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To: Membership of X3T13
From: Lawrence J. Lamers, Secretary X3T13
Gene Milligan, Chair X3T13 (acting)
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Subject: Minutes of X3T13 Working Group
July 31 - August 1, 1996 : San Jose, CA

Agenda

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*Operating under the procedures of The American National Standards Institute.

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- 10. New Business
 - 10.1 SFF Option Pins [] ()
 - 10.2 Anti Redundancy [] ()
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 - 10.4 SFF 3-inch [] ()
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Results of Meeting

1. Opening Remarks

Gene Milligan called the meeting to order at 9:00 a.m., Wednesday May 24, 1996. He thanked Marc Noblitt of Seagate for hosting the meeting.

The Chair requested that Larry Lamers take the minutes for this meeting and thanked him for agreeing to the request.

As is customary, the people attending introduced themselves. A copy of the attendance list was circulated for attendance and corrections.

It was stated that the meeting had been authorized by X3T13 and would be conducted under the X3 rules. Ad hoc meetings take no final actions, but prepare recommendations for approval by the X3 Technical committee. The voting rules for the meeting are those of the parent committee, X3T13. For the ad hoc, other than straw votes, the voting rules are: one vote per participating company.

Gene Milligan informed the attendees that, if appointed Chair of X3T13 by X3, he preferred to be a "Non-voting Chair" with another Seagate employee functioning as the voting member. He indicated the motivation was to facilitate an attempt to Chair the meetings without bias to specific factions positions. However even in this mode he would reserve the right to cast a vote in the event there were no Seagate representatives present. In order to preserve a basis for volunteering for Chair he intends to remain the Principal member for Seagate until X3 has appointed a Chair for X3T13. Gene asked if there were objections to this concept. Since there were none, he requested that Marc Noblitt cast any votes as the Seagate representative if votes were needed during this ad hoc meeting.

The minutes of this meeting will be posted to the X3T13 and the ATA Reflector and will be included in the next X3T13 committee mailing.

2. Approval of Agenda

The electronically distributed agenda was used as a basis for the meeting with adjustments as reflected in these minutes.

3. Attendance

Attendance at working group meetings does not count toward minimum attendance requirements for X3T13 membership. Working group meetings are open to any person or company to attend and to express their opinion on the subjects being discussed.

Richard	Kalish	Adaptec, Inc.	P
Ron	Roberts	Apple Computer	A
Joe	Chen	Cirrus Logic Inc.	P
Hale	Landis	Consultant	P
Paul	Raikunen	Digital	P
I. Dal	Allan	ENDL	P
Robert	Liu	Fujitsu Computer Products	P
Kazuo	Nakashima	Fujitsu Computer Products	G
Tony	Goodfellow	GSI	P
Dan	Colegrove	IBM Corp.	P
Duncan	Penman	IIX Consulting	P
Ron	Stephens	Iomega Corp.	G
Pete	McLean	Maxtor Corp.	P
Robert	Griffith	Oak Technology	A
Jauher	Zaidi	Palmchip Corp.	G
Curtis	Stevens	Phoenix Technologies	P
Mark	Evans	Quantum Corp.	P
Kenichi	Kojima	Sanyo Electric Co. Ltd	P
Gene	Milligan	Seagate Technology	CH
Marc	Noblitt	Seagate Technology	P
Yogi	Schaffner	Silicon Systems	P
Patrick	Mercer	SyQuest Technology Corp.	A
David	Evans	Symbios Logic	G
Mike	Winchell	Symbios Logic	G
Tokuyuki	Totani	Toshiba America Inf.	P
Tom	Hanan	Western Digital Corp.	P
Devon	Worrell	Western Digital Corp.	A1
Andrew	Shu	Samsung, SISA	G

4. Document Distribution

The following documents were distributed:

- Proposal for X3T13 1153D ATA/ATAPI-4 Rev 5 [McLean]
- D96114R0 Proposal for removing redundant information [McLean]
- D96142R3 Proposal to Modify the Reset Protocol in ATA/ATAPI-4 [Evans]
- D96103R1 Feature Status Reporting [McLean]
- D96116R0 Editor's omission in ATA-3 (X3T13/D2008r7) [McLean]
- X3T13 Document Register
- D96104R6 ATA Overlap Proposal [McLean]

Pete McLean noted that he provided a copy of the current document register and plans to do this at future meetings.

5. Review of Old Action Items

There were no open action items.

6. ATA-2 - Project 0948-D [Larry Lamers]

X3 letter ballot passed 21:0:1:1.

7. ATA-3 - Project 2008-D Status

Pete McLean reported that the 8-bit data transfers had been omitted and need to be included. Pete proposed adding a clause to deal with the 8-bit register transfers (see D96116r0). Public review closes September 17, 1996. Pete will submit this as a public review comment from the Technical Editor noting that it is an omission. The chairman will take a vote to pre-approve the comment resolution.

Gene Milligan intends to prepare a press release for distribution to advise the folks who have purchased the document of the above item.

The ANSI editor's pre-edit comments have been received and reviewed by Pete. On one item Pete asked for guidance - the asterisk associated with signal orientation in 10.2. Pete will remove the asterisk to avoid confusion.

8. ATA-4 - Project 1153D**8.1 Project 1153D proposed draft**

Pete advised that due to the short time before the next meeting a revision of the document may not be available before the meeting.

The working group recommended that 1153 rev 5 be designated as the working document.

8.2 Interrupts for READ/WRITE Sectors and DMA [] ()

At the prior ad hoc meeting, a request was made to check the protocol vis-à-vis the interrupts for READ/WRITE Sectors and DMA. The group was not prepared to discuss this issue at this meeting.

8.3 DSC bit Usage [] ()

At the prior ad hoc meeting, a request was made to check the DSC bit usage - claim that software checks values not bits in registers so what should DSC be for all commands. The group was not prepared to discuss this issue at this meeting.

9. Old Business**9.1 Enhanced BIOS Disk Drive Technical Report [Stevens] (D96139r0)**

The technical work is complete, however a sanitization is needed. Hale Landis noted that he believes that some vagaries exist that need clarification. Curtis Stevens responded that the purpose of the report was to document current practice and that resolution of open issues was beyond the scope of the report. (Chairman's note: If there are issues, they should be identified and a determination made as to how the issues should be discharged.)

9.2 Interrupt Glitches (Determination) [Stevens] ()

Due to issues with the Index bit (not available for firmware control in some designs), Curtis Stevens will submit his proposal with the DSC bit.

9.3 Adding feature status to IDENTIFY DEVICE[McLean] (D96103r1)

Pete McLean reviewed his proposal for a new IDENTIFY DEVICE, IDENTIFY DEVICE DMA, and IDENTIFY PACKET DEVICE responses. The proposal would add information to word 82, 85, 86, and 87 to allow a host to know the currently enabled options and those that would be enabled following reset.

9.4 Strong Command Overlap and Command Queuing [McLean] (D96104r6)

Mark Evans moved and Mark Noblitt seconded that X3T13 stop work on D96104, command overlap and command queuing. The motion failed 10:10:0.

Mark stated that the merit and implementability of this proposal has been questioned for over a year; all reflector responses received have not supported command overlap and queuing.

Devon stated that it is his belief that the shared interrupts portion is the only contentious part. He further stated that Microsoft has indicated that command overlap and queuing is a requirement for DVD peripherals and if T13 doesn't address it then the ATAPI DVD working group will define it. Devon still is advocating a proxy interrupt approach that he believes does not require hardware changes.

Hale Landis noted that deadlock situations requiring the host to reset the bus exist in the proposals and a great deal of work will be required to get it right. He states that there are no cost or performance benefits to doing overlap or queuing.

David Evans proposed an amendment to request a liaison to the DVD group be established and that person should bring in a defined set of requirements for their needs. Not accepted.

Ron Stevens of Iomega noted that there are lots of problems with slave devices, soft reset, mixing SFF-8020 devices and ATA devices. He felt that letting the DVD group decide the overlap and queuing is not good since it will invariably lead to more problems on the cable.

Pete McLean moved and Ron Roberts seconded that the working group affirm their commitment to shared interrupts as defined in D96104r6. Replaced by amendment.

Ron Roberts noted that internal discussions at Apple are divided over whether or not command overlap and queuing should be supported.

Devon requested an amendment that would remove the shared interrupts. Not accepted.

Dal Allan offered a friendly amendment that shared interrupts be removed from D96104 and proposals be solicited for replacements. Accepted.

Devon - interrupts at the device are turned off during data transfers by the driver (see X3T10/95-258).

Pete requested that the proposals be specific and that the changes to D96104 be defined.

As amended, Pete McLean moved and Ron Roberts seconded that shared interrupts be removed from D96104 and proposals be solicited for replacements. The motion carried 16:4.

Mark Evans moved and Marc Noblitt seconded that references to IDENTIFY DEVICE, READ DMA OVERLAP and WRITE DMA OVERLAP be removed. After discussion the motion was withdrawn.

9.5 Cache Flush [Roberts] (D96106r2)

Ron Roberts stated that the agreement reached at the last working group was acceptable. He presented a document with this agreement. However, some subfunctions were still included, the group did not want this. Ron stated that Apple wants to control the cache without using a SET FEATURES command.

Over Ron's objection the working group modified the proposal to remove sub commands and recommended it for incorporation into ATA-4.

Tom Hanan moved and Marc Noblitt seconded that the revised proposal (D96106r3) be recommended for incorporation into ATA-4. The motion carried 10:3. (The impact of the modification is that SET FEATURES is

used to enable or disable write caching and the new command is used to cause the cache to be flushed with positive feedback to the host of the completion of the flush.)

9.6 ATA Cable Issues and Definitions [Evans] ()

Mark Evans stated that terminator test cables were distributed. No-one had any test results to discuss.

9.7 Core Command Set [Stevens] (D96135r0)

Curtis Stevens has not completed the proposal.

9.8 Reset Proposal [Evans] (D96142r3)

Mark Evans reviewed the latest revision of the reset proposal.

Add restart at step b) to 9.1.1.

Questions about the sequence; some events may occur out of sequence. Suggested to pick up Pete McLean's timing diagram out of D96114r0. Request to modify it to show in/out/sampling states. Add part on interpreting signals and bits to conventions section.

A recommendation on handling the SRST bit to avoid deadlocks with a device. Soft reset ignored during hard reset and ignored as to ending state.

Effect of migrating to and from sleep needs some wording work - assigned to Pete, Devon and Mark.

Mark proposed removing the 31 second maximum and require that the sampling be done by 450 ms for DASP. This agrees with the statement in ATA-1 that the master can drive DASP for an LED after 450 ms. Step f) will be drafted to reflect this.

Mark's proposal indicates that many current drives configured as slave devices assert DASP and never release it. This loses the interlock with PDIAG. This also implies that a minimum time for deassertion of PDIAG is needed.

Mark and Marc to investigate the 'safe' timing for leaving DASP asserted.

Devon defines the reset sequences as power-on reset, hardware reset (i.e., RESET-), software reset (i.e. SRST reset), and device reset. The reset labels need to be improved to be less confusing. Each description will cover the sequence for all types of devices with the ATA and ATAPI differences noted.

Label	Dev 0	Dev 1	Both Devices	Abort Commands	
Power-on Reset			tbd		
Hardware Reset (RESET-)			Y	y	
Software Reset (SRST)			Y	see tables below	
Device Reset	if selected	if selected	n	y	

? what happens if the power-on sequencing is not consistent for all devices on the bus.

for ATAPI Devices

DEV	BSY	DRQ	Result	Defaults
y	x	1	Set BSY, commands in process are terminated, clear queue, stop data transfer, post ATAPI signature, performs PDIAG sequence, clear BSY	Do not
y	1	x		revert
y	0	0	Set BSY, post ATAPI signature, performs PDIAG sequence, clear BSY	Do not
n	x	x		revert

for ATA Devices

DEV	BSY	DRQ	Result	Defaults
y	x	x	Set BSY, commands in process are terminated, stop data transfer, perform PDIAG sequence, clear BSY	Reverts
n	x	x		

Note: The results of commands that are terminated by a Software Reset are indeterminate.

Consider recommendation that Software Reset not be used in future systems - use Device Reset. The effect of a Device Reset on sleep mode needs to be thought through.

For non-packet devices (i.e., ATA) Software Reset takes precedence over Device Reset.

Specify maximum time to set DRDY of 30 secs after BSY cleared.

9.9 Items from the Open Issues List [] ()

9.9.1 Removable device feature set needs further work

Tom Hanan noted that there is a SFF specification that will be polled for acceptance dealing with removable features. It uses reserved fields to define added functions. Need statement from Devon on feature set support for packet vs. non-packet devices.

9.9.2 33 Megaword transfers

No business.

9.9.3 Shielding

No business.

9.9.4 Termination

No business.

9.9.5 Grounding

No business.

9.9.6 Is IORdy open collector or tri-state?

Pete will change the text to match the table.

9.9.7 Behavior of a device when a reset is received.

See item 9.8.

9.9.8 Should power management be mandatory?

Consensus that power management is required but that only one form is to be used (ATA or packet).

9.10 X3T13 Reflector, ftp, and Web Site Setup [Hanan]

The <http://www.X3T13.com> is operational. The reflector is x3t13@dt.wdc.com.

10. New Business**10.1 SFF Option Pins [] ()**

In a straw poll, DEV0, DEV1, CSEL garner support. The other functions did not get broad support. It is desirable to strive for one definition; however there are three proposals for this, each with an intractable supporter. Tom Hanan emphasized that his proposal (less the hard drive specific items) is implemented that way on all ATAPI CDROMS.

Ron Roberts moved and Tom Hanan seconded that the option pins not be defined in ATA. The motion failed 4:11. Near the end of the discussion the various proponents indicated that they may be able to make changes to garner a universal solution. They all agreed to check avenues for agreement before the next meeting.

10.2 Anti Redundancy [McLean] (D96114r0)

Home work - review and be prepared for the next working group.

10.3 Security Erase [Colegrove] ()

Dan Colegrove received direction and will generate a proposal and post it to the reflector. The idea is to couple the function with the security feature to provide protection against virus attacks.

10.4 Annex E [] ()

Hale Landis pointed out that moving certain tables to the annex eliminated the explicit definition of illegal codes from the Normative portion of ATA/ATAPI-4. Pete McLean will add verbiage on the invalid cases to the body of the document.

10.5 DVD Copy Protection [] ()

The X3 OMC has decided to have an ad-hoc meeting to determine what if anything the X3 committees ought to do regarding DVD copy protection. They plan to have a recommendation by 9/96.

11. Call for Patents

This is a regular agenda item to identify any potential patent issues with developing standards.

A document is available from ANSI, "Procedures for the Development and Coordination of American National Standards", at no charge. Annex I contains the ANSI patent policy.

The Chair requested that any participant aware of patents or patent disclosures that may be required to comply with any publications resulting from X3T13 projects provide an early disclosure of such patent and offer to license such patents under reasonable and non-discriminatory conditions in accordance with the ANSI Patent Policy. No additional patents were identified by the attendees in response to this call.

12. Open Issues List Summary

The following items were added to the list at this meeting:

- 1) Have silicon providers see if the 400 nS delay before reading the status register is needed.
- 2) Mark's item 36 of D96142r3 still needs to be researched because of portable cache flushing situations.
- 3) Consider recommendation that Software Reset not be used in future systems - use Device Reset
- 4) Does Device Reset cause the device to come out of sleep mode.

13. Review of New Action Items

- 51) Everyone check the protocol vis-à-vis the interrupts for READ/WRITE Sectors and DMA.

- 52) Everyone to check on usage of DSC bit and determine which values result for each command.
- 53) Regarding note 9 in Mark Evan's proposal D96142r3 folks should check if the 5 microsecond requirement is needed for coming out of sleep mode.

14. Meeting Schedule

The next plenary meeting of X3T13 will be October 25, 1996 at the Sheraton Princess Kaiulani Hotel, in Honolulu, HI, hosted by Quantum. For reservations call 808-922-5811.

The next working group meeting will be August 21-23, 1996 at the Seagate facility in San Jose, CA hosted by Seagate.

The subsequent working meeting will be September 25-27, 1996 at the Windsor Hotel hosted by Phoenix Technologies.

15. Adjournment

The meeting was adjourned upon completion of all the agenda items.