Accredited Standards Committee
X3, Information Processing Systems

To: Membership of X3T9.2

From: George Penokie and Gerry Johnsen

Subject: Minutes of RAID Study Group Meeting (6/23/93)

                            Agenda
1.   Opening Remarks
2.   Attendance and Membership
3.   Approval of Agenda
4.   SCSI Disk Array Model (93-003r6) [Penokie]
6.   RAID Issues from Trimm's Perspective (Gary Watson) [93-087r0]
7.   Action Items
8.   Meeting Schedule
9.   Adjournment

                        Results of Meeting

1.   Opening Remarks

George Penokie the RAID Study Group Chair, called the meeting to order at 8:00
am, Wednesday June 23, 1993. He thanked Joe Molina of Technology Forums for
hosting the meeting.

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 X3T9.2 and would be
conducted under the X3 rules. Ad hoc meetings take no final actions, but
prepare recommendations for approval by the X3T9.2 task group. The voting
rules for the meeting are those of the parent committee, X3T9.2. These rules
are: one vote per company; and any participating company member may vote.

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

George stated that this is the seventh meeting of the RAID study group and the
first joint meeting between the RAID Advisory Board Host Interface group and
the X3T9.2 RAID study group. The purpose of the group is to deal with
interface issues related to using RAIDs. The study group will assess the
issues and then formulate a strategy for dealing with them.

2.   Attendance and Membership

Attendance at working group meetings does not count toward minimum
attendance
requirements for X3T9.2 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:

RAID Study Group Meeting Attenders

Name	S	Organization	Electronic Mail Address
Mr. Randy Hall	O	Array Technology Corp.	hall@arraytech.com
Mr. Gerry Johnsen	O	Ciprico Inc.	
Mr. Bob Solomon	O	Data General Corp.	bobsolomon@dgc.ceo.dg.com
Mr. Paul Massiglia	O	Digital Equipment Corp.	massiglia@genral.enet.dec.com
Mr. Doug Hagerman	O	Digital Equipment Corp.	hagerman@starch.enet.dec.com
Mr. Don Johnson	V	Dynatek	
Mr. Howard Grill	O	Formation	
Mr. Jeffrey L. Williams	P	Hewlett Packard Co.	jlw@hpdmd48.boi.hp.com
Mr. Bill Hutchison	O	Hewlett Packard Co.	hutch@.boi.hp.com
Mr. David Snook	O	Hitachi America	
Mr. George Penokie	P	IBM Corp.	gop@rchvmp3.vnet.ibm.com
Mr. Giles Grazier	O	IBM Corp.	gfrazier@asuvm6.vnet.ibm.com
Mr. Keith Dulac	O	NCR Corp.	keith.dulac@wichitaks.ncr.com
Mr. Jerry Fredin	O	NCR Corp.	jerry.fredin@wichitaks.ncr.com
Mr. Dave Towle	V	Storage Dimensions	davet@xstor.com
Mr. Tom Ruwart	V	Unversity of MN/AHPCRC	tmr@ahpcrc.umn.edu

16 people present

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Status Key:  P   -  Principal
             A   -  Alternate
             O   -  Observer
             L   -  Liaison
             S,V -  Visitor
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3.   Approval of Agenda

The agenda developed at the meeting was approved.

4.   SCSI Disk Array Model (93-003r6) [Penokie]

George Penokie presented revision 6 of the SCSI Disk Array Model. This was the first time many on the people present had heard a presentation on the SCSI Disk Array Model and some time was spent mapping the terminology from the RAB host interface group to the SCSI Disk Array Model. Generally the terminology does map and the RAB group has agreed to convert their documentation to the SCSI Disk Array Model terminology in their next rev.

There are a few concepts in the area of mapping LBAs to specific locations on specific devices which are not in the SCSI Model which George agreed should be in the SCSI Model. The RAB group will provide George with the necessary documentation and those new concepts will be placed into Rev 7 of the SCSI Model.

A question was asked as to the difference between a DACL and a SDA. George could not think of any and will look into removing SDA from the model.

There was a long discussion on how things should be addressed. The SCSI model
 uses an almost flat addressing scheme while the RAB model assumes an N deep
 layering scheme. Both groups agreed that neither scheme has been completely
 thought out. George agreed to exercise some scenarios to see if the flat
 scheme will work. Doug Hagerman indicated that DEC has a proposal which
 covers addressing which he will bring to the next meeting.

There was a question as to weather or not all FRUs should be addressable.
The
 answer is yes and no. All FRUs have to be identifiable so they can be
called
 out for replacement but not all have to be addressable using LUIs. Multiple
 FRUs may be contained within a single LUI.

It was decided that Number of LBAs need not be part of the maintenance
 services because that information is available through standard SCSI
commands
 once the LUI of a device is known.

The discussion on configuration services was the most controversial of the
 day. Opinions on how configuration should be handled ranged from; 'should
all
 be vendor specific' to 'should be controlled down to the sector using bit
 maps' to 'should be characteristics passed to the DACL with the DACL
figuring
 out the details.' It was generally agreed that:

 -some definition is needed to allow interoperability
 -An expert system concept (like the SCSI model) is a good long term concept
  but is not practical today
 -Using RAID terminology is not desirable
 -Defining the RAID concepts (0 through 5) without using 'RAID' and allowing
  for future concepts is desirable

The conclusion was that a limited expert system might me made to work but
 there would have to be an alternate path for detailed mapping control. It
is
 safe to say not everyone agreed with this conclusion.

Another comment about the configuration services was that the model should
 preclude 'on the fly' changes in the configuration.

It was agreed to add to the SCSI Disk Array Services the following:

 -Verify LBA Set
 -Enable LBA Range
 -Enable Writes to a LBA Range

The reporting of exception conditions was discussed and it was verified that
 this indeed is a religious issues and can only be solved by allowing the
host
 to select which religion it wants to follow. Rev. 6 of the SCSI Disk Array
 model already covers this issue and no change is requested in this area.

The remaining time was used to answer questions about sections 6 and 7 of
the
 model. A few minor wording changes where agreed to.

5.   RAID Issues from Trimm's Perspective (Gary Watson) [93-087r0]

Gary Watson was not present. No discussion of 93-087r0 occurred.

6.   Action Items

1)   George Penokie will prepare revision 7 of the RAID Model.

7.   Meeting Schedule

The next meeting of the RAID Study Group is planned for July 22, 1993 at the
Sheraton Tara Wayfarer Inn in Bedford, NH. The meeting is expected to start
at 9:00am-12:00am.

George stated that in the even numbered months the RAID Study Group will
plan
to meet with the RAID Advisory Board. In the odd numbered months the RAID
Study Group will meet on Thursday morning with X3T9.2.

8.   Adjournment

The meeting was adjourned at 11:00 a.m. on Wednesday June 23, 1993.