI-64

Change from:

"EUI-64 Extended Unique Identifier, 64-bits"

to:

"EUI-64 Extended Unique Identifier, 64-bits (ANSI/IEEE 394-1995)"

LSI#30 (E) Clause 3.3 abbreviation ORB

Change from:

"ORB Operation request block"

to:

"ORB Operation request block (See SBP-2)"

LSI#31 (E) Clause 3.3 abbreviation RBC

Change from:

"RBC Reduced Block Commands"

to:

"RBC Reduced Block Commands (this standard)"

LSI#32 (E) Tables 3, 10, 11, & 12 (Clauses 4.2, 4.6, 4.7, & 4.8)

Please do not repeat a field name (such as Transfer Length or Logical Block Size) twice in a multi-byte field. If necessary, place it on the bottom line of the field. Note that in table 12, the Number of Logical Blocks field can be represented once using the same technique employed for the Logical Block Address field in table 11.

LSI#33 (E) Clause 4.8.1

Please remove the clause separation for "Removable Medium Device Parameters". Alternatively, add a new clause header immediately following table 12, "4.8.1 Parameters for all RBC Devices", which will change clause 4.8.1 to 4.8.2.

LSI#34 (E) Clause 5.1 table 14

Change "linked" to "Linked" so that the spelling matches that used in the paragraphs below the table and the spelling used in SPC-2.

LSI#35 (E) Clause 5.1 last paragraph

Change from:

"Support of other bits and fields in the Inquiry command and its associated pages are not specified in this document."

to:

"Support of other bits and fields in the INQUIRY command and its associated pages (see SPC-2) are not specified in this standard."

LSI#36 (E) Clause 5.3.1 - bullet b)

Change from:

"If the saved values of the mode parameters are not able to be accessed from the non-volatile vendor-specific location, terminate the command with CHECK CONDITION status and set the sense key to NOT READY;"

to:

"If the saved values of the mode parameters are not able to be accessed from the non-volatile vendor-specific location, terminate the command with CHECK CONDITION (02v16) status and set the sense key to NOT READY (02v16);"

LSI#37 (E) Clause 5.4 bullet b) after table 19

Since a hard reset is not the same as a bus reset in all cases and protocols, change:

"b) upon a hard (or bus) reset condition."

to:

"b) upon a hard or bus reset condition."

LSI#38 (T) Clause 5.5 - 1st paragraph after table 21

Change from:

"The required Key, ASC, and ASCQ values are described in Table 22."

to:

"The required sense key and ASC/ASCQ values are described in Table 22."

Note: If the ASC/ASCQ related lxx comments below are not accepted, then changes will be required in the column headings in tables 21 and 21, and the change described above would have to be to:

"The required sense key, sense code, and sense qualifier values are described in Table 22."

LSI#39 (E) Clause 5.6 - table 23

In the mode field, change from "101vb" to "101v2".

LSI#40 (E) Clause B.1 - 1st paragraph

Change from:

"Devices shall notify Initiators of unsolicited status support by setting the Asynchronous Event Reporting Capability (AERC) bit to one in the standard data format of the INQUIRY command"

to:

"Devices shall notify initiators of unsolicited status support by setting the Asynchronous Event Reporting Capability (AERC) bit to one in the standard data format of the INQUIRY command (see SPC-2)."

Note the change in the capitalization of "initiators", it's easy to miss.

LSI#41 (E) Clause B.1 - 2nd paragraph
Change from:

"Typically, devices default to unsolicited status disabled and only send unsolicited status following a write to the Unsolicited_Status_Enable CSR. The Unsolicited_Status_Enable CSR is actually a handshake mechanism and must be written after every unsolicited status event in order to enable another such event."

to:

"Devices default to unsolicited status disabled and only send unsolicited status following a write to the Unsolicited_Status_Enable CSR. The Unsolicited_Status_Enable CSR is a handshake mechanism and must be written after every unsolicited status event in order to enable another such event."

The description of this feature in SBP-2 unambiguously states that this is the required (and only allowed) behavior. Therefore, qualifier words such as "typically" and "actually" are inappropriate.

LSI#42 (E) Clause B.1.1 - 1st paragraph
Change from, "... UNSOLICITED_STATUS_ENABLE register." to,
"... Unsolicited_Status_Enable CSR ." The latter is the more frequently used terminology.

Note: This comment can be ignored if comment 10/200 is adopted. The proposed changes in comment 200 do not include this text, effectively deleting it.

LSI#43 (E) Clause B.1.1 - table B.1
In the first row, change: "SMART THRESHOLD EXCEEDED" to either "SMART threshold exceeded" or "FAILURE PREDICTION THRESHOLD EXCEEDED". The latter is the SPC-2 definition of the 5D(hex) ASC, but the former would be acceptable since it cannot be confused with any SPC-2 defined names for ASC/ASCQ values, which are all upper case.

See also comment 117.

LSI#44 (E) Clause B.1.1.3 - 1st paragraph
Change from "... CHECK CONDITION (06v16) ..." to "... CHECK CONDITION (02v16) ...".

LSI#45 (T) Clause B.1.1.4 - 1st paragraph
Change from "... SMART THRESHOLD EXCEEDED ..." to "FAILURE PREDICTION THRESHOLD EXCEEDED ..." since the latter is the name assigned to ASC 5D(hex) by SPC-2.

See also comment 119.

***Substantial (Technical) Changes That Reduce RBC Command
***Set Dependence on SBP-2

LSI#100 (T) Clause 3.2 and Annex A

Create a new clause in Annex A, A.1 Glossary and move the following definitions from 3.2 to A.1: command block, login, quadlet, register, status block, system memory, transaction, unit, unit architecture, and unit attention.

In clause 3.2, add the following definitions:

additional sense code: A field in the sense data. See {ref sense data glossary def} and SPC-2. Equivalent to the sense code field in an SBP-2 status block (see A.5 {ref RBC status block, after renumbering, I think}).

additional sense code qualifier: A field in the sense data. See {ref sense data glossary def} and SPC-2. Equivalent to the sense qualifier field in an SBP-2 status block (see A.5 {ref RBC status block, after renumbering, I think}).

command descriptor block: A structure up to 16 bytes in length used to communicate a command from an application client to a device server.

sense data: Data describing an error or exceptional device condition that a device delivers to an initiator (see SPC-2).

sense key: A field in the sense data. See {ref sense data glossary def} and SPC-2. Equivalent to the sense key field in an SBP-2 status block (see A.5 {ref RBC status block, after renumbering, I think}).

status: Response information sent from a device to an initiator upon completion of each command.

unit attention condition: A state that a logical unit maintains while it has asynchronous status information to report to one or more initiators.

In clause 3.3 add the following abbreviations:

ASC Additional Sense Code
ASCQ Additional Sense Code Qualifier
CDB Command Descriptor Block

LSI#101 (T) Clause 4 - first sentence after table 1

Change from:

"The Control byte (the last byte of the Command Descriptor Bytes) shall be set to zero."

to:

"The Control byte (the last byte of the CDB) shall be set to zero."

LSI#102 (T) Clause 4.1 - 5th paragraph after table 2

Change from:

"FORMAT progress (when requested by the initiator) shall be reported with a status of CHECK CONDITION (02v16), a sense key of NOT READY (02v16), a sense code of 04v16, and a sense qualifier of 04v16, LOGICAL UNIT NOT READY, FORMAT IN PROGRESS, and the INFORMATION field shall contain ..."

to:

"FORMAT progress (when requested by the initiator) shall be reported with a status of CHECK CONDITION (02v16), a sense key of NOT READY (02v16), an

ASC/ASCQ of LOGICAL UNIT NOT READY, FORMAT IN PROGRESS (04v16/04v16), and the sense data Information field shall contain ..."

Note: Comment 3 also concerns this sentence.

LSI#103 (T) Clause 4.1 - 6th paragraph after table 2
Change from:

"Upon successful completion of the FORMAT command, status information shall be sent to the initiator with a status field of CHECK CONDITION (02v16), a Sense Key UNIT ATTENTION (06v16), sense code of EVENT STATUS NOTIFICATION (38v16), a sense qualifier of MEDIA CLASS EVENT (04v16), and an event field of NEW MEDIA READY FOR ACCESS (02v16)."

to:

"Upon successful completion of the FORMAT command, the status shall be CHECK CONDITION (02v16), the sense data shall be set as follows; sense key UNIT ATTENTION (06v16), ASC/ASCQ of EVENT STATUS NOTIFICATION - MEDIA CLASS EVENT (38v16/04v16), and an event field of NEW MEDIA READY FOR ACCESS (02v16)."

Would it also be correct to note that the statement above applies only if asynchronous event notification is enabled?

LSI#104 (T) Clause 4.1 - 7th paragraph after table 2
Change from:

"If the FORMAT command fails, the device shall return a status block with a status of CHECK CONDITION (02v16), a sense key of MEDIA ERROR (03v16), a sense code and sense qualifier of FORMAT COMMAND FAILED (31v16, 01v16)."

to:

"If the FORMAT command fails, the device shall set a status of CHECK CONDITION (02v16), a sense key of MEDIA ERROR (03v16), and an ASC/ASCQ of FORMAT COMMAND FAILED (31v16/01v16)."

LSI#105 (T) Clause 4.2.1 - 1st paragraph
Change from:

"Until the removable medium device and media are ready to be accessed, a READ(10) command shall cause the device to return status of CHECK CONDITION (02v16), sense key of NOT READY (02v16), and sense code of LOGICAL UNIT NOT READY (04v16). The sense code qualifier shall reflect the current state of the device/media."

to:

"Until the removable medium device and media are ready to be accessed, a READ(10) command shall cause the device to return status of CHECK CONDITION (02v16), sense key of NOT READY (02v16), and an ASC of LOGICAL UNIT NOT READY (04v16). The ASCQ shall reflect the current state of the device/media."

LSI#106 (T) Clause 4.2.1 - 2nd and 3rd paragraphs
Change from:

"When the device becomes ready, and the initiator supports asynchronous event notification, the device shall send unsolicited status with a status field of CHECK CONDITION (02v16) a sense key of UNIT ATTENTION (06v16), a

sense code of EVENT STATUS NOTIFICATION (38v16), a sense qualifier of MEDIA CLASS EVENT (04v16), and an event field of NEW MEDIA READY FOR ACCESS (02v16).

"If the initiator does not support asynchronous event notification, alternative methods must be used to determine the state of the device/media combination. Refer to the GET EVENT STATUS NOTIFICATION command contained in the MMC-2 specification for a description of those alternative methods."

to:

"When the device becomes ready, a unit attention condition shall be established with a sense key of UNIT ATTENTION (06v16), ASC/ASCQ of EVENT STATUS NOTIFICATION - MEDIA CLASS EVENT (38v16/04v16), and an event field of NEW MEDIA READY FOR ACCESS (02v16). When the unit attention condition is delivered, the status shall be CHECK CONDITION (02v16)."

Note: the current text describes a classic unit attention condition, with the additional feature that use of asynchronous event notification is used. Once the report is described as a unit attention condition (which is what it is) there is no need to describe ways to report the information in the absence of asynchronous event notification, those mechanisms are already covered in SPC-2.

LSI#107 (T) Clause 4.3.1 - 1st paragraph

Change from:

"If the device does not contain media then it shall return status of CHECK CONDITION (02v16), sense key of NOT READY (02v16), sense code of LOGICAL UNIT NOT READY (04v16), and sense code qualifier shall reflect the current state of the device/media."

to:

"If the device does not contain media then it shall return status of CHECK CONDITION (02v16), sense key of NOT READY (02v16), ASC of LOGICAL UNIT NOT READY (04v16), and the ASCQ shall reflect the current state of the device/media."

LSI#108 (T) Clause 4.4 - 2nd to the last paragraph

Change from:

"The device shall terminate any command received that requires more power than allowed by the START STOP UNIT command's most recent power condition setting with a status of CHECK CONDITION (02v16), a sense key of ILLEGAL REQUEST (05v16), and sense code and qualifier of ILLEGAL POWER CONDITION REQUEST (2Cv16, 05v16)."

to:

"The device shall terminate any command received that requires more power than allowed by the START STOP UNIT command's most recent power condition setting with a status of CHECK CONDITION (02v16), a sense key of ILLEGAL REQUEST (05v16), and ASC/ASCQ of ILLEGAL POWER CONDITION REQUEST (2Cv16/05v16)."

LSI#109 (T) Clause 4.4.1 - 2nd paragraph

Change from:

"If the removable medium device is in either PREVENT state 01v2 or 11v2 and receives a START STOP UNIT command with the Power Condition field set

to the SLEEP state (5), the device shall respond with status of CHECK CONDITION (02v16), sense key of ILLEGAL REQUEST (05v16), and sense code and qualifier of ILLEGAL POWER CONDITION REQUEST (2Cc16, 05v16)."

to:

"If the removable medium device is in either PREVENT state 01v2 or 11v2 and receives a START STOP UNIT command with the Power Condition field set to the SLEEP state (5), the device shall respond with a status of CHECK CONDITION (02v16), sense key of ILLEGAL REQUEST (05v16), and an ASC/ASCQ of ILLEGAL POWER CONDITION REQUEST (2Cc16/05v16)."

LSI#110 (T) Clause 5.1 - 4th paragraph after table 14
Change from:

"Since RBC devices report sense information as part of the STATUS delivery function, and all tasks are cleared as the result of a device error, Automatic Contingent Allegiance is not supported. Since the Normal ACA (NACA) bit is not supported in the Control Byte of the CDB, the NACA bit in Inquiry data shall be set to zero."

to:

"RBC devices shall report sense data using the autosense method (in the case of SBP-2 in the status block, see Annex A). RBC devices shall clear all tasks as the result of any device error."

"RBC devices shall not support Auto Contingent Allegiance and ignore the Normal ACA bit in the CDB Control byte. Therefore, RBC devices shall return a zero in the NormACA bit in Inquiry data (shown as NACA in table 14)."

LSI#111 (T) Clause 5.4 - table 20
Change headings in the second and third columns from "Sense code" to "ASC" and from "Sense code Qualifier" to "ASCQ", respectively. Note: if this change is not made exactly, it still would be necessary to change the heading the third column from "Sense code Qualifier" to "Sense qualifier".

LSI#112 (E) Clause 5.5 - table 21
Change third column heading from "ASC, ASCQ" to "ASC/ASCQ". Likewise, change ASC/ASCQ numbers from ", " notation to "/" notation. This is just to be consistent with the other notation proposed in this comments.

LSI#113 (T) Clause 5.5 - 1st paragraph after table 21
Change from:

"RBC devices shall report SMART status via Asynchronous Event Notification and the TEST UNIT READY status response."

to:

"RBC devices shall report SMART status via a unit attention condition (with the associated asynchronous event notification, if enabled) and the TEST UNIT READY status response."

LSI#114 (T) Clause 5.6.1 - 1st paragraph
Change from:

"When the download microcode and save command has completed successfully the device shall generate a Unit Attention status block and send it, via unsolicited status if enabled, to all initiators except the one that issued

the WRITE BUFFER command. When reporting the Unit Attention condition, the device shall set the sense code and qualifier to MICROCODE HAS BEEN CHANGED (3Fv16 , 01v16)."

to:

"When the download microcode and save command has completed successfully the device shall generate a unit attention condition and send it, via asynchronous event notification if enabled, to all initiators except the one that issued the WRITE BUFFER command. When reporting the unit attention condition, the device shall set the ASC/ASCQ to MICROCODE HAS BEEN CHANGED (3Fv16/01v16)."

Note: the following minimal changes are required even if the "ASC/ASCQ" and "unit attention condition" changes are not made.

"When the download microcode and save command has completed successfully the device shall generate a unit attention status block and send it, via unsolicited status if enabled, to all initiators except the one that issued the WRITE BUFFER command. When reporting the unit attention condition, the device shall set the sense code and qualifier to MICROCODE HAS BEEN CHANGED (3Fv16 , 01v16)."

LSI#115 (T) Clause A.1.2 - after 1st paragraph

Insert the following paragraph after the first paragraph in the A.1.2.

"A SCSI command CDB is placed in command_block field of an SBP-2 command ORB. The SCSI status for the command is found in the status field of an SBP-2 status block with resp field of REQUEST COMPLETE (0v16). The six bit status block status value is converted to an eight bit SCSI status by adding two zero bits in the most significant bit positions of the byte."

LSI#116 (T) Clause A.4

This clause should contain a table showing how the fields in the SBP-2 status block can be used to construct the fields in SPC-2 sense data. At prototype for such a table is included here but is incomplete owing to missing information in RBC r5.

| Sense data field | Status block usage |
|---------------------------------|--|
| Valid | equals the contents of the v field |
| Response code | ??? |
| Segment number | zero |
| Filemark | equals the contents of the f field |
| EOM | equals the contents of the e field |
| ILI | equals the contents of the i field |
| Sense key | equals the contents of the sense key field |
| Information | equals the contents of the information field |
| Additional sense length | 11(decimal) 0B(hex) |
| Command-specific information | zero |
| Additional sense code | equals the contents of the sense code field |
| Additional sense code qualifier | equals the contents of the sense qualifier field |
| Field replaceable unit code | zero |
| SKSV & Sense-key specific | zero |

The prototype table above needs to be checked for accuracy and the ??? descriptions need to be added.

LSI#117 (T) Clause B.1.1 - Table B.1

Change the second column heading from "Sense code" to "ASC".

See also comment 43.

LSI#118 (T) Clause B.1.1.3 - Table 24

Change the first and second column headings from "Sense code" to "ASC" and from "Sense code Qualifier" to "ASCQ", respectively. Note: if this change is not made exactly, it still would be necessary to change the heading the second column from "Sense code Qualifier" to "Sense qualifier".

LSI#119 (T) Clause B.1.1.4 - 1st paragraph

Change from:

"The status field shall be set to CHECK CONDITION (02v16), the sense key to RECOVERED ERROR (01v16), the sense code to SMART THRESHOLD EXCEEDED (5Dv16), and the sense qualifier to the SMART threshold descriptor value."

to:

"The status value shall be set to CHECK CONDITION (02v16), the sense key to RECOVERED ERROR (01v16), the ASC to SMART THRESHOLD EXCEEDED (5Dv16), and the ASCQ to the SMART threshold descriptor value."

See also comment 45.

LSI#120 (T) Clause B.2.2 - 1st list item

Change from:

"When ready, the device shall issue unsolicited status with a status field of CHECK CONDITION (02v16), a sense key of UNIT ATTENTION (06v16) a sense code of EVENT STATUS NOTIFICATION (38v16), a sense code qualifier of MEDIA CLASS EVENT (04v16), and an event field of NEW MEDIA READY FOR ACCESS (02v16)."

to:

"When ready, the device shall issue an event status notification with a status value of CHECK CONDITION (02v16), a sense key of UNIT ATTENTION (06v16) a ASC of EVENT STATUS NOTIFICATION (38v16), a ASCQ of MEDIA CLASS EVENT (04v16), and an event field of NEW MEDIA READY FOR ACCESS (02v16)."

Note the use of "status value" instead of "status field".

LSI#121 (T) Clause B.2.2 - 4th list item

Change from:

"If a START STOP UNIT command is issued, the device shall return unsolicited status with a status field of (02v16), a sense key of UNIT ATTENTION (06v16) and sense code of EVENT STATUS NOTIFICATION (38v16), a sense qualifier of POWER MANAGEMENT CLASS EVENT (02v16), and an Event field of DEVICE SUCCESSFULLY CHANGED POWER STATES (01v16),."

to:

"If a START STOP UNIT command is issued, the device shall return event status notification with a status field of (02v16), a sense key of UNIT ATTENTION (06v16) and ASC of EVENT STATUS NOTIFICATION (38v16), a ASCQ of POWER MANAGEMENT CLASS EVENT (02v16), and an event field of DEVICE SUCCESSFULLY CHANGED POWER STATES (01v16)."

Note the use of "status value" instead of "status field".

LSI#200 (T) Proposal for Clause 6 (see comment 10)

6 Deferred Error and Unit Attention Information

6.1 Deferred error conditions

{this text is mostly from B.1.1.2}

Deferred errors may be produced as a result of cached data management or support of the Immediate function in commands such as START STOP UNIT or FORMAT. Table xx shows the sense key and ASC values that RBC devices may return as deferred errors.

{reproduce table B.1 with only the first three rows}
{note: comments 43 and 117 concern table B.1 as it is used here}

When asynchronous event notification is enabled (see A.6), RBC devices shall use it to report deferred errors.

6.1.1 SMART notification

{this text is mostly from B.1.1.4}
{comments 45 and 119 have been applied to this text}

RBC devices shall notify the initiator when a SMART threshold is exceeded via a deferred error report (preferably as an asynchronous event notification, if enabled). The status value shall be set to CHECK CONDITION (02v16), the sense key to RECOVERED ERROR (01v16), the ASC to FAILURE PREDICTION THRESHOLD EXCEEDED (5Dv16), and the ASCQ to the SMART threshold descriptor value. Refer to Table 22 for SMART ASCQ values.

6.2 Unit attention conditions

{this text is mostly from B.1.1.1}

When initiators must perform a login function to access a device, a unit attention condition shall persist for a logged-in initiator until a) an asynchronous event notification reports the unit attention condition or b) the initiator's login becomes invalid or is released. When there is no transport login function, a unit attention condition shall persist for a initiator until a) an asynchronous event notification reports the unit attention condition or b) a hard or bus reset occurs.

Logical units may queue unit attention conditions; more than one unit attention condition may exist at the same time.

Table xx shows the sense key and ASC values that RBC devices may return for unit attention conditions.

{reproduce table B.1 with only the last four rows}
{move the power status row to before the event status row}
{note: comment 117 concerns table B.1 as it is used here}

When asynchronous event notification is enabled (see A.6), RBC devices shall use it to report unit attention conditions.

6.2.1 Power state change notification

{this text is mostly from B.1.1.3 1st paragraph}
{but, it has been changed slightly to be less SBP-2 specific}
{note: the change in comment 44 has been included here}

RBC devices shall notify an initiator of the intent to change power states via a unit attention condition (preferably as an asynchronous event notification, if enabled). The status value shall be set to CHECK CONDITION (02v16), the sense key to UNIT ATTENTION (06v16), and the sense code to POWER CONDITION CHANGE NOTIFICATION (5Ev16). The sense qualifier shall be set to the value of the new power state plus 40v16 as shown in table xx.

{reproduce the remainder of B.1.1.3 unchanged, here}

6.3 Event status notification

{the following is new text, cloned from 6.2.1}

RBC devices shall notify an initiator of media, power management, and device busy events via a unit attention condition (preferably as an asynchronous event notification, if enabled).

6.3.1 Removable medium device initial response

{this is from B.2.2}
{comments 120 and 121 have been applied to the following text}

For removable devices the following sequence must occur at power on:

- When ready, the device shall issue an event status notification with a status value of CHECK CONDITION (02v16), a sense key of UNIT ATTENTION (06v16) a ASC of EVENT STATUS NOTIFICATION (38v16), a ASCQ of MEDIA CLASS EVENT (04v16), and an event field of NEW MEDIA READY FOR ACCESS (02v16).
- The initiator shall issue a MODE SENSE command followed by a READ CAPACITY command.
- The initiator may issue a START STOP UNIT command with Power Condition values of one, two or three. If this command is not issued, the device shall assume Standby state (Power Condition = 3).
- If a START STOP UNIT command is issued, the device shall return event status notification with a status field of (02v16), a sense key of UNIT ATTENTION (06v16) and ASC of EVENT STATUS NOTIFICATION (38v16), a ASCQ of POWER MANAGEMENT CLASS EVENT (02v16), and an event field of DEVICE SUCCESSFULLY CHANGED POWER STATES (01v16).

6.3.2 Event status sense information

{this is from B.2.3}
{There's rather heavy, but not substantive rewording here}

For the event status notification unit attention condition, the following sense data shall be used. The status value shall be CHECK CONDITION (02v16), the sense key shall be UNIT ATTENTION (06v16), and the ASC shall be EVENT STATUS NOTIFICATION (38v16). The ASCQ shall be one of the values shown in table xx.

| ASCQ | Name | Description |
|-------|------------------|---|
| 02v16 | POWER MANAGEMENT | indicates that a Power Management event has |

| | | |
|-------|-------------------------|---|
| | CLASS EVENT | occurred or is impending |
| 04v16 | MEDIA CLASS EVENT | indicates that a Media Class event has occurred |
| 06v16 | DEVICE BUSY CLASS EVENT | indicates that a Device Busy Class event has occurred |

For the sense key, ASC, and ASCQ values described above, the contents of the sense data Information field further describe the event status. The general format of the sense data Information field is shown in table xx.

{reproduce table B.2 here}

The following clauses provide specific sense data Information field definitions for each of the ASCQ values shown in table xx {the new table sketch-out above}.

{reproduce B.2.3.1 as 6.3.2.1 with changes from comment 21}

{reproduce B.2.3.2 as 6.3.2.2 with changes from comment 21}

{reproduce B.2.3.3 as 6.3.2.3 with changes from comment 21}

{{{
Only a small volume of text from the former Annex B that is left after Clause 6 is created. Therefore, it seems sensible to append the remaining text on Annex A, as follows.
}}}

A.6 Unsolicited Status Operation

{reproduce all the text from B.1 here.}
{note: comments 11, 40, and 41 propose needed changes in this text}

When enabled, RBC devices shall use unsolicited status to report unit attention conditions and deferred errors (see clause 6).

A.7 Event status retention

{this text is mostly from B.2.1}

RBC devices using SBP-2 shall retain event status for a logged in initiator if a bus reset occurs after the event has occurred but prior to the unit attention information being sent to the initiator. If the initiator fails to reconnect to the device within the reconnect time-out period (see SBP-2), the retained event status information shall be discarded.

If the initiator successfully reconnects, it shall write to the Unsolicited_Status_Enable register. The device shall transfer the retained event status, via unsolicited status. Once the event status is successfully transferred to the initiator, the device shall discard the retained event status.

{{{
Note: The contents of B.2 have not been included anywhere in the comment 200 proposal, effectively deleting them from RBC. See comment 12.
}}}

Ophidian Designs:

I have six main comments that span substantial portions of the document:

A. When RBC was broken out as a project separate from SBP-2, the stated rationale (as I remember it) was that RBC could and should be independent of SBP-2 or any other SCSI protocol. Unfortunately this document is only part way there. In some places it is specific to SBP-2 and 1394a, in others it has been SAM-ized (pardon the expression). The result is inconsistent and needs to be fixed. Either go back and make it totally SBP-2/1394a dependent (with no formal relationship to the rest of SCSI), or adopt SAM or SAM-2 terminology throughout. I advocate the latter; I believe it is an entirely editorial task, albeit a rather large editorial task.

B. This needs a section describing the device model. It suffers from the same problem as SCSI-2, namely that bits and pieces of device model are spread throughout the command descriptions, and many parts implicit and left unstated. I suggest you start with SBC clause 5.1, then edit it to get rid of everything that is unnecessary or inappropriate. Remove the description of power conditions from the START STOP UNIT command and make it a separate clause of the device model. Probably do the same with the prevent flags, removing its description from the PREVENT/ALLOW MEDIUM REMOVAL command to a separate clause.

C. Similarly, much of the information in annex B should be moved to be body of the document, either part of the device model or adjacent to it. You need a different name. "Status" has a formal meaning in SCSI, and there's no such thing as "unsolicited status". I suggest you call this simply "Event Information", referring to the value passed in the fourth quadlet of an SBP-2 status block. You need one or more clauses defining the contents of the Event Information (tables B-2 through B-11). You need one clause defining how Event Information is passed within normal SCSI sense data (see table 61, page 75, of SPC-r11a, I suggest using either Command-specific information (bytes 8-11) or Additional sense bytes (bytes 18-n)). You need another clause, probably in Annex A, defining the special case for SBP-2, where Event Information is passed in the SBP-2 status block.

D. It seemed to me that you had very nearly included or rewrote all relevant portions of the SPC-2 command descriptions in clause 5. Having 90% of a command description here and 10% in SPC will, in my opinion, only lead to confusion. Consider including the entire command description here and deleting the reference to SPC.

E. This comment assumes you continue to reference SPC. I found your treatment of SPC commands in clause 5, listing only fields that were restricted, quite confusing. For all SPC commands in clause 5, please exactly duplicate the CDB format or table from SPC or SPC-2. In the text following the CDB table, list all fields whose interpretation is unchanged from SPC. Follow that with the text you have now.

F. The distinctions between fixed and removable media devices seem somewhat arbitrary. Many of the distinctions appear to add unnecessary special cases and complexity to devices and/or host software. Consider the following thought experiment. Take a removable device, install some media, then seal it shut (e.g. glue the door closed or install it in an internal device bay). >From a user's perspective, this is equivalent to a fixed media device. From the device's perspective, it shouldn't have to change any of its firmware or command support. Yet RBC does require changes between fixed and removable devices. Requiring changes serves no purpose, it merely complicates things, such changes should be optional.

Specific comments:

1. Page 1, clause 1.2, delete last sentence ("The initial focus..."). Whatever may have motivated development of this standard, the standard is what it is. It is either restricted to SBP-2 or potentially usable on other transports.
2. Page 2, reference to SBC-3. This should refer to SBC, not SBC-3. I could find no references to SBC in the document. Is this needed?
3. Page 2, references. There are normative references to several standards that in turn normatively reference SAM. Including a direct reference to SAM or SAM-2 will reduce confusion.
4. Pages 3-4, glossary. I don't believe the following terms are used anywhere except in the informative SBP-2 Storage Model (clause A.1). And if I missed a reference outside of Annex A, it should be changed or reworded as these terms are 1394 / SBP-2 specific. As such I think they can and should be deleted from the glossary: "register", "system memory", "transaction", "unit", "unit architecture"
5. Page 3, glossary. "command block" should be replaced with "Command Descriptor Block" and that the definition from SPC is correct without alteration. True, that data structure is conveyed in a specific field within an SBP-2 ORB, but it is conveyed by other means in other SCSI protocols.
6. Page 3, glossary. A "logical unit" is part of a SCSI target, not a "unit architecture".
7. Page 3, glossary. "login" needs to be qualified as applicable to SBP-2.
8. Page 4, glossary. "status block" needs to be qualified as applicable to SBP-2. I would amend its definition to state that it is used to communicate SCSI status and sense information to an initiator. The statement that it is used when an ORB has completed is incorrect, since it is used also for unsolicited status/sense.
9. Page 4, glossary. "unit attention" would be better defined identically as in SPC.
10. Page 6, clause 4. Table 1 lists no commands from MMC-2. Why is that mentioned in the text preceding the table?
11. Page 6, Table 1. Comparing this table with the corresponding one in SPC (Table 5, spc-r11a page 18) is instructive. Two commands that are mandatory in SPC are omitted here, REQUEST SENSE and SEND DIAGNOSTIC (used to invoke device internal self-test). These both provide functions that are necessary for usable devices, yet are better performed by other mechanisms (not SCSI commands) with 1394 / SBP-2. These two commands are necessary if RBC is to be used with any protocol other than SBP-2. Please add those two commands to this table, listing them as optional for SBP-2 devices, mandatory for all other protocols.
12. Page 6, Table 1, and clause 4.1. There is no good reason to prohibit FORMAT UNIT with fixed media devices. Many fixed media devices allow their size to be altered to that they will appear, to host software, identical to an older device. The need for this is unlikely to go away. The preferred

way to do this is with the FORMAT UNIT command, as the alternative would be vendor unique. FORMAT UNIT should be optional for fixed media as well as removable. See also comment on the mode page.

13. Page 6, Table 1, and clause 5.4. There is no benefit to prohibiting PREVENT/ALLOW MEDIUM REMOVAL for fixed media devices. It is simpler to say that the command shall be ignored (treated as a no-op). See next comment.

14. Page 6, Table 1. Much as I regret complicating an ideally simple command profile, it appears that persistent reservations are a de facto requirement for multi-initiator devices. I think you need to add those command to this table, perhaps with a note recommending their implementation by multi-initiator devices and saying they should be ignored by single-initiator devices.

15. Page 6, Table 1. What does it mean to say that a command "shall not be supported"? If such a command is issued to a device, what shall the device do in response? Since "shall" is used, the behavior is mandatory, yet it is not specified anywhere in this document. I recommend not using this notation, since it calls into question what it means. Adopting the two preceding comments would accomplish this.

16. Page 6, clause 4.1. If the statement that "This command is not defined for..." is taken literally, it implies that behavior when this command is received is not defined and therefore vendor unique. I doubt that is what is intended. My recommendation (see above comments) is that this command be made optional (and therefore well defined) for all devices.

17. Page 7, third paragraph, delete "The Percent/Time bit default value shall be one". This bit is provided in each and every FORMAT UNIT command, therefore the idea of a default value is meaningless.

18. Page 7, paragraphs 5 and 6. One of these refers to an "INFORMATION field", the other to an "event field", I believe both are intended to be the same. Please reword these to refer to what I called "Event Information" in general comment C above.

19. Page 7, paragraph 8, "is corrected (media replaced)". This implies that media replacement is the only way to correct the problem. Either remove the parenthetical phrase or make it clear that it is an example.

20. Page 7, paragraphs 6, 8 and 9. Each of these uses "shall" to describe initiator behavior ("shall respond" or "shall not be interrupted"). I am uncomfortable with this wording, as it too often leads to unwarranted assumptions. For example, "the initiator shall issue a MODE SENSE command" may lead to device firmware that doesn't bother to check the operation code of the next command, since it's known to be MODE SENSE. Yes, that's

obviously stupid design, but I've seen it occur in the past. I recommend replacing these uses of "shall" with either "should" or "will typically". Alternately, spell out the possible consequences of the initiator not complying with the "shall" (this might be particularly appropriate for interrupting a FORMAT UNIT command).

21. All of the CDBs show "Control = 00". The meaning of this is not obvious. If this is meant as a restriction or requirement, there needs to be some text saying so (probably in the device model section).

22. Pages 8-9, clause 4.2.1. Placing this matter here implies that it only applies to READ. That is, when new media has installed in a device, the

initiator may not READ it (per this section), but is allowed to WRITE it (since no similar text appears there). This material needs to be moved to the device model section and made applicable to all data access commands. Also, this appears to be merely redefining the unit attention condition and reporting mechanisms already defined elsewhere (see SAM-2). For what purpose? The only differences I see are that SAM-2 seems to be a much clearer and more complete definition.

23. Page 9-10, clauses 4.3 and 4.3.1. The first sentence below the CDB requires returning read capacity data even when returning a check condition. Many fixed media devices support varying formats, not just removable media devices. 4.3.1 prohibits returning capacity information when no media is in the device, even if the device supports only one media format. I recommend deleting 4.3.1 and replacing the text of 4.3 below the CDB with: "READ CAPACITY data (see Table 5) shall be returned to the initiator prior to sending GOOD status for the command. The Block Length in Bytes and the Logical Block Address of the last logical block of the media contained in the device shall be returned. If the device does not contain media and cannot determine the values to return by other means, then it shall return status of CHECK CONDITION, sense key of NOT READY, sense code of LOGICAL UNIT NOT READY and the sense code qualifier shall reflect the current state of the device or media."

24. Page 11, clause 4.4, note at top of page 11. This note seems completely wrong or irrelevant. The Immed bit specifies when the target shall return status. The ability of the initiator to detect target actions is irrelevant.

25. Page 11, third paragraph, Load/Eject bit. This paragraph uses "ejecting" and "unloaded" as what I suspect are synonyms. Discard one term and use the other consistently.

26. Page 11, fourth paragraph. The parenthetical phrase, "media shall not be accessed by the initiator", places a restriction on the initiator, which is pointless. If the purpose of an initiator stopping a unit is to make issuing device access commands a protocol violation, the initiator could more simply refrain from issuing access commands. I expect you mean to say that this function renders the logical unit inaccessible for data transfers.

27. Page 12, definition of Sleep (state 5), second sentence, "A device reset shall be required before access...". This sentence prohibits a device from responding until a device reset occurs. I don't think this is what you intend. For example, if a user loads new media, device access is still prohibited until after a device reset. While an initiator must issue a device reset to ensure access, the proper wording is "A device reset may be required...".

28. Page 12, last paragraph. This paragraph makes no sense. When a device is in sleep state, the operating system has no control over it. It must reset the device, removing it from sleep state, before doing anything. Thus saying that the operating system "shall allow" media ejection makes no sense. Perhaps this is a requirement on the device rather than the operating system?

29. Page 14, first paragraph after CDB. The wording of this paragraph overrides or ignores the setting of the Write Cache Disable mode page flag. That is, when FUA = 0, this paragraph specifies write caching is allowed regardless of the state of WCD. I don't think this is what is desired.

30. Page 14, third paragraph (the note) after CDB. What is meant by "FUA

support"? If a device does not support write caching, is it allowed to reject as illegal a write command with FUA=0? A write command with FUA=1?

31. Page 14, fourth paragraph after CDB (after the note). "read data"?

32. Page 16, first paragraph (before CDB), last sentence. What does the presence or absence of the notation (c) mean? This does not define it adequately. A mode page parameter might be (1) required to be not changeable for all RBC devices, (2) either changeable or not changeable at the device's option, or (3) required to be changeable for all RBC devices. This paragraph says nothing about fields that do not have the (c) notation, something explicit should be said to avoid confusion. For fields with the (c) notation, either (2) or (3) are plausible interpretations from the existing wordings. Also, note that the wording here implies that changeable parameters may also be saved, whereas elsewhere there seems to be an implication that removable media devices need not save changeable parameters.

33. Page 16, Table 12. Why is the logical block size not listed as changeable? Many hard drives support this and significant markets require this. While many devices might choose to support only a single block size, others might support several.

34. Page 16, Table 12. The Read, Write, Format and Lock bits should be changeable.

35. Page 16, first two paragraphs following Table 12. The last sentence of the first paragraph and the second paragraph appear to specify the same thing, but with conflicting terminology. Please make these consistent and/or eliminate one.

36. Page 16, last paragraph. The Power/Performance field does not specify a "level of control", that comes from the Power Conditions field of the Start/Stop Unit command. Rather, the Power/Performance field specified the guidelines or tradeoffs the device shall use when Power Conditions specify Device Control.

37. Pages 16-17, Read, Write, Format and Lock flags. These flags are specified backwards, their polarity should be reversed. They should also be allowed (as options) for fixed media devices. As currently specified, fixed media devices "shall set these bytes [sic] to zero". This zero setting allows full access to the device. The same zero setting allows no access whatsoever to removable media devices. That conflict is idiotic. The same default setting (I suggest zero) should allow full access to any device.

38. Page 19, formatting of RELADR bit in Table 14.

39. Page 19, second paragraph after CDB. This paragraph discusses asynchronous event reporting as an option, which appears to contradict the table specifying AERC = 1.

40. Page 19, fourth paragraph after CDB. The first clause (up to the comma) of the first sentence is both irrelevant and wrong. SBP-2 devices report sense with status, but RBC devices on other protocols might not. But sense reporting is irrelevant to ACA support.

41. Page 20. The second paragraph after Table 15 says SP shall be one, the first paragraph of 5.2.1 says the SP bit is optional. This conflict needs to be reconciled.

42. Page 29, clause A.2.1. Text describes entry key 3A, diagram shows key 39.

43. Page 29, clauses A.2.1 and A.2.2. Were are "Command_set" and "Command_set_revision" specified?

44. Page 29, clause A.3. Delete first paragraph, irrelevant to non-SB-2 devices.

Comments attached to YesC ballot from Bill McFerrin of Philips Electronics:

1. Add a new value to the Event Field of Table B.10:
0x02 - Progress of an immediate command.

2. Text below Table B.9:

- Replace: The Time field is the predicted amount of time remaining for the device to become not busy, in units of 100 ms.

- With: For events other than those with a value of 0x02, the Time field is the predicted amount of time remaining for the device to become not busy, in units of 100 ms. For events with a value of 0x02, the Time (LSB) field is the predicted percent completion of a previously issued immediate command. The frequency of reporting is unique for each command.

The motivation for adding this change is to provide a means to report progress of an immediate command without using REQUEST SENSE. While the change is not required for RBC, it is required for other device types that have legacy commands that cannot be changed but wish to use unsolicited status. This small change accomodates this situation.

Comments attached to No ballot from Skip Jones of QLogic Corp.:

It is my belief that having a new "Reduced" command set that is little more than a subset of a mature, proven command set induces more confusion and ultimately less interoperability than it does to serve any market. The argument that current SCSI commands require too much code space to be used with minimal ROM space for near-commodity product is bogus. SCSI has been and continues to be coded and booted from minimal ROM space in consumer-level electronic equipment at the required cost targets. It is true that the current SCSI command set is complicated and mandates highly competent firmware engineering expertise, especially when reducing it's compiled space while preserving the necessary functionality. I have no doubt that SCSI is much more difficult than ATA firmware and it is enormously difficult for ATA-level and other low-end commodity product firmware engineers to learn how to proficiently and efficiently code SCSI. However, I do not feel that retarding the command set is the best approach to solving such inadequacies.

Skip Jones

Comments attached to YesC ballot from Mark Evans of Quantum Corp.:

The following are Quantum's letter ballot comments on RBC rev 5:

Global: In most cases "initiator" should be changed to "application client" to be consistent with other T10 documents.

Global: In most cases "device" should be changed to "device server" to be consistent with other T10 documents.

4.1 FORMAT UNIT, first paragraph: For consistency, the table number should be

referenced in the first sentence.

4.2 READ CAPACITY, paragraph 2: The sentence, "The Block Length in Bytes and the Logical Block Address of the last logical block on the logical unit are returned." should be changed to, "The Returned Logical Block Address and the Returned Block Length in Bytes should be those of the last logical block on the logical unit." [see sbc-r08c]

Table 5 - READ CAPACITY data: "Logical Block Address" should be changed to "Returned Logical Block Address" [see sbc-r08c].

4.4 START STOP UNIT, paragraph 2: The order of the sentences should be reversed so the definition for the "zero" value is first, i.e.,

"An Immediate (Immed) bit of one indicates that status shall be returned as soon as the command descriptor block has been validated. An Immed bit of zero

indicates that status shall be returned after the operation is completed."

would become,

"An Immed bit of zero indicates that status shall be returned after the operation is completed. An Immediate (Immed) bit of one indicates that status

shall be returned as soon as the command descriptor block has been validated."

4.4 START STOP UNIT: The Power conditions descriptions table (numbered as Table 8 in this revision) the sentence preceding the table, and the relevant descriptive text that follows the table should be moved up in the document to immediately follow the paragraph describing the Power Conditions field.

4.4 START STOP UNIT: In the Power conditions descriptions table and the descriptive paragraphs that follow, "state" should be changed to "condition" [see sbc-r08c].

4.4 START STOP UNIT: In the descriptive paragraphs that follow the Power conditions descriptions table, "[condition name] (state [code number])" should

be changed to "[condition name] condition (code 0xh)" where "x" is the

condition code value.

4.4 START STOP UNIT: In the descriptive paragraphs that follow the Power conditions descriptions table, "...lower power level than [condition name]..."

should be changed to "...lower power consumption level than when in [condition

name] condition..." throughout.

4.4 START STOP UNIT: The last paragraph should be changed from, "It is not an

error to request a device be placed into the same power state that it currently occupies" to, "It is not an error to request a device be placed into

the same power state in which it currently resides" (as was mentioned at the last working group meeting).

4.4.1 START STOP UNIT Removable...: In the paragraphs that follow, "state" should be changed to "condition".

4.6 WRITE (10), paragraph 4: This sentence should be changed from, "The Logical Block Address field specifies the starting logical block address on the device for the read data to be accessed." to either, "The Logical Block Address field specifies the starting logical block address on the device for the WRITE data to be written." or (as it is in SBC-2), "The LOGICAL BLOCK ADDRESS field specifies the first logical block of the range of logical blocks

for this command."

5.2 MODE SELECT, first paragraph: For consistency, the table number should be

referenced in the first sentence.

5.3 MODE SENSE: A paragraph should be inserted before the first table. This paragraph should say something like, "The MODE SENSE(6) command (see table [table number]) provides a means for a device server to report parameters to an application client. It is a complementary command to the MODE SELECT(6) command."

5.6.1 Download Microcode and Save Mode, first sentence: I think that "device"

should be changed to "logical unit."

Comments attached to No ballot from Robert Snively of Sun Microsystems Computer Co:

I have the following comments on the RBC document, revision 5. Most of these came from study of revision 4, but have been checked to see if they are still valid for revision 5. While I am favorably impressed with the correctness of this document and with the simple structure defined by RBC,

I believe that there are still a few problems in the documentation of the functions and details of the architecture and have provided the following comments.

The correction of the following comments is very important to approval of this standard:

- 1) FORMAT UNIT should be mandatory
- 4) Model of FORMAT UNIT progress reporting is not clear
- 6) Note on START STOP command is incorrect
- 8) Incomplete specification of VERIFY
- 13) INQUIRY command should support Device Identification page of VPD.
- 16) The page control support table needs to be corrected.
- 17) Remove descriptive text from PREVENT/ALLOW MEDIA REMOVAL
- 18) SMART model required
- 20) Annexes need to be reformatted for clarity
- 21) Incomplete information about command set
- 22) Security key
- 23) Clarification of status presentations

COMMENTS:

- 1) FORMAT UNIT should be mandatory

Technical, 4.0, pdf 18, table 1

FORMAT UNIT is a command commonly used by low-level utilities for both removable and fixed devices. It should be a mandatory command, but it should be clearly indicated that no action is required take place during the successful completion of the command for those devices not requiring or supporting actual medium formatting. This actually applies to both removable and fixed devices, since even removable devices may come with pre-formatted media.

Proposed Change:

Change N to Y in line 1 of table 1.

Change O to Y in line 1 of table 1.

- 2) Implement tolerance for commands

Technical, 4.0, pdf 18, table 1

The PREVENT/ALLOW MEDIUM REMOVAL and SYNCHRONIZE CACHE commands are presently not mandatory for various combinations of fixed and removable support.

I would propose that these commands be mandatory regardless of the type of RBC medium, and implemented such that no action is required to take place for those media that do not require that function. This would allow utilities to be constructed largely independent of whether the device is fixed or removable and would allow the "correct" behavior (which might be no operation at all) to be performed by the device.

Proposed Change:

Change N to Y in line 7 of table 1.

Change O to Y in line 9 of table 1.

Make any modifications in the descriptive text necessary to indicate that these commands may be completed without executing any operation on the device or medium for those devices where the instructions have no meaning.

3) READ(6) should be mandatory

Technical, 4.0, pdf 18, table 1

Many out-of-date utilities use READ(6) to read such items as boot records, volume labels, partition information, and directories. If there is any chance that such out-of-date utilities may still be

required in SBP attached devices, READ(6) should be included as a mandatory compatibility feature.

Proposed Change:

Add READ(6) to pdf 18, table 1.

Add a clause describing the RBC usage of READ(6)

4) Model of FORMAT UNIT progress reporting is not clear

Technical, 4.1, pdf 19, all

I was unable to determine from this document what mechanism was used for format progress updates. In older SCSI devices, the mechanism was polling using REQUEST SENSE. In this one, I assume that Unsolicited Status is used, but I was unable to find a clear statement to that effect.

If unsolicited status is used, but no status_FIFO location is available to the LUN, it should additionally be clearly specified that only the latest value of progress is provided at the time the location becomes available.

Proposed Change:

Specify the FORMAT UNIT progress indication model. I assume that this would require modification to paragraphs 1, 2, 3, 4, and 5 of clause 4.1, but I am not sure of the intended model, so cannot make any recommendation for the text.

Note that there is a bug in SBP-Rev4, pdf page 48 that specifies an incorrect src code for unsolicited status.

5) REQUEST SENSE requirements?

Technical, 4.x, pdf 18

This is actually a question. Does the provision of a write to the Unsolicited_Status_Enable CSR constitute a request for any status that may be lying around in the device? If so, REQUEST SENSE is probably not needed. However, if there is a requirement for soliciting current status that is not met through the CSR mechanisms (something that must be included in another document, since it does not appear to be included here), then REQUEST SENSE might become a required command.

Proposed Change:

Specify and reference the mechanism by which status may be solicited from a target, indicating that it is a functional substitute for REQUEST SENSE in either 4.0 or a sub-clause of 5.

6) Note on START STOP command is incorrect

Technical, 4.4, pdf 23, first paragraph

The note indicates that the Immediate bit has no meaning for RBC. This is not correct. The Immediate bit should be used, although its meaning can be somewhat loosely interpreted by an RBC device. There is no need to have a mechanism to determine when a device has begun executing a command, since the Immediate bit references only the relative timing by the target.

The previous paragraph correctly describes the behavior of the Immediate bit for a generic SCSI device. I believe that the correct interpretation would slightly modify the paragraph previous to that and remove the note.

Proposed Change:

The last paragraph of pdf page 22 should be rewritten as follows:

"An Immediate (Immed) bit of zero indicates that status shall be returned after the operation is completed. An Immed bit of one indicates that status may be returned as soon as the command descriptor block has been validated and shall be returned as soon as the RBC device implementation allows."

The note contained in the first paragraph of pdf page 23 should be entirely deleted.

7) Incorrect ASC/ASCQ

Technical, 4.4, pdf 24, paragraph 7.

The specified ASC/ASCQ is incorrect.

The value should be LOW POWER CONDITION ACTIVE, as specified in SBC.

Proposed Change:

Change ILLEGAL POWER CONDITION REQUEST (2C16, 0516) to LOW POWER CONDITION ACTIVE, supplying the correct values.

8) Incomplete specification of VERIFY

Technical, 4.7, pdf 27, all

The VERIFY command has rarely been used by any programs and often not implemented by disk drives because it is so poorly defined. In particular, there is no specification as to what sort of verification is performed and what should happen if the verification is in whole or part unsuccessful.

I would propose that this be specified or the command be removed from the document.

Proposed change:

Add the following new paragraph at the end of 4.7.

"The VERIFY command verifies that the data written on the media by a previous WRITE command is readable without any uncorrectable errors at the time of execution of the command. It does not guarantee the information is complete or valid."

9) Write Cache Disable bit interacts too rigorously with removability.

Technical, 4.8, pdf 28, second and third paragraph.

There are statements that indicate that the WCD (Write Caching Disable) bit cannot be supported by devices that cannot physically lock the medium. In addition, devices that cannot prevent medium removal are not allowed to support the WCD bit.

Unfortunately, the "unsupported" zero state of the WCD bit is the active state of supporting the caching function.

Rather than change the caching control function, making the cache enabled behavior vendor and device specific would be a superior change.

Proposed Change:

Change the last sentence of the second paragraph of clause 4.8 on pdf page 28 ("Devices Write Caching.") to read:

"Devices that cannot physically lock the media may ignore the state of the WCD bit and always disable write caching if information sent by a successful WRITE(10) command would be lost from the media when the media is removed."

Remove the next paragraph ("Devices that ... WCD bit.").

10) Number of blocks note should be normative.

Technical, 4.8, pdf 28, sixth paragraph

There is no reason to make the text a note. It should be simply included as a description of the model of MODE SELECT/SENSE operation.

Proposed Change:

Make the text part of the main text, removing it from the state of a note.

11) Power/Performance effects are vendor specific

Technical, 4.8, pdf 28, last paragraph on page.

It should be clarified that the actual boundaries of power/performance values and relative performance and power characteristics are vendor specific and need only change monotonically at certain numeric boundaries.

Proposed Change:

Add the following line to the paragraph which ends on the first lines of pdf page 29.

"The changes in the value of power and performance for various values of the Power/Performance field are vendor specific."

12) Format should be allowed, even if not executed

Technical, 4.8.1, pdf 29, 4th paragraph of clause.

The FORMAT UNIT function should complete successfully even if the media cannot be formatted and even if no action takes place when the FORMAT UNIT command is executed.

Proposed Change:

Add the following sentence to the paragraph describing the format bit.

"The device shall accept a FORMAT UNIT command whether or not any actual formatting function is performed by the command."

Alternatively, remove the Format bit from the standard and use the information contained in the FORMAT UNIT to carry that implication.

13) Table format needs to be corrected

Editorial, 5.0, pdf 30, table 13

Correct table cell borders

14) Allow PREVENT/ALLOW MEDIA REMOVAL for fixed devices

Technical, 5.0, pdf 30, table 13

Since it is desirable to create common utilities where possible, why not simply allow fixed devices to implement the PREVENT/ALLOW MEDIUM REMOVAL command to be executed without performing any operation?

Proposed Change:

Change N on line 4 of table 13 to Y.

13) INQUIRY command should support Device Identification page of VPD.

Technical, 5.1, pdf 31, last paragraph

The Vital Product Data Device Identification page has proven to be a very useful function in all SCSI drivers. It allows SCSI utilities direct access to the device identification information that is normally hidden away in vendor specific driver managed configuration information. I believe it is very desirable to either require or strongly encourage disk drives and most other block oriented devices implementing RBC to support the Device Identification page as an alternate mechanism for reaching the identification information normally available through the CSRs.

Proposed Change:

Change the last paragraph on pdf page 31 to read as follows:

The Vital Product Data Device Identification page should be supported by RBC devices. Support of other bits and fields in the INQUIRY command and associated pages is optional.

14) MODE SENSE/SELECT Device Specific Parameter not defined

Technical, 5.3, pdf 33, all

Neither this section nor the page definition in clause 4.8 defines the device specific parameter for the RBC devices.

I believe that the device specific parameter should be similar to the SBC device specific parameter defined in SBC, pdf page 105 of SBC rev 8c, table 72, page 88.

I would suggest that the DPOFUA bit be reserved and set to zero.

I strongly believe that the WP bit should be implemented. This is especially key for blocked devices that are removable.

Proposed change:

Where the overall mode page format is considered (probably section 4.8), the Device Specific Parameter should be defined.

The following text stolen from SBC would be appropriate:

[Install table 72, with bits 6-0 marked as reserved]

"When used with the MODE SELECT command the write protect (WP) bit is not defined."

"When used with the MODE SENSE command a WP bit of zero indicates that the medium is write enabled. A WP bit of one indicates that the medium is write protected."

15) Question about Block Descriptors in MODE SENSE/SELECT

Technical, 5.3, pdf 33, first paragraph of clause

The Disable Block Descriptors (DBD) bit keeps you from using the block descriptors. As far as I can see, the only significant difference between the RBC device parameters page (4.8) and the direct access device mode parameter block descriptor (SBP 8.3.2.2)

is that the RBC has a five byte block count. Is it really true that a four byte block count does not provide enough range for RBC devices? If there is a convincing argument that 4 bytes is not enough (i.e. 4+ Gigablocks will be exceeded on an RBC device in the next 10-15 years), locking DBD to 1 is appropriate. If there is not such a convincing argument, the block length and number of block fields should be removed from the RBC mode page and placed in the more standard data descriptor block.

Proposed change:

Remove block length and block count numbers from RBC mode page and place them in the more standard block descriptors location using the format defined by SBC. This effects 4.8 as well as 5.3, first paragraph.

16) The page control support table needs to be corrected.

Technical, 5.3, pdf 33, Table 17

The table is in conflict with the 4.8 and does not provide the necessary information to use the standard SCSI MODE SENSE/SELECT management algorithms.

One powerful advantage of MODE SENSE/SELECT is that it can ignore and emulate any undesirable requests. Examples in non-RBC SCSI devices include parameter rounding and ignoring parameters that are not meaningful. If the same philosophy is allowed in RBC, then the table can be removed and replaced with simple textual descriptions of the effects of the states. In particular, all parameter displays should be supported to allow the standard protocol which determines what is current, what is default, what is changeable, then sets what is desired.

The nice thing about RBC is that the simplified page definitions make the function quite simple. Default values and Changeable values are simply constants provided to the initiator. Current values are the values that are active and by definition are identical to the saved values, since the SP bit is specified as one.

Proposed change:

Replace table 17 with the following text:

"The page control field is supported as specified in SPC-2."

5.3.1 will also require minor editorial modifications to reflect this improvement.

17) Remove descriptive text from PREVENT/ALLOW MEDIA REMOVAL

Editorial, 5.4, pdf 34, all

The text of PREVENT/ALLOW MEDIA REMOVAL appears to be identical to the text of the same command in SPC, except for the recommended sense information. The descriptive text should be removed and reference made to SPC-2.

This avoids possible inadvertent conflicts with the standard text.

Proposed change:

Replace entire text of 5.4, except table 20, with the following text:

"The PREVENT/ALLOW MEDIA REMOVAL command shall be implemented as specified by SPC-2. The error codes in table 20 are recommended for various conditions that may occur during execution of the command."

18) SMART model required

Technical, 5.5, pdf 36, all

It is not clear how often SMART information is presented, how it is reset, or what use is expected to be made of it.

If this is not specified in a standard or controlled document somewhere, it must be specified here.

If it is specified in such a document, the document must be placed among the references in clause 2.

Proposed change:

Install a descriptive clause that includes how SMART information is expected to be created, reset, and used. If this is already available in a controlled document, reference the document and indicate any RBC variations from the standard behavior expressed by the document.

19) Download with offsets should be allowed

Technical, 5.6, pdf 38, all

The 111 mode, Download Microcode with Offsets and Save option should be allowed, since microcode sizes will often exceed normal write buffer sizes for simple machines.

Proposed change:

Place the corresponding text from 7.24.7 of SPC-2 in this section to allow the Download microcode with offsets and save function to be performed.

This also requires table 23 to be updated to contain the buffer offset parameter.

20) Annexes need to be reformatted for clarity

Editorial, All annexes, pdf 39-49, all

There is a great deal of confusion possible about the normative and informative state of various paragraphs in the annexes.

With little effort, the annexes can be modified and reformatted to correct this potentially serious ambiguity. See the proposal below.

Proposed change:

New annexes should be generated to separate unambiguously normative and informative information. I will name the new annexes A', B' etc and indicate what should go in each one:

A' RBC Storage model (informative)

Should include A.1, A.2, A.1.2

B' RBC requirements for SBP and CSR objects (normative)

Should include A.2, A.2.1, A.2.2, A.2.3

Should include A.3

Should include A.4

C' Unsolicited status (I assume this is probably normative)

Should include all of Annex B.

21) Incomplete information about command set

Technical, A.2, pdf 41, several clauses

The values that specify the RBC command set and revision should be specified in A.2.1 and A.2.2 unless they are specified in another document. In that case, the document should be referenced.

Proposed change:

Place proper values in Command_Set and Command_Set_Revision fields in A.2.1 and A.2.2

22) Security key

Technical, A.3, pdf 41, all

The vital product data page that is defined as mandatory by this section is not included in the INQUIRY command description

in section 5.1.

In any case, what has this publicly available constant to do with security? A security model should be described to specify this relationship unless the relationship is clearly described by another controlled document.

Proposed change:

Place requirement for vital product data page 80hex in section 5.1.

Describe the relationship between serial number (specified in page 80hex) and the master password. Explain how the public availability of the master password accomplishes the security goals.

23) Clarification of status presentations

Technical and editorial, B, pdf 43-49, all

The model here is not very clear. It is my impression that Unsolicited Status handles the following conditions:

Unit Attention

Deferred Errors

Power State Change notification

SMART notification
Event status notification

However, the paragraphing would indicate that Unsolicited Status and Event Status are somehow different in their presentation mechanism or somehow not related.

In addition, you should not bother to have a single sub-clause under another sub-clause. An example is B.1.1.1 which should be included in B.1.1

Proposed change:

Rewrite as necessary to properly relate the clauses:

B.1 -> B Unsolicited Status Operation
include B.1.1 directly in this section.

B.1.1 -> B.1 Unit Attention presentation and retention

B.1.1.2 -> B.2 Deferred error presentation

B.1.1.3 -> B.3 Power state change notification

Include references to or the actual values for power state change notification YY field here.

B.1.1.4 -> B.4 SMART notification/presentation

B.2 -> B.5 Event Status Notification

Include in this section B.2.1, event status retention

B.2.2 -> B.5.1 Removable medium event status notification algorithm

B.2.3 -> B.5.2 Event status sense information

B.2.3.1 -> B.5.2.1 Power management information values

Note that it is not very clear how this relates back to the standard formats required by SBP-2 and unsolicited status. A table showing the complete content would be a great help in placing this properly in context.

B.2.3.2 -> B.5.2.2 Media event information values

Here too, the context must be properly provided. If this is made more clear in either the new B.1 or the new B.5, it could be omitted from B.5.2.1 and B.5.2.2, but now it is difficult to create unambiguous representations of the proper status.

B.2.3.3 -> B.5.2.3 Device Busy Event information values

Note that SCSI device busy management overlaps with this function. The relationship must be clarified.

To really clarify this, it may require the rather special behavior

of the power notification protocol to be included and separately described in a separate annex, which would become annex D, normative.

Comments attached to YesC ballot from Paul D. Aloisi of Unitrode Corporation:

The vice chair is George Penokie, Not Larry Lamers.

***** End of Ballot Report *****