

Response to ATA-3 Letter Ballot Comments

Accredited Standards Committee
X3, Information Technology

Doc.No. : X3T13/D96112r0
Date: 18 January 1996
Project: 2008D
Ref. Docs. : X3T10/95-044 & X3T10/96-004r1
Reply to : Mr. Peter McLean
Maxtor Corporation
2190 Miller Drive
Longmont, CO 80501
(303) 678-2149

To: X3T13 Membership
From: Pete McLean, ATA-3 editor
Subj: Response to ATA-3 letter ballot comments

The ATA-3 letter ballot, X3T10/95-044, project 2008D results were 45:1:0:5. In addition, six yes votes included comments as presented in Summary of Letter Ballot Results on ATA-3 and SIP, X3T10/96-004r1.

The editor wishes to thank all of the members who took the time to review the ATA-3 document and offer comments.

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

Apple Corp:

December 29, 1995

**Mr. John Lohmyer
X3T10 Chairman
Symbios Logic, Inc.
1635 Areoplaza Dr.
Colorado Springs, CO 80916**

Subject: Issues and Comments on ATA-3 (Revision 6)

Below are comments and concerns from a review of the subject document. We have some general concerns and those are listed in the following items.

GENERAL COMMENTS

#001 ATA-3 Not Backward Compatible!

ATA-3 states it's backward compatible with ATA-2 and is not intended to require changes to presently installed software (p.15, Scope). However, the obsoleting of parameters contradicts this statement. In addition, the specification also does not fully describe the

usage differences between the different versions. Examples of this are described below in comments for Section 8.7 (Identify Drive command)

ATA-3 does not replace ATA-2. The ATA-2 standard remains valid and product may be implemented in accordance with ATA-2.

#002 Everything Is Vendor Specific?

There are too many "vendor specific" items in the specification. The use of "vendor specific: leads to conflicts due to multiple interpretations of the specification, and thus, makes it virtually impossible to write a generic driver for ATA devices. For example, all features enabled/disabled by the Set Features command are vendor specific. However, these features impact the defined ATA commands. (see Set Features below)

This is a result of lack of definition in previous versions of the ATA standards. If all vendor specific items were specified, the problem pointed out in item #001 would be made even worse. By defining things as vendor specific at least the reader is made aware that different implementations do exist.

#003 What Are Default Settings?

There is no description of the default settings which occur after power on, or hard and soft reset. The default configuration is specified as vendor specific, with the exception of register values. Other than the values in the registers, how does anyone determine which features are set or cleared? Or how does anyone know which features are available?

This is a result of lack of definition in previous versions of the ATA standards. If all vendor specific items were specified, the problem pointed out in item #001 would be made even worse. By defining things as vendor specific at least the reader is made aware that different implementations do exist.

#004 What Features Are Supported?

Speaking of features, why can't we find out which features are supported or which are currently enabled? We suggest either adding a field in Identify Device or a new command called Get Features which returns a list of ATA defined features with bits set indicating the feature(s) are supported and/or enabled. If this is appealing, Apple would like to make a proposal.

Words 82 and 83, Command sets supported were added to the IDENTIFY DEVICE response to address this problem.

#005 To Retry Or Not To Retry?

There are two methods for enabling/disabling retries. The first is via the Set Features command subcommands 33h and 99h). The second is via the Read or Write commands themselves (with or without retries). What is the difference between the two and which has priority? For example, if retries are disabled via Set Features and a Read w/ retries command is issued, will retries be done or not? The implementation is stated as vendor unique, but clearly there must be a set standard.

Retry algorithms in today's magnetic disk drives have become extremely complex and are designed to function with the particular magnetic and electronic components in a particular implementation. As a result, retry mechanisms vary among products from a single vendor as well as among vendors, In many cases these mechanisms cannot be disabled.

SPECIFIC ITEMS

#006 p20 Section 4.3

- In Table 2 replace commas with periods in voltage values for Min and Max (4 places)

This standard complies with international convention, and therefore, what would be designated as a decimal point in the USA is denoted by a comma.

#007 p21 Section 4.3.1

- In Table 4 replace commas with periods in pull-up values for host (2 places)

This standard complies with international convention, and therefore, what would be designated as a decimal point in the USA is denoted by a comma.

- Add note 7 for INTRQ which states "If the host uses a level sensitive interrupt controller a 10K pull down or pull-up, depending upon the level sensed, may be required."

Accepted.

#008 p53 Section 8.1 (Check Power Mode)

- The description has changed from ATA-2. Old text stated if device was in, going to, or recovering from a mode, that mode is returned. New text does not state this and implies a devices going into or recovering from a mode does not have to return that same mode.

Accepted.

#009 p61 Section 8.7 (Identify Device)

- Does not describe a value for Obsolete. It would seem logical the value for an Obsolete field would be zero, but zero in some fields may cause confusion with ATA-2 drivers (see Word 49 below)

Obsolete is intended to indicate that a value is not specified in this standard that was specified in a previous ATA standard. An implementor may wish to place a value specified in a previous ATA standard in this field if compatibility with the previous ATA standard is desired.

- Word 0 - Bit 15 set in ATA-2 meant non-magnetic media. Now means ATAPI. This breaks use with PCMCIA Flash ATA devices which set this bit.

This was done to be compatible with ATAPI devices as currently specified in SFF8020. Since ATA-3 devices and ATAPI SFF8020 devices must coexist on the same physical cable with different device drivers, this compatibility is required. In the case of most if not all PCMCIA PC Card ATA devices today, a unique PCMCIA PC Card ATA aware device driver is used and this PCMCIA PC Card ATA aware device driver will never encounter an ATAPI device.

- Word 47 - A value of 0 in bits 0-7 should be described as "R/W Multiple not supported" instead of Reserved.

If a device declares itself an ATA-3 device, R/W Multiple must be supported.

- Word 49 - Bits 8 and 9 (LBA and DMA supported) are obsolete, but still required in ATA-2 which denote these features are supported. Obsoleting them (by using a zero value) will prohibit ATA-2 drivers from using these features.

Obsolete is intended to indicate that a value is not specified in this standard that was specified in a previous ATA standard. An implementor may wish to place a value specified in a previous ATA standard in this field if compatibility with the previous ATA standard is desired.

- Word 60-61 - In ATA-2 if this value is 0 then LBA was not supported and, therefore, must continue have the same meaning if bit 8 of Word 49 is obsolete.

If a device declares itself an ATA-3 compliant device, LBA must be supported.

#010 p93 Section 8.28 (Set Features)

- This results of this command are too vague in that there is no determination as to whether the command is supported or the parameters are invalid. Furthermore, since all features are vendor unique, how do you know what parameters are expected? Today, all we can do is issue the feature and assume if it succeeds the feature is both supported and enabled. A dangerous assumption! Perhaps we need to add another error value to denote a parameter error. Of course, this means vendors will actually have to check for correct parameters also.

- The definition and implementation of all these commands (even the obsolete ones) are vendor unique. However, the use of these features impact commands defined in the standards (for example Read and Write) which mean the standards themselves must be vendor unique. Why do we even need a standard? We suggest that a minimal definition for each feature which ATA lists, be defined, else remove all features since ATA has no say in the way the affect the rest of the standard.

This is a result of lack of definition in previous versions of the ATA standards. If all vendor specific items were specified, the problem pointed out in item #001 would be made even worse. By defining things as vendor specific at least the reader is made aware that different implementations do exist.

**R. Schnell, D. Pak, R. Roberts
Apple Computer, Inc.**

IBM Corp.:

**From: Dan Colegrove
Subject: Letter Ballot Comments for ATA-3**

ATA-3 Letter Ballot Comments

Requested edits are indicated with "-->".

SECURITY MODE COMMANDS

1. 7.5.1

The 2nd Paragraph should be changed to make it clear that changing the master password has no effect on the locking state of the drive.

without enabling the lock function.

--> without enabling or disabling the lock function.

Accepted.

2. 7.5.2 When a user password is set, the device shall automatically enter lock mode the next time the device is powered-on.

--> When a user password is set, the device shall automatically enter lock mode the next time the device is powered-on or hardware reset.

Accepted.

3. 7.5.3 Security mode operation from power-on

--> Security mode operation from power-on or hardware reset

Accepted.

4. 7.5.4 If the user password is lost and Maximum security level is set, data access shall be impossible. However, the device shall be unlocked using the ERASE UNIT command with the master password to unlock the device and shall erase all user data.

--> If the user password is lost and Maximum security level is set, data access shall be impossible. However, the device shall be unlocked using the SECURITY ERASE UNIT command with the master

password to unlock the device and shall erase all user data.

Same as Quantum 14). Accepted.

5. 7.5.5 Attempt Limit for SECURITY UNLOCK command

The SECURITY UNLOCK command has an attempt limit counter. The purpose of this counter is to defeat repeated trial attacks. After each failed user or master password SECURITY UNLOCK command, the counter is decremented. When the counter value reaches 0 the EXPIRE bit (bit 4) of word 128 in the Identify Device information is set, and the SECURITY UNLOCK and SECURITY UNIT ERASE commands are aborted until the drive is powered off or hardware reset. The EXPIRE bit is cleared after power on or hardware reset. The counter is reset to 5 after a power on or hardware reset.

Accepted.

6. Table 7

CHECK POWER --> CHECK POWER MODE

EXECUTE DEVICE DIGNOSTICS --> EXECUTE DEVICE DIAGNOSTICS
-
FORMET TRACK --> FORMAT TRACK
-

Accepted.

7. Table 9

Word 128 F Security status --> Word 128 V Security status
-

Accepted.

8. 8.7.40.1 <--> 8.7.40.2 (change order)

Accepted.

9. 8.7.40.2 Add sentence: When security mode is disabled, bit 8 is cleared to 0.

Accepted.

10. 8.7.40.6 security is supported.

--> the Security mode feature set is supported.

Accepted.

11. 8.24

DESCRIPTION - Frozen mode is quit by power off.

--> Frozen mode is quit by power off or hardware reset.

Accepted.

12. 8.25

User-High - The lock function shall be enabled from the next power-on.

--> The lock function shall be enabled from the next power-on or hardware reset.

User-Maximum - The lock function shall be enabled from the next power-on.

--> The lock function shall be enabled from the next power-on or hardware reset.

Master-High - This combination shall set a master password but shall not enable the lock function.

--> Remove

Master-Maximum-This combination shall set a master password but shall not enable the lock function.

-->

Master-High or This combination shall set a master password but shall Maximum not enable or disable the lock function. The security

level is not changed.

Accepted.

SMART COMMANDS

The Enable/Disable autosave should be a required SMART command set command. BIOS implementations are dependant on a no error return from Enable/Disable autosave.

In Section 7.6.5 move SMART ENABLE/DISABLE ATTRIBUTE AUTOSAVE to the shall be implemented list.

In Section 8.31.2, Change the Type field to read: If the SMART feature set is implemented, this command shall be implemented.

This comment is very similar to Maxtor #2 and Quantum 23). Accepted.

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Maxtor Corp.:

18 December 1995

Maxtor Corporation comments to accompany Yes vote on X3T10/95-044r0, Approval of forwarding ATA-3, AT Attachment-3 for further processing.

Maxtor #1 - Table 10 - Minor version number - add values for ATA-3 X3T10 2008D revision 6 and revision 7.

This comment is the same as Quantum 18). It is accepted and the following entries shall be added to table 10.

Value	Minor revision
0002h	ATA-1 published, ANSI X3.221-1994
0004h	ATA-2 published, ANSI X3.279-1996
000Ah	ATA-3 published, ANSI X3.***-199x
000Bh	ATA-3 X3T10 2008D revision 6
000Ch	ATA-3 X3T13 2008D revision 7

Maxtor #2 - Clause 8.31.2 SMART ENABLE/DISABLE ATTRIBUTE AUTOSAVE -
Change: TYPE - Optional - SMART Feature set. If the SMART feature set is implemented, this command is optional and not recommended.
To: TYPE - Optional - SMART Feature set. If the SMART feature set is implemented, this command is optional.

See IBM comments, SMART commands

QLogic Corp.:

Message-Id: <199512052141.NAA03581@qlogic.qlc.com>
Date: 5 Dec 1995 13:43:55 -0800

From: "Skip Jones" <sk_jones@qlc.com>
Subject: Reason for No vote
To: John.Lohmeyer@ftcollinsco.ncr.com

To comply with the requirements for a No vote regarding Ballot X3T10/95-044r0, I submit to you the following reasons for my No vote.

I voted No to forward ATA-3 for further processing because I do not believe that it is ready to forward.

During recent sessions of the ATA working groups there has been an "all-of-a-sudden" knee-jerk panic to get this document forwarded. As result of this frantic rush, ATA-3 has been neutered to the point of relative uselessness for the dubious sake of expediency.

Areas that ATA-3 was originally intended to address were pulled out because they were too difficult to define effectively within the ATA committee's self-imposed rushed time schedule. Therefore, the committee has offered-up a comparatively meaningless document which provides the industry with nothing more than what is already available from more mature solutions.

Regards,

Skip Jones,
Marketing Manager
QLogic Corporation

Quantum Corp.:

Date: Wed, 20 Dec 1995 13:43:49 -0800
Message-Id: <0d891be0@cc_smtpgw.qntm.com>
From: mevans@qntm.com (Mark Evans)
Subject: Quantum's comments re: ATA-3 Revision 6
To: "Lohmeyer; John" <JLOHMEYE@cosmpdaero.ftcollinsco.ncr.com>

You should soon be receiving Quantum's letter ballot for X3T10[soon to be 13?]/2008D Revision 6, ATA-3. Since our response to this ballot is "Approve with comments", I'm sending along the following list of comments that Quantum has assembled for consideration by the working group for the document. The list appears long, but almost all of the comments are editorial in nature and may have already been addressed by the document's editor. Non-editorial comments have additional remarks. Each comment references either 1) the page (p #), section (name or s #), paragraph (P #) and line (L #), or 2) the page (p #) and the table, figure or note (t#, f # or n#) in the document where the item occurs. Please call or email me if you have any questions.

1) p 14, Introduction, P 3, L 1 -- "...evolved..." should be changed to "...evolve..."

Accepted.

2) p 16, s 3.1.7, P 1, L 7 -- "...associate..." should be changed to "...associated..."

Accepted.

3) p 23, s 5.2.6, P 1, L 2 -- "...and the host..." should be changed to "...and the device..."

The current statement, "The rising edge of DIOR- latches data at the host and the host shall not act on the data until it is latched." is correct.

4) p 25, f 2 -- "This configuration is not recommended." should be deleted. The two major computer manufacturers who utilize CSEL today have implemented the "not recommended" configuration. They have told us that they feel that their implementation should not be referenced in this manner in an ANSI document.

Accepted.

5) p 31, FUNCTIONAL DESCRIPTION, P 1, L 1 -- "...LBS..." should be changed to "...LBA..."

Accepted.

6) p 32, EFFECT, P 1, L 4 -- "...is..." should be changed to "...are..." to match the subject "...results..."

Accepted.

7) p 33, EFFECT, P 1, L 4 -- "...is..." should be changed to "...are..." to match the subject "...results..."

Accepted.

8) p 40, n 7 -- This note is not clear in its intent and should be reworded.

Same as Seagate 3). Accepted. Change to:

"BIOSs and drivers that sample status as soon as the BSY bit is cleared to zero may not detect the assertion of the CORR bit by the device."

9) p 40, P between Notes 7 and 8 -- "When writing..." should be changed to "After the host has written..."

Accepted.

10) p 42, 7.2, P 2, L 2 -- "...is less than..." should be changed to "...is less than or equal to..."

Accepted.

11) p 42, 7.2, P 2, L 7 -- "...is less than..." should be changed to "...is less than or equal to..."

Accepted.

12) p 42, 7.2, P 7, L1 -- "...support shall be supported by..." should be changed to "...addressing methods shall be supported by..."

Accepted.

13) p 44, 7.3.4, P 1, L 2 -- "...in vendor..." should be changed to "...in a vendor..."

Accepted.

14) p 46, 7.5.4, P 2, L 2 -- "...the ERASE..." should be changed to "...the SECURITY ERASE..."

See IBM 4.

15) p 58, DESCRIPTION e), P 1, L 4 -- "...Register, else..." should be changed to "...Register, or else..."

Accepted.

16) p 58, DESCRIPTION f) -- The formatting for this paragraph should be made like the other subsections in this group.

Accepted.

17) p 65, 8.7.2, P 1, L 2 -- "...16 383..." should be changed to "...16 384..."

See table B.1. Not accepted.

18) p 69, t 10 -- This table needs to be updated to include the latest minor version numbers.

See Maxtor #1.

19) p 74, INPUTS, P 1, L 2 -- "...which..." should be deleted.

Accepted.

20) p 79, PREREQUISITES, P 1, L 3 -- "...write..." should be changed to "...WRITE..."

Accepted.

21) p 79, PREREQUISITES, P 1, L 3 & 4 -- The requirement for WRITE LONG preceding READ LONG should be clarified. Some applications for READ LONG would not want to have this command preceded by a WRITE LONG. If a user wanted to test a device's error correction he might perform a READ LONG, then intentionally corrupt data, and then perform a WRITE LONG. In fact, performing a WRITE LONG before a READ LONG could irretrievably corrupt data if the bytes transferred after the 512 data bytes were indeterminate.

?

22) p 94, 8.28.2, P 2, L 1 -- "...thisstandard..." should be changed to "...this standard..."

Accepted.

23) p 100, TYPE, P 1, L 1 & 2 -- "...is optional and not recommended." should be changed to "...shall be implemented." This is based on an agreement made by the S.M.A.R.T. Working Group.

See IBM comments, SMART COMMANDS.

24) p 100, DESCRIPTION, P 1, L 1 -- "...optional..." should be deleted (see 23 above)

See IBM comments, SMART COMMANDS.

25) p 100, DESCRIPTION, P 5 -- This paragraph should be deleted (see 23 above)

SMART commands are still optional. Not accepted.

26) p 105, DESCRIPTION, P 3, L 1 -- "...therefore, number..." should be changed to "...therefore, the number..."

Accepted.

27) p 135, 10.1, P 1, L 1 -- "...controller..." should be changed to "...device..."

Accepted.

28) p 149, B.2.3, P 1, L1 -- "...drives..." should be changed to "...devices..."

Accepted.

Milligan (Seagate):

To: "john.lohmeyer" <john.lohmeyer@symbios.com>
From: Gene Milligan <Gene_Milligan@notes.seagate.com>
Date: 3 Jan 96 8:11:42
Subject: GEM's ATA-3 LB Comments

GEM ATA-3 Letter Ballot Comments

The following comments accompany my YES ballot. They are all editorial.

1) With the formation of X3T13 the committee citing should be adjusted on the cover page and elsewhere to give full credit to X3T10 for the development of the ATA-3 and to vector follow up activity to the new ATA Attachment Technical Committee X3T13.

Accepted. The next revision of the document shall have new frontmatter in compliance with publishing requirements.

2) The patent statement has been useful information for the committee participants. However now that the ATA-3 is being forwarded, the patent statement should be replaced with the standard X3 patent statement for the case where patent claims have been made and offered in accordance with the ANSI patent policy. In particular the specific citing of claims should be removed.

I recognize that X3T11 has left such statements in some of their forwarded standards. But this is inappropriate since the committee should not take any position on the validity of the claims made.

The editor believes the current wording is correct although the location of the patent disclaimer will change when the frontmatter is corrected.

2) I think the ad hoc recommended, and even if they didnt I think, that the definition of optional should be moved from 3.1.13 to the Keywords clause 3.2.1.

Accepted.

3) It seems difficult to parse Note 7. I suggest changing it to Detection of the CORR bit, asserted by the device while the BSY bit is cleared to zero, is not certain for BIOS and drivers that sample status as soon as the BSY bit is cleared to zero. (It would be nice to replace BIOS with the plural of BIOS.)

See Quantum 8).

4) In table 9, word 128, bit 4 is inadvertently duplicated.

Accepted.

5) In 8.36 change The host shall a shall use PIO mode 0 ... to The host shall use PIO mode 0

Accepted.

Gene Milligan

Western Digital:

October 13, 1997

**Mr. John Lohmeyer
Chairman X3T10
1635 Aeroplaza Dr.
Colorado Springs, CO 80916**

Mr. Chairman

In conjunction with Western Digital's Yes vote on ATA-3 (2008) we would like to make the following comment.

Western Digital considers the detailed command description provided for the set SMART thresholds sub-command to be misleading. The note indicating that this command may be eliminated in the future does not address the fact that changing these thresholds may permanently destroy user data or render the device unusable in some network configurations.

Unlike the other SMART sub-commands the set thresholds sub-command is in reality a vendor specific command used for manufacturing. Western Digital is proposing that all detail except the command name and opcode be removed from ATA-3. Western Digital would also like to propose that this opcode be made Vendor Specific.

Please feel free to contact me if you have any questions or comments.

Sincerely,
Western Digital Corporation

Tom Hanan
Principal Engineer
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