Accredited Standards Committee[*]
X3, Information Processing Systems

To: **Membership of X3T10**

From: **Lamers/Milligan**

Subject:Minutes of X3T10 ATA Working Group - April 12-14, 1995

Agenda

1. Opening Remarks

Gene Milligan convened the meeting at 9:30 AM. He thanked Pete McLean of Maxtor for hosting the meeting. He also requested that Larry Lamers take the minutes and thanked him for accepting 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 X3T10 and would be conducted under the X3 rules. Ad hoc meetings take no final actions, but prepare recommendations for approval by the X3T10 task group. The voting rules for the meeting are those of the parent committee, X3T10. For the ad hoc, other than straw votes, the voting rules are: one vote per participating company.

The minutes of this meeting will be posted to the X3T10 BBS and the ATA Reflector and will be included in the next X3T10 committee mailing.

Gene announced that the ATAPI project had been approved as project 1120D.

2.   Attendance and Membership, Introductions

Attendance at working group meetings does not count toward minimum attendance requirements for X3T10 membership. Working group meetings are open to any person or company to attend and to express their opinion on the subjects being discussed.

The following people attended the meeting.

Name	Company	Telephone	Email
Mr. Lawrence J. Lamers	Adaptec, Inc.	408-957-7817	ljlamers@aol.com
Mr. Richard Kalish	Adaptec, Inc.	408-957-7169	rkalish@corp.adaptec.com
Mr. Ian Davies	Cirrus Logic	303-466-5228	iand@cirrus.com
Mr. Joe Chen	Cirrus Logic Inc.	510-226-2101	chen@cirrus.com
Mr. Jon Haines	Conner Peripherals	303-682-8460	jon.haines@conner.com
Mr. Marc Noblitt	Conner Peripherals	303-682-8408	marc.noblitt@conner.com
Mr. Hale Landis	Consultant	303-548-0567	landis@sugs.tware.com
Mr. Kevin Calvert	Future Domain Corp.	714-253-0522	kevinc@fdc.mhs.compuserve.com
Mr. Mark Shipman	Intel Corp.	503-696-2318	mark-shipman@ccm2.hf.intel.com
Mr. Dan Colegrove	IBM Corp.	507-286-5558	colegrove@vnet.ibm.com
Mr. Pete McLean	Maxtor Corp.	303-678-2149	pete_mclean@maxtor.com
Mr. Chris D'Iorio	NEC	708-238-7794	cd-iorio@nectech.com
Mr. Ted Fujioka	Panasonic MKE	408-945-5606	100207.2272@compuserve.com
Mr. Curtis E. Stevens	Phoenix Technologies	714-440-8330	curtis_stevens@bannet.ptltd.com
Mr. James McGrath	Quantum Corp.	408-894-4504	jmcgrath@qntm.com
Mr. Gene Milligan	Seagate Technology	405-324-3070	Gene_Milligan@notes.seagate.com
Mr. Ron Werbow	Seagate Technology	805-582-3815	ron_werbow@notes.seagate.com
Mr. Stephen G. Finch	Silicon Systems, Inc.	714-573-6808	5723283@mcimail.com
Mr. Mike Yokoyama	Sony Electronics, Inc.	408-955-4344	masayuki@cppc.sel.sony.com
Mr. Devon Worrell	Western Digital Corp.	714-932-7042	worrell@dt.wdc.com
Mr. Tom Hanan	Western Digital Corp.	714-932-7472	hanan_t@a1.wdc.com

3. Document Distribution

SFF-8020 ATA Packet Interface for CD-ROMs
Pete McLean 95-194r0 on Command Overlap

4. Approval of Agenda

The agenda was approved as presented.

5. Review of Action Items

7)   Jeff Rabbe to check to see if Intel will release for open control the definitions presently published in SFF 8038 by 2/15/95. Jeff requested and has been given information on the ANSI Patent Policy. Carried over.

8)   Devin Worrell to add appropriate specificity to the interaction of command overlap and power modes by 2/15/95. Carried over.

9)   Devin Worrell to adjust the overlap and queuing proposal according to the results of the 1/26/95 meeting and in particular to recast it in specification format suitable for detailed technical review and, if accepted, to have portions or the entire proposal integrated into the ATA Working Draft 2/15/95. Carried over.

15)   Tom Hanan to develop a project schedule for ATAPI. Completed in the course of this meeting.

6. ATA-2 Items

See 11.3.

7. ATA-3 Items

7.1 Informational Exception Condition (IEC) Reporting [Colegrove]

Tom Hanan stated that he believes the IEC reporting will be used primarily in networks and scanned for once per day. If an IEC condition is indicated the network would then automatically backup the work station data and disable the drive pending replacement.

Jim McGrath reported that a proposal on predicting drive failures based on an industry initiative is expected to be presented at the next meeting. His intent is to process this as an SFF informational document (not subject to revision).

Jim McGrath objects to the use of the CORR bit. He requested a command/status protocol to get the information. Curtis Stevens responded that a bit is preferable since new commands are difficult for BIOSs to support.

Gene Milligan suggested that since a SET FEATURES is used to enable reporting then the error register could be used since only software that expected the "error" would enable the reporting. Dan Colegrove will look into this.

It was suggested that bit 7 of the error register be used to indicate encoded values to report IEC. Everyone is enjoined to investigate the impact of this for a decision at the next meeting.

7.2 Version Indication [Milligan]

Gene Milligan presented a modification of the IDENTIFY DRIVE data for version reporting. Words 71-73 are defined. Tom requested that the nibble encoding of revision report be put back in.

The question of when the data is valid was brought up. Jim McGrath indicated that the wording around the variable fields to indicate that it may change due to being stored on the media.

Gene will generate a revised proposal (see 95-154).

7.3 Dynamic Power Selection [McGrath]

See revision 1 of X3T10/95-125. Tom Hanan stated that existing implementations do not change the power selection when soft reset occurs. Jim incorporated this change in revision 2. Several editorial changes were suggested and incorporated into revision 2.

Jim McGrath moved and Pete McLean seconded that 95-125r2 be accepted for incorporation into ATA-3. The motion carried 7:0.

7.4 Working Draft Status [McLean]

Pete reviewed the list of items for inclusion in ATA-3 rev 1. Change bars will be used to indicate changes from rev 0 to rev 1.

7.5 Transceiver Requirements [Patton]

Tom Hanan reported that impedance and slew rate models are completed. Now have 5 models of the wave forms on the ATA cable:

        Simulation 1 based on variable reactance - based on placement of cable in chassis.
        Simulation 2 based on time delay for signal propagation.
        Simulation 3 based on impedance matching to match output driver to cable impedance.
        Simulation 4 based on cross-coupling of signals in cable.
        Simulation 5 based on hysterisis of input receivers.

All these influence the signal integrity. A proposal that illustrates the results of the simulation and poses the issues is being developed. Lowering the driver current and changing to CMOS input receiver levels are possible approaches for systems at or above 16.6 MB/sec. Specifically for ATA-3 the suggestion is to lower the minimum driver current from 12 ma to 4 ma.

Tom Hanan moved and Jim McGrath seconded that X3T10/95-199r0 be accepted for incorporation into ATA-3. The motion carried 6:0.

Steve Finch asked if slew rate limit control is still needed with the lower current drivers. It may not be necessary to do this but it is not a disadvantage to continue to control the slew rate. (With the lower value of current the slew rate may be achieved due to loading characteristics.)

The transconductance curve is important for the driver according to Tom.

7.6 DRDY Max Set Time [Colegrove]

Dan Colegrove reviewed the points he had brought up in prior meetings about the time systems are allowing for drives to respond. The 2 minute time-out for DRDY (used to be unlimited) should be reduced to 30 sec after the BSY bit goes false.

Dan Colegrove moved and Tom Hanan seconded that the 2 minute recommendation be changed to 30 sec in clause 9.1.1 item j of ATA-3 rev 0. The motion carried 9:1.

It was pointed out that 9.1.2, item k; 9.2.1 item I; 9.2.2 item j, are also affected by this motion.

7.7 DASP Timing Diagram [Landis]

Hale Landis moved and Steve Finch seconded that clause 10.6 be deleted from ATA-3. The motion carried unanimously.

8. Beyond ATA-3

8.1 Strong Command Overlap and Command Queuing

Pete McLean presented a proposal (see 95-194r0) on Command Overlap.   A signal is needed to perform the 'drive selection' 'arbitration' function. It was suggested CS0 and CS1 be used in combination to do this. The signals need to be qualified by DIOW and DIOR. IOCS 16 will be used for interrupt. Pete pointed out that there is a timing issue with DREQ during DMA transfers that needs to be addressed. This is an issue with arbitration on the host bus that needs to be synchronized.

Jim McGrath argued for extending the registers to 16-bits to provide for a queue tag in the command and status registers. This suggestion needs to be examined with regard to Intel PCI bus mastering.

Tom Hanan reported that the editors of SFF 8020 had already included command overlap according to the Western Digital proposal in the SFF ATAPI specification.

Jim McGrath moved and Rick Kalish seconded that the ATA working group requests that the SFF ATAPI should not incorporate features for strong overlap and command queuing into SFF-8020 because these will be defined within X3T10. The motion carried 10:0.

After a discussion of concern over attendees not being present for both ATAPI and ATA issues, Curtis Stevens moved and Steve Finch seconded that the agenda for future ATA meetings be unified, gap times be removed, and agenda order can be reordered at the start of the meeting. The motion carried unanimously.

8.2 GT 16.6 MB [Chen]

No business.

8.3 IDENTIFY DRIVE data in support of host requirements [Penman]

The chair read an EMAIL from Duncan Penman. This item is temporarily withdrawn. Curtis Stevens requested an item be added to the next meeting agenda for Boot Engineering Extension Record (BEER).

8.4 28 bits [Stevens]

Curtis reported that 2**64 sectors of addressing are in the IBM int 13 extensions. The current 28-bit addressing will hit the wall within 8 years at the present capacity rate. The sixteen-bit register extensions should be architected to allow for at least another 8 bits of addressing. Pete McLean agreed to incorporate this architecture into his command overlap proposal.

9. Old Business

9.1 Multiple Connector ATA Implementations [McGrath]

Jim McGrath stated that the latest version of this document was distributed at Win Hec. It is currently being balloted as an SFF item.

The working group agreed to carry this as a discussion item and look for a way to incorporate a 'y' cable implementation into a future ATA document. This allows a shared signal configuration.

9.2 EDDS revision status [Stevens]

Curtis Stevens reported that the document will move beyond the preliminary state in the near future.

9.3 ATA Lite [Landis]

Withdrawn for now.

9.4 CS0, CS1 [Masiewicz]

This agenda item dropped.

9.5 Set Multiple [Landis]

Hale Landis stated that the SET MULTIPLE command should be removed as a requirement before being able to use READ MULTIPLE and WRITE MULTIPLE. To prevent applications from changing the multiple value and potentially causing problems this really needs to be a fixed value optimized for the drive characteristics.

Curtis Stevens pointed out that not being able to adjust the multiple causes a serious backward compatibility issue.

Ron Werbow moved and Tom Hanan seconded that the drive be allowed to enable its default optimum set multiple value at power on without the issuance of a SET MULTIPLE command for incorporation into ATA-3. The motion carried 12:0. See document X3T10/95-200r0 for details.

A lot of discussion followed on the usage and potential problems with set multiple. Curtis stated that tuning the multiple value does have a significant effect on system performance depending on what an application is doing. Gene Milligan stated that he will request input from SI group on this topic.

Hale Landis moved and Curtis Stevens seconded that discussion on this subject be terminated. The motion carried unanimously.

10. New Business

10.1 ID Word 53 Comment

This should not be an issue for ATA-3 drives. The word 'may' should be 'are not'.

10.2 Drive detection

There is a problem with detecting non-existent drives when the signals are floating. A lite pull-down on the BSY signal in the host can solve this problem. This will be considered for ATA-3. (Chairman's Note: The minutes are accurate but we were not. Since BSY is a bit and not a signal, what did we really mean?)

10.3 Quantum Email questions

Clause 8.17 of ATA-2 rev 3 regarding READ DMA - should the statement regarding the sector in error not be transferred, per ATA-1, be included? The answer is no since the error may be detected after the sector is transferred.

In clause 9.6 the question has the same answer.

In clause 8.19 regarding READ MULTIPLE on reporting the sector address of the error. There is an extraneous carriage return between paragraph 13 and 14 that should be removed during the editorial process.

10.4 Review of ATA-3 schedule

The schedule approved in 10/94 called for a letter ballot to forward in 11/95. The group is on track to make this happen. For the record the schedule approved then was:

> Proposal "cut off" January 1995 (later items slated for ATA-4)
> Preliminary description of proposed items by 11/10/94
> Consensus on approach and acceptance of a working document by March 1995.
> Solidify the dpANS by July 1995.
> Final edit by September 1995.
> Initiate Letter Ballot for forwarding by November 1995.

11. ATAPI Items

11.1 SFF Contributions

See 11.5.

11.2 QIC Contributions

No business.

11.3 ATA Software Programming Interface (ATASPI)

This work will be conducted in the System Issues group. This item will be deleted from future agendas.

11.4 ATAPI Plan and Schedule

Based upon Tom Hanan's estimation of the time required and available to generate the first draft, the working group agreed to the following project schedule:

> Conversion of ATAPI SFF 8020 and review of the initial draft for 1120 -   6/21/95
> Accept a 1120 working document   -   7/13/95
> Cutoff new proposals for 1120   -   7/13/95
> Vote for forwarding of 1120 to X3   -   11/95

This schedule would synchronize ATAPI 1120 and ATA-3 2008. Pete McLean cautioned that if significant items were moved from ATAPI to ATA-3 as late as 7/13, it could jeopardize the 11/95 forwarding date for ATA-3.

11.5 Division of SFF-8020 into ATA-3 and ATAPI

Tom Hanan led a discussion on what parts of SFF-8020 should constitute the ATAPI working draft. Several sections are being pulled in that have known issues. These will be resolved when reviewing the revision 0 document.

A discussion on weak overlap and proxy overlap occurred. How these should be disposed of is a key issue. Tom Hanan will attempt an electronic poll using the ATA reflector on this issue to determine which documents should define the items. The three items for the poll are: ATAPI release service; ATAPI proxy interrupt; ATAPI interleaved DMA.

The Group Decided To Include the following SFF8020R2.2 sections in X3T10/1120:

> 1.5   Scope
>   - Roll into ATA-3 Boiler Plate

> 3.0   Conventions
>   - Roll into ATA-3 Boiler Plate

> 4.0   ATAPI Overview
>   - Roll generic items into Introduction

- Change this section to "ATAPI Model"
- Pull in Model items from section 5.0

5.0   ATAPI Protocol
Two section 5.0 Items were controversial enough to cause the group to request a straw poll via the reflector to decide if they should be included in X3T10/1120. (Proxy IRQ, Interleaved DMA)

6.0   ATAPI Transport Mechanism

10.0   Physical Interface
- Place in annex until a better place is found.

Annex BConnectors
- Place in Annex until a better place is found.

11.6 Other ATAPI

Hale Landis reviewed an EMAIL he had posted a few weeks ago. Most of these are editorial and were accepted by Tom. There is an issue with the behavior of a device when an existing command is interrupted with another command.

The question of how to coordinate the QIC-157, SFF-8020, and ATAPI working drafts was discussed. It is expected that future updates will occur as part of the X3T10 ATA, ATAPI and MMC projects.

12. Call for Patents

Gene Milligan requested that anyone aware of any patents required for the proposals be disclosed early in accordance with the ANSI patent policy.

As noted in prior minutes the Secure Mode proposal involves patents by Maxtor and IBM. The cited patents have been offered under the ANSI patent policy.

13. Action Items

16)   Tom Hanan to provide the maxpower specification developed internally for 1.8-inch power management.
17)   Gene Milligan to request input from SI group on set multiple usage.
18)   Pete McLean to prepare revision 1 of ATA-3.
19)   Tom Hanan to prepare revision 0 of ATAPI (X3T10/1120)
20)   Gene Milligan add to the May agenda Boot Engineering Extension Record (BEER).

14. Meeting Schedule

May 10-11, 1995 in Harrisburg, PA. in conjunction with X3T10.
Jun 21-22, 1995 at the Crown Sterling Suites in Milpitas, CA hosted by Quantum.
July 12-13, 1995 in Colorado Springs, CO in conjunction with X3T10.
August 23-24, 1995 at the Crown Sterling Suites in Milpitas, CA hosted by Quantum.
September 13-14, 1995 in Manchester, NH in conjunction with X3T10.
October 18-19, 1995 at the Crown Sterling Suites in Milpitas, CA hosted by Quantum.
November 8-9, 1995 in Palm Springs in conjunction with X3T10.
December, 1995 - no meeting.

15. Adjournment

The meeting adjourned at the close of business on April 14, 1995.