Response to ATA/ATAPI-4 Letter Ballot Comments

Accredited Standards Committee
NCITS, Information Technology

Doc.No. : T13/D97152r0
Date : 3 October 1997
Project : 1153D
Ref. Docs. : T13/D97008r0 & T13/D97011r1
Reply to : Mr. Peter McLean
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To: T13 Membership
From: Pete McLean, ATA/ATAPI-4 editor
Subj: Response to ATA/ATAPI-4 letter ballot comments

The ATA/ATAPI-4 letter ballot, T13/D97008r0, project 1153D results were 21:2:0:3. In addition, six yes votes included comments as presented in Summary of Letter Ballot Results on ATA/ATAPI-4, T13/D97011r1.

The editor wishes to thank all of the members who took the time to review the ATA/ATAPI-4 document and offer comments.

Responses to these comments follow. The comments are bolded, the responses are in normal text.

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The No vote from Richard Kalish had the following comments:

Adaptec, Inc. votes NO on forwarding ATA/ATAPI-4 until the following comments are resolved:

1) The required patent letter for ANSI is on file.

Patent letter has been received from Quantum (D97153R0).

2) Remove the 40ns minimum pulse width requirement for INTRQ, the nIEN bit is used correctly is sufficient to prevent race conditions.

The requirement is redundant. Regardless of the pulse width the host device driver is recommended to disable interrupts then wait a certain amount of time (maximum time is 400nsec for IRQ de-assertion), then switch the DEVice bit. If the host detects the interrupt it can be handled. Otherwise, the host gets the interrupt after re-selecting to the device.

Another approach is that the host device driver reads the status register and checks the SERV bit before switching. This way host can process any pending interrupts without waiting 400nsec. Any outstanding event can be processed if needed.

Disabling interrupts via the nIEN bit prevents the INTRQ from glitching when a device is deselected or the Command register is written. However, it creates the possibilty of an INTRQ

glitch when the host writes the Device Control register to disable the interrupt. That is, if the host writes the Device Control register just as the device decides that it is ready for service, the INTRQ signal may glitch as the device asserts it just a few nanoseconds before the nIEN bit is set to one and the device recognizes it. The committee feels that the 40 ns minimum pulse width prevents unpredictable behavior due to INTRQ glitches.

3) - For Ultra DMA, the transmitting end (either using the HSTROBE or DSTROBE) should be 120nsec (equal to a 33.3 MBytes/sec rate). The 117 nsec specification is to provide some margin for the receiving end of Ultra DMA transfer device. The working draft should indicate this margin.

Accepted. Modify table 32 as follows:

NAME	MODE 0		MODE 1		MODE 2		COMMENT
	MIN	MAX	MIN	MAX	MIN	MAX	
t_{CYC}	114		75		55		Cycle time allowing for assymetry and clock variations (from STROBE edge to STROBE edge)
$t2_{CYC}$	235		156		117		Minimum two cycle time allowing for clock variations (from rising edge to next rising edge or falling edge to next falling edge of STROBE)
$t2_{TCYC}$	240		160		120		Minimum typical sustained average two cycle time
...	...	...	...	...	...	...	...

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The Yes vote from Ron Roberts had the following comments:

Comments:
From Apple Computer, Inc.

1) Section 7.15.6.4 - The text implies that DMA may occur at any time DMARQ and DMACK are asserted. It is stated that DRQ must be set to one during a DMA transfer, but also that when DRQ is cleared to zero that DMA transfers are possible. Request that the text state that DRQ must be set and remain during any PIO or DMA transfer. DRQ should be cleared to zero when the PIO or DMA transfer is complete. Requiring the same DRQ sequence for PIO and DMA transfers can help the host in recovering from situations when the host and device get out of sync in DMA transfers (overrun and underrun) without requiring a reset.

The text here and the protocol description for Multiword DMA is consistant in stating that when DMARQ and DMACK are asserted and the DMA transfer takes place either BSY=1 and DRQ=0, or BSY=0 and DRQ=1 is acceptable.

2) Section 7.15.6.5 - This text does not serve any useful purpose and should be removed.

Replace current text with:
Some bits in this register were defined in previous ATA standards but have been declared obsolete in this standard. These bits are labeled “obsolete”.

3) There is insufficient documentation as to how the host should detects devices on the bus, and how those devices respond when the other device is not present. Some information is provided in Section 9.16 (Single device configurations), but this is not clear. For example, how does the host know whether or not a device is present if the other device mimics its response? Requiring the host to issue a command to the device is too involved. Suggest either adding more text to Section 9.6 (Device selection protocol) or create a new section describing the expectations of accessing, for example, device 1 when it is not present and/or detecting devices.

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4) Section 9.16 - The text states the host must violate the standard protocol to select device 1 when there is no device 0 present by setting DRV to 1 without waiting for the current selected device (device 0) to set BSY clear. Perhaps, this section could be changed to instruct how to detect one or more devices on the bus.

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The No vote from Tony Goodfellow had the following comments:

The Ballot request was not received. However our response is:
No to accepting the document as it stands:
Reason:
The Overlapped/Queued commands are being added for the first time. It is recognized that the recommended implementation will impose considerable Host Overheads due to the need to poll the two devices on one channel (cable). D97142R1 proposes a solution that could be implemented on the Host provided that the definition of the NOP command is slightly modified. If this modification is not included in the document now, we will be creating a legacy situation that will impose further difficulties for Host System Driver implementations.

Accepted. Add the NOP command modifications as described in D97142R1.

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The Yes vote from Dan Colegrove had the following comments:

Additional Comments

1. In table 11, word 50 "bit 15 shall be zero, bit 14 shall be one". (This was changed from Rev 15.) But in the description of word 50 (8.12.23), "bit 15 shall be one, bit 14 shall be zero".

Accepted.

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The Yes vote from Darrell Redford had the following comments:

Flush Cache Command

There needs to be a way of performing this command offline, especially if the command can take up to 30 seconds. To no have offline capability could render the system unusable.

The intent of this command was to allow the host to tell the device to flush its cache and for the host to have positive notification when the cache flush was completed so that the host did not do anything that might cause data corruption before the flush was complete. Not having the command complete until the cache flush was complete was deemed the most positive way to accomplish this.

Get Media Status
Iomega's drives currently return WP, MC, MCR and NM even when MSN is disabled. If this violates the specification, then the command should require an ABORT to be returned if MSN is disabled. Otherwise, the command is fine as is.

This is a technical change. What would the group like to do?

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The Yes vote from Pete McLean had the following comments:

The following comment accompanies the Maxtor Yes vote for the letter ballot to forward D1153R16 to NICITS.

1. Queuing of commands to a device presents a unique situation for the handling of the INTRQ signal and the SERV bit. It is believed that this needs to be further clarified in the document and the following descriptive changes are suggested:

Clause 6.7 Queued feature set (page 26)

Replace the last two paragraphs, currently:

“When queuing commands, the host shall disable interrupts via the nIEN bit before writing a new command to the Command register and may re-enable interrupts after writing the command. When reading status for one command, the SERV bit may be set because the device is ready for service associated with another queued command.

The device shall set the SERV bit to one and a pending interrupt as soon as service is required for a queued command. If the device has neither BSY nor DRQ set to one and interrupts are enabled via the nIEN bit, INTRQ shall be asserted. If the device sets a pending interrupt when interrupts are disabled by the nIEN bit or the device is busy on the bus (i.e., BSY or DRQ is set to one), the device shall wait until interrupts are enabled by the nIEN bit and BSY and DRQ are cleared to zero before asserting INTRQ.”

With the following:

“When the device is ready to continue the processing of a bus released command and BSY and DRQ are both cleared to zero, the device requests service by setting SERV to one, setting a pending interrupt, and asserting INTRQ if selected and nIEN is cleared to 0. SERV shall remain set until all commands ready for service have been serviced. The pending interrupt shall be cleared and INTRQ negated by the usual means of a Status register read or a write to the Command register.

When the device is ready to continue the processing of a bus released command and BSY or DRQ is set to one (i.e., the device is processing another command on the bus), the device requests service by setting SERV to one. SERV shall remain set until all commands ready for service have been serviced. At the completion of the current command processing (i.e., when both BSY and DRQ are cleared to zero), the device shall process interrupt pending and INTRQ per the protocol for the command being completed. No additional interrupt shall be processed due to commands ready for service.

When the device receives a new command while queued commands ready for service exist, the device shall execute the new command, process interrupt pending and INTRQ per the protocol for the new command. If queued commands ready for service still exists at the completion of this command, SERV remains set to one but no additional interrupt shall be processed due to commands ready for service.

When queuing commands, the host shall disable interrupts via the nIEN bit before writing a new command to the Command register and may re-enable interrupts after writing the command. When reading status at the completion of a command, the host shall check the SERV bit since the SERV bit may be set because the device is ready for service associated with another queued command. The host will receive no additional interrupt to indicate that a queued command is ready for service."

Clauses 8.24.5.1, 8.46.5.1, PACKET, READ DMA QUEUED and WRITE DMA QUEUED release (pages 116, 124, and 193)

Replace the description of the SERV bit with:

"SERV (Service) shall be cleared to zero if no other queued command is ready for service. Shall be set to one if another queued command is ready for service. Shall be set to one when the device has prepared this command for service."

Clauses 8.24.5.2, 8.24.6, 8.46.5.2, and 8.46.6, READ DMA QUEUED and WRITE DMA QUEUED command complete and error outputs (pages 125, 126, 194, and 195)

Replace the description of the SERV bit with:

"SERV (Service) shall be cleared to zero if no other queued command is ready for service. Shall be set to one if another queued command is ready for service."

Clause 9.11 Figures 16 and 17 and Clause 9.12 Figure 18, PACKET and READ/WRITE DMA QUEUED protocols (pages 234, 237, 241, 242, and 243)

Place the following text next to the boxes that contain "SERV=0":

"If another queued command is ready for service, SERV shall be set to one."

Accepted.

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The Yes vote from Mark Evans had the following comments:

T13/ATA/ATAPI-4 REVIEW

Review of ATA/ATAPI-4 with Letter Ballot Comments

To: T13 Technical committee
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Subj: Review of ATA/ATAPI-4 (T13 1153D Revision 16) with Letter Ballot Comments

Introduction: The following is a list of recommended corrections, comments and editorial suggestions that resulted from a review of the ATA/ATAPI-4 draft document (T13 1153D, Revision 16, 25 August 1997) in preparation of voting on the letter ballot for this project. This list contains items having varying degrees of importance relative to the document. The list is ordered by appearance in the document and this order should not imply any weight of importance to any particular item. Where appropriate these comments are referenced by clause, paragraph and sentence number in the document.

2. Normative References, paragraph 1, sentence 1: "...reference..." should be changed to "...referenced..."

Rejected. “The following standards contain provisions that, through reference in the text, constitute provisions of this standard.” is correct.

3.1.2 "ATAPI (AT Attachment Packet Interface):" should be changed to "ATAPI (AT Attachment Packet Interface) device:"

Accepted.

3.1.11 command acceptance: This would be more clear if the clauses in the first sentence were reversed to the order in which they actually occur, i.e., "A command is considered accepted whenever the currently selected device has its BSY bit equal to zero and the host writes to the Command register [and it should be a small "r" in register]."

Accepted.

3.1.20 DMA: The sentence should be changed to "...without host processor intervention..."

Accepted.

3.2.2.5 optional: The last sentence reads, "Describing a feature as optional in the text is done to assist the reader." Done to assist the reader do what? This sentence should be clarified or deleted.

Accepted. Deleted.

3.2.2.7 reserved: The last sentence says, "Receipt of reserved code values in defined fields shall be treated as an error." What does this mean? This sentence should be clarified or deleted.

Accepted. Change sentence to read “Receipt of reserved code values in defined fields shall be treated as a command parameter error and reported by setting the ABRT bit to one.”

4.1 Cable configuration, Figure 1: "...degredation..." should be corrected to "...degradation..." See also 5.2.13, Figure 4 and Figure 5

Accepted.

4.3.2.1 Cable configuration, sentence 2: says, "It is recommended that DIOR-, DIOW-, and IORDY not be shared." It has been pointed out to me that this is in the passive voice and that we have a perfectly good active voice word in the conventions clause that is defined as meaning "...it is recommended". The word is "should". So, this sentence could be changed to, "DIOR-, DIOW-, and IORDY should not be shared." This could be a global change in the document. Also see (at least): 6.5.2, paragraph 1, sentence 2; 6.8.2, paragraph 4, sentence 1; 6.10.4, sentence 4; 6.11.6 paragraph 1, sentence 1; 6.11.6, paragraph 2 sentence 1; 6.12, last paragraph, sentence 2; 8.23.1, note; 8.27.1, note; 8.28.1, note; 8.45.1, note; 8.48.1, note; 9.2 paragraph 7, sentence 2; 9.3, paragraph 6, sentence 2; 9.5, paragraph 5, sentence 2; 9.15, (i) note; A.2.2, sentence 1 and 2; C.2.8, paragraph 7, last sentence; Table E.4, note; Table E.5, note.

Do we change these or leave for emphasis?

5.2.8 DMARQ, sentence 2: should be changed to, "For Multiword DMA transfers the direction of the data transfer is controlled by DIOR- and DIOW-." This got missed when Ultra DMA was included in the standard.

Accepted.

5.2.9 INTRQ, paragraph 1, sentence 2: should be changed to, "When the nIEN bit is cleared to zero, and the device is selected, INTRQ shall be enabled through a tri-state buffer and shall be driven by the device (either asserted or negated)." because the meaning of "enabled" is unclear.

Accepted.

5.2.11 PDIAG-:CBLID-: paragraph 2, sentence 1 should read, "...after completion of each power on or hardware reset..."

Accepted.

5.2.11 PDIAG-:CBLID-: It would be helpful to have an additional note here (like the one after CSEL) that says something like,

NOTE - CBLID is selectively grounded in the 80-conductor cable assembly host connector for the purpose of indicating to the host that the assembly being used is an 80-conductor assembly (as opposed to a 40-conductor assembly).

Accepted. Will be put note in figure 3 with the word “selectively” left out.

6.2 Register delivered...addressing, paragraph 3, item (b), sentence 2: says, "The LBA bit of the Device/Head register shall be ignored for commands that do not access the media." This sentence should be deleted. At least SET MAX ADDRESS uses this field and is a non-data command.

Accepted.

6.2.1 Definitions and value ranges of IDENTIFY DEVICE words: The word "Words" is capitalized many places in this clause. I thought the decision was to not capitalize "word' when referring to an IDENTIFY DEVICE word. This occurs in several places in the document (see at least 6.2.2 and 8.38.8).

Accepted.

6.2.2 (b) "Devices may respond with an `ID NOT FOUND' or an `ABORTED COMMAND' error..." I know, I know, this came directly from one of my proposals. However, upon looking through the whole document, the closest it comes to defining what "ABORTED COMMAND error" means is in the description for ABRT in 7.11.6, and I couldn't find anyplace where "ID NOT FOUND error" is defined. Either this (and the other occurrences) should be changed to something like, "Devices may set IDNF or ABRT to one, ERR to one, clear BSY to zero, and assert INTRQ...", or a definition for "ID NOT FOUND error" and "ABORTED COMMAND error" saying about the same thing should be added in clause 3.

Then, unfortunately, if this recommended change is accepted, the document needs to be made consistent for this as there are many occurrences of these in several different forms (e.g.: "Command Abort error"). Several, but probably not all of the offending clauses are: 6.2.2 (c); 6.3.1, paragraph 3; 6.5.1, paragraph 2, sentence 1; 6.7, paragraph 1, sentence 4; 6.7, paragraph 3, sentence 4; 6.12, paragraph 4, sentence 4; 8.11.6, sentence 1; 8.17.6, sentence 1; 8.18.6, sentence 1; 8.19.6, sentence 1; 8.25.8, paragraph 5; 8.27.5.2; 8.31.8; 8.34.8, paragraph 4, sentence 1; 8.34.8, paragraph 4, sentence 3; 8.38.8 paragraph 4 (third from last), sentence 1; 8.38.8 paragraph 5 (next to last); 8.41.1.8, paragraph 2 [these last three are from my proposals, as well]; and 8.47.8, paragraph 6.

Accepted. Would the group prefer to add the definition and use it everywhere: (also see page 13)

“command aborted: The completion of a command with the ABRT set to one in the Error register and the ERR bit set in the Status register”.

or

the phrase “the ABRT set to one in the Error register and the ERR bit set in the Status register” everywhere.

6.4.2.2 (d), sentence 1: based on input from several folks this should be changed to, "A recipient shall not signal a termination request immediately when the sender stops generating STROBE edges."

Accepted.

6.5.1 Identification of PACKET Command feature set devices, paragraph 2, sentence 2: IDENTIFY DEVICE is not "replaced" by IDENTIFY PACKET DEVICE. After a device "aborts [sic]" the IDENTIFY DEVICE command the host shall issue an IDENTIFY PACKET DEVICE command to obtain the data.

Accepted. Remove second sentence and replace with “The IDENTIFY PACKET DEVICE command is used by the host to get identifying parameter information for a device implementing the PACKET command feature set.”

6.6 Overlapped feature set, paragraphs 4 and 5, sentence 1: the beginning of both of these sentences have several parts to the "If" conditional. It would be more clear if a "then" was added, "...SET FEATURES command, then the device..."

Rejected. This editorial style is common throughout the document.

6.8.2 Power management commands, paragraph 4, sentence 1: should be changed to, "After receiving a reset it is recommended that the device return to the power mode..."

Accepted.

6.9 Advanced Power Management feature set, paragraph 4: could be changed from, "The IDENTIFY DEVICE response word..." to, "IDENTIFY DEVICE word..."

This is a consistancy issue. Which way do people prefer it?

6.10.2 Initial setting of the User password: the end of this sentence should be changed to, "...the next time the device is powered on or after a hardware reset."

Accepted.

6.11 SMART feature set, paragraph 1, sentence 3: the comma should be removed between "condition" and "allows".

Accepted.

6.11 SMART feature set, paragraph 2, sentence 2: the end of this sentence should be changed to, "...shall implement SMART as defined by the command packet set implemented by the device."

Accepted.

6.12 Host Protected Area feature set, paragraph 4, sentence 4: not only has an "IDNF error", but seems cumbersome. It could be changed to, "Any read or write command to an address above the maximum address specified by the SET MAX ADDRESS command shall cause the device to set IDNF or ABRT to one, ERR to one, clear BSY to zero, and assert INTRQ."

Accepted. Make the sentence read "Any read or write command to an address above the maximum address specified by the SET MAX ADDRESS command shall cause the device to set the IDNF bit to one in the Error register. "

6.12 Host Protected Area feature set, paragraph 4, sentence 5: the end of this sentence could be changed to, "...across power-up or hardware reset cycles."

Accepted.

6.13 CFA Feature Set: should be, "...set"

The intended convention is “Name feature set”. The document will be searched for “feature set” and occurances not in compliance with the convention will be changed.

6.13 CFA Feature set, paragraph 3, sentence 1: "...Identify Device..." should be "...IDENTIFY DEVICE..." This occurs twice in this sentence.

Accepted.

6.13 CFA Feature set, paragraph 4, sentence 2: "...sectors erased precondition." should be "...sector's erased precondition."

Accepted.

6.14 RMSN and RM feature sets, paragraph 1, sentence 2: "...feature set, intended..." should be changed to "...feature set is intended..." so that the sentence has a verb. See also sentence 3.

Accepted.

6.14.1 RMSN feature set, paragraph 1, sentence 4: the beginning of both of the parenthetical clauses should be changed to "...(for devices..."

Accepted.

6.14.1 RMSN feature set, paragraph 1, sentence 4: "...drive..." should be changed to "...device..."

Accepted.

6.14.1 RMSN feature set, paragraph 1, last word: should be changed from "...disk..." to "...media..." See also 6.14.2 Removable Media feature set, paragraph 1, sentence 3.

Accepted.

6.14.1 RMSN feature set, paragraph 2, sentence 2: "...must..." should be changed to "...shall..."

Accepted.

6.14.1 RMSN feature set, paragraph 4: the numbered list has some extra carriage returns and other formatting issues.

Accepted.

6.14.1 RMSN feature set, paragraph 4, (2.): the hyphens between ..."word-x..." and "...bit-x..." should be deleted. See also 6.14.2 Removable Media feature set, paragraph 4, (2.).

Accepted.

6.14.1 RMSN feature set, paragraph 4, (3.) through (6.): the second sentence of (3.) should be (4.), and (4.) through (6.) should be (a), (b) and (c).

Accepted.

7.2 I/O register descriptions, paragraph 1, sentence 5: this sentence should be changed to, "During invalid combinations of assertion and negation of CS0-, CS1-, DA0,

DA1, and DA2 a device shall keep DD(15:0) deasserted and ignore transitions on DIOR- and DIOW-.

Accepted. Except “deasserted” should be “in the high impedance state”.

7.2 I/O register descriptions, paragraph 1, last word: should be "...registers."

Change to “Valid register addresses are described in the clauses defining the registers.”

7.2 I/O register descriptions, paragraph 2: Though this paragraph talks about what Control and Command Block registers do, I can't find any place where the document says which register is which type. This paragraph could be changed to,

"The Command Block registers are used for sending commands to the device or posting status from the device. These registers include the Cylinder High, Cylinder Low, Device/Head, Sector Count, Sector Number, Command, Status, Features, and Data Registers and the Data port. The Control Block registers are used for device control and presenting alternate status. These registers include the Device Control and Alternate Status registers."

Accepted. Except add “Error” and leave out “Data port” and no cap on register.

7.3.4 Effect: "...perform an interrupt acknowledge or..." should be deleted because "perform an interrupt acknowledge" is not defined.

Accepted.

7.4.3 Access restrictions, sentence 2: "The contents of the this register is..." should be changed to "The content of this register is..."

Accepted.

7.4.5 Functional description, sentence 2: is it acceptable in normative sections of the document to reference informative sections for descriptions? If not, this reference should be deleted.

It says that they are “summarized” there, not that they are defined there.

7.9.5 Functional description: "This register allows a host to ... enable/disable interrupts." This is not a clear description. This should be changed to, "This register allows a host to ... cause a device to place INTRQ in the released (high impedance) state or, when the device is selected, to assert and negate INTRQ."

Change to “This register allows the host to software reset attached devices and to enable or disable the assertion of the INTRQ signal by a selected device.”

7.9.5 nIEN, sentence 2: should be changed to, "When the nIEN bit is cleared to zero, and the device is selected, INTRQ shall be enabled through a tri-state buffer and shall be driven by the device (either asserted or negated)."

You mean 7.9.6. Change to "When the nIEN bit is cleared to zero and the device is selected, INTRQ shall be enabled through a tri-state buffer and shall be asserted or negated by the device as appropriate."

7.11.3 Access restrictions, sentence 2: this sentence should be changed to, "...upon completion of power on, or after a hardware or software reset, or after the completion of an EXECUTE DEVICE DIAGNOSTICS or DEVICE RESET command.

Accepted.

8.1.6 Error outputs, Status register - DF: "...drive fault..." should be changed to "...device fault..." See also the same sections in 8.2.6, 8.3.6, 8.4.6, and 8.5.6.

Accepted.

8.7.6 Error outputs, sentence 2: I thought this sentence was hard to read. It could be changed to, "If not supported, the results of this command are indeterminate if the device has BSY set to one when the DEVICE RESET command is written, and, if the device has BSY cleared to zero when the DEVICE RESET command is written, the device shall set ABRT to one, ERR to one and assert INTRQ."

Change to “If this command is not supported and the device has the BSY bit or the DRQ bit set to one when the command is written, the results of this command are indeterminate. If this command is not supported and the device has the BSY bit and the DRQ bit cleared to zero when the command is written, the device shall set the ABRT bit to one, set the ERR bit to one, and assert INTRQ if nIEN is cleared to zero.

8.7.7 Prerequisites, sentence 1: "In particular," should be deleted.

Accepted.

8.9.5 Normal outputs, sentence 3: This sentence should be changed to, "The values of the bits in the Error register are not as defined in 7.11.6."

Accepted.

8.11.6 Error outputs, sentence 2: after sentence 1 is cleaned up, this sentence should be deleted. See also the same sections of 8.17.6, 8.18.6, and 8.19.6.

Accepted.

8.11.6 Error outputs, Error register, NM, the last words in sentences 1 and 2: "...drive." should be changed to "...device." See also the same sections of 8.17.6, 8.18.6, and 8.19.6.

Accepted.

8.12.8 Description, paragraph 2, sentence 1: "... and generates an interrupt." should be changed to "... and asserts INTRQ." See also the same section in 8.13.8.

Accepted. Change to “.....and asserts INTRQ if nIEN is cleared to zero.”

8.13.29 Word 71: "...typical (3 sigma) time..." should be changed to "...typical time (the mean plus three standard deviations)..." See also 8.13.30.

Accepted.

8.14.8 Description, paragraph 1, sentence 2: "INTRQ is asserted..." should be changed to "INTRQ may be asserted..." See also the same section of 8.15.8.

Accepted.

8.17.2 Feature set: "Mandatory for task file devices..." should be changed to "Mandatory for devices not implementing the PACKET Command feature and..." This occurs twice in this clause. See also 8.18.2 and 8.19.2.

Accepted.

8.20.6 NOP, Error outputs: If the command always fails with ABRT set to one, it can neither be determined whether a device supports the command nor whether the device could not complete the command (how does a device not complete a NOP, anyway?) It seems as if every condition shall cause a device to set ABRT to one, ERR to one and assert INTRQ when this command is issued. Therefore, this command is mandatory for all devices. How's that for logic?

Editors note - Who says ATA commands are logical?

8.20.6 Description, sentence 2: should be changed to, "...by setting ABRT to one, ERR to one, clearing BSY, and asserting INTRQ."

Change to "...setting the ABRT bit to one, setting the ERR bit to one, and asserting INTRQ if nIEN is cleared to zero."

8.21.6 Error outputs: the carry over lines under EOM, ILI and SERV should be indented farther to line up with the other lines in this section.

Accepted.

8.29.8 Description, sentence 3: "If the password selected by word 0 matches," should be clarified to say, "If the password selected by word 0 matches the password previously saved by the device,"

Accepted.

8.31.8 Description, sentence 3: "If the password does not match," should be clarified to say, "If the password does not match the password previously saved by the device,"

Accepted.

8.32.8 Description, sentence 3: "...quit..." should be replaced by "...disabled..."

Accepted.

8.37.9 Enable/disable write cache, sentence 2: ends with the words, "...before posting command complete." Like ABORTED COMMAND and ID NOT FOUND error, I could find no definition for "posting command complete" in this document. Either this sentence needs to be changed to, "...before the device sets DRDY to one, clears BSY to zero, and asserts INTRQ." or a definition for "posting command complete" needs to be included in clause 3.

Accepted. Would the group prefer the definition and use it everwhere:

“command completion: Command completion is the completion by the device of the action requested by the command or the termination of the command with an error, placing of the appropriate error bits in the Error register, placing of the appropriate status bits in the Status register, clearing of both the BSY and DRQ bits to zero, and asserting of INTRQ if nIEN is cleared to zero and the command protocol specifies that INTRQ be asserted.”

or

Put the phrase “clears BSY and DRQ to zero and asserts INTRQ if nIEN is cleared to zero” everywhere.

8.37.14 Enable/disable release interrupt: "...asserting of an interrupt..." should be changed to "...asserting INTRQ..." See also 8.37.15

Accepted.

8.40.8 Description, paragraph 2, sentence 3: says, "In Sleep mode the interface becomes inactive without affecting the operation of the interface." I don't understand what this means.

Change to “In Sleep mode, the device only responds to the assertion of the RESET signal and the writing of the SRST bit in the Device Control register.”

8.40.8 Description, paragraph 3: "...deassert..." should be changed to "...release..."

Accepted.

8.42.8 Description, paragraph 2: "See Table 14." should be added at the end of this paragraph. This is the table that specifies the Standby Timer values.

Accepted.

9.5.1 EXECUTE DEVICE DIAGNOSTICS - Device 0: In previous versions of the ATA standard, it was indicated in the flow chart that the selected device asserted INTRQ after the completion of this command. When this command was removed from the "Non-data command protocol" list, that indication disappeared. This clause on EDD protocol never mentions any device asserting INTRQ. Therefore something like the following should be added:

12) After completing the above steps, Device 0 shall assert INTRQ.

Accepted.

A.1.1 Assembly using ..., paragraph 1, sentence 5: "...shal..." should be changed to "...shall..."

Accepted.

B.1 Definitions..., paragraph 2, sentence 2: "...DISK..." should be changed to "...Disk..."

Accepted.

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The Yes vote from Tokuyuki Totani had the following comments:

Toshiba Corporation comments to accompany Yes vote on T13/D97008R0, Approval of forwarding D1153R16.PDF AT Attachment with Packet Interface Extension (ATA/ATAPI-4) for further processing.

-P11 5.2.11 PDIAG-:CBLID- (Passed diagnostics:Cable assembly type identifier)
The host may sample CBLID- after completion of each hardware reset sequence in order to detect the presence or absence of an 80-conductor cable assembly.

This conflicts with the following sentence in P214 9.2.2 Power on and hardware resets - device 1 Section 16) says Device 1 shall release PDIAG- after receipt of the first command from the host.

Also Execute Device Diagnostic will not release PDIAG-:CBLID-.

P11 5.2.11 should state The host may sample CBLID- after following series of events in order to detect the presence or absence of an 80-conductor cable assembly.
1) Host shall wait for the completion of each hardware reset sequence.
2) Host shall Issue a command other than Execute Device Diagnostics to the Device 1.

Accepted. Change second paragraph of 5.2.11 to read:

The host may sample CBLID- after a power on or hardware reset in order to detect the presence or absence of an 80-conductor cable assembly by perfoming the following steps:

a) The host shall wait until the power on or hardware reset sequence is complete for all devices on the cable.
b) If device 1 is present, the host should issue IDENTIFY DEVICE or IDENTIFY PACKET DEVICE and use the returned data to determine that device 1 is compliant with ATA-3 or this standard. Any device compliant with ATA-3 or this standard shall release PDIAG no later than after the first command following a power on or hardware reset sequence.

NOTE – Older devices not in compliance with this standard or ATA-3 may continue to assert this signal providing a false indication of the cable type. Issuing IDENTIFY DEVICE or IDENTIFY PACKET DEVICE not only provides the host with the information required to verify that the devices are compliant with these standards, but also insures that devices compliant with these standards shall release this signal.

If the host detects that CBLID is connected to ground, then an 80-conductor cable assembly is installed in the system. If the host detects that this signal is not connected to ground, then an 80-conductor cable assembly is not installed in the system.

- P83 8.12.23 Word 49-50: Capabilities
Apparently we fixed the Table 11 Word 50 bit 15 and 14 but forgot to fix the related chapter.
>Bit 15 of word 50 shall be set to one to indicate that the contents of word 50 are valid.

>Bit 14 of word 50 shall be cleared to zero to indicate that the contents of word 50 are valid.

should be changed to
Bit 15 of word 50 shall be cleared to zero to indicate that the contents of word 50 are valid.
Bit 14 of word 50 shall be set to one to indicate that the contents of word 50 are valid.

Accepted.

- P83 8.12.23 Word 49-50: Capabilities
The description of Bit 0 is not clear and should be reworded.
Bit 0 of word 50 indicates that the device manages the Standby timer value. Bit 0 shall be set to one if the timer value is equal to or greater than 5 minutes. Bit 0 shall be cleared to zero if the timer value is less than 5 minutes.
Should be changed to Bit 0 shall be set to one if the device ignores the timer value less than 5 minutes. Bit 0 shall be cleared to zero if the device is capable of operating with timer value less than 5 minutes.

Change text to read “Bit 0 of word 50 indicates that the device sets the Standby timer and ignores Standby timer values set by the host. Bit 0 shall be set to one if the timer value set by the device is equal to or greater than 5 minutes. Bit 0 shall be cleared to zero if the timer value set by the device is less than 5 minutes.”

- P126 8.23.6 Error Outputs
As bit 2 (CORR bit) is obsolete, see P46 7.15.6 Field/bit description, "CORR" bit should be "na". Also "Status register -" description shall not mention CORR bit. In other way if we are going to keep CORR bit, we should change P46 7.15.6 bit 2 "obsolete" to "#". This applies to all "READ" commands.

Accepted.

-P272 Table 32 Ultra DMA data burst timing requirements
The table is inconsistent with other tables in terms of cycle time. tcyc, t2cyc includes some margins for receiver circuits. The transfer rates for Ultra DMA are 16.7, 25.0 and 33.3 MB/s and related "sender" strobe t2cyc's are 240, 160 and 120 ns not 235, 156 and 117 ns. The table can mislead to design higher rate transfer.

Accepted. See Adaptec comment 3.