Accredited Standards Committee*
InterNational Committee for Information Technology Standards (INCITS)

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Reply to:	John Lohmeyer

To: T10 Membership
From: Ralph Weber / John Lohmeyer
Subject: Minutes of T10 Plenary Meeting #50 -- July 18, 2002
            Colorado Springs, CO

Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. Approval of Minutes - May 2002 Meeting - Nashua, NH (T10/02-162r0)
5. Document Distribution
6. Call for Patents
7. Review of Old Action Items
8. Project Status Reports
    8.1   Project Status Summary and INCITS Liaison [Lohmeyer]
            8.1.1   INCITS Antitrust Guidelines
    8.2   SCSI Fibre Channel Protocol - 2 (FCP-2) {Project 1144-D} [Snively]
    8.3   SCSI Architecture Model - 2 (SAM-2) {Project 1157-D} [Weber]
    8.4   MultiMedia Command Set - 3 (MMC-3) {Project 1363-D} [McFerrin]
    8.5   SCSI Parallel Interface - 4 (SPI-4) {Project 1365-D} [Penokie]
    8.6   SCSI Domain Validation Technical Report (SDV) {Project 1378-DT} [Gibbons]
    8.7   SCSI Medium Changer Commands - 2 (SMC-2) {Project 1383-D} [Oetting]
    8.8   SCSI Signal Modeling (SSM) {Project 1414-DT} [Aloisi/Barnes]
    8.9   SCSI RDMA Protocol (SRP) {Project 1415-D} [Simpson]
    8.10   SCSI Primary Commands - 3 (SPC-3) {Project 1416-D} [Weber]
    8.11   SCSI Block Commands - 2 (SBC-2) {Project 1417-D} [Elliott]
    8.12   Object-based Storage Devices Commands (OSD) {Project 1355-D} [Weber]
    8.13   SCSI Stream Commands - 2 (SSC-2) {Project 1434-D} [Peterson]
    8.14   SCSI Passive Interconnect Performance (PIP) {Project 1439-D} [Daggett]
    8.15   SCSI Serial Bus Protocol -3 (SBP-3) {Project 1467-D} [Johansson]
    8.16   SCSI Signal Modeling - 2 (SSM-2) {Project 1514-D} [Aloisi/Manildi]
    8.17   SCSI RDMA Protocol - 2 (SRP-2) {Project 1524-D} [Simpson]
    8.18   SCSI Parallel Interface - 5 (SPI-5) {Project 1525-D} [Penokie]
    8.19   SCSI Management Server Commands (MSC) {Project 1528-D} [Penokie/Elliott]
    8.20   MultiMedia Command Set - 4 (MMC-4) {Project 1545-D} [McFerrin]
    8.21   Automation/Drive Interface - Physical Layer (ADP) {Project 1556-D} [Suhler/Griswold]
    8.22   Automation/Drive Interface - Transport Protocol (ADT) {Project 1557-D} [Suhler/Griswold]
    8.23   Automation/Drive Interface - Commands (ADC) {Project 1558-D} [Suhler/Griswold]
    8.24   SCSI Enclosure Services - 2 (SES-2) {Project 1559-D} [Elliott]
    8.25   Fibre Channel Protocol - 3 (FCP-3) {Project 1560-D} [Peterson]
    8.26   SCSI Architecture Model - 3 (SAM-3) {Project 1561-D} [Weber]
    8.27   Serial Attached SCSI (SAS) {Project 1562-D} [Elliott]

9. Old Business
    9.1   Style Guide [Moore]
    9.2   Project Proposal for a SCSI Parallel Interface - 6 (SPI-6) Standard (01-145) [Lohmeyer]
    9.3   A/V Direct-Access Project Proposal (01-337) [Johansson]
10. New Business
    10.1   Actions on Parallel SCSI Working Group Recommendations
    10.2   Actions on SAS Working Group Recommendations
        10.2.1   SAS PHY recommendations
        10.2.2   SAS Protocol recommendations
    10.3   Actions on CAP Working Group Recommendations
        10.3.1   Actions on recommendations for more than one document
        10.3.2   Actions on recommendations for SAM-3
        10.3.3   Actions on recommendations for SPC-3
        10.3.4   Actions on recommendations for SES-2
    10.4   Actions on Other Working Group Recommendations
    10.5   Negative ballot on ITLB 4450 approving INCITS 350 (FCP-2) (02-262) [Deborah J. Donovan]
11. ISO/IEC
    11.1   ISO/IEC Report [Robinson]
    11.2   ISO/IEC Business [Robinson]
        11.2.1   Proposal for a New Work Item on High Performance Serial Bus (IEEE Std. 1394-1995 and 1394a-2000)
        11.2.2   Standard for Control and Status Register (CSR) Architecture for Microcomputer Busses (IEEE Std. 1212)
12. Liaison Reports
    12.1   T11 Liaison Report (02-252) [Forbes]
    12.2   T13 Liaison Report [Colegrove]
    12.3   SFF Industry Group [Allan]
    12.4   IEEE 1394 [Johansson]
    12.5   SCSI Trade Association (STA) [Jones/Aloisi]
    12.6   IETF SCSI over IP [Black/Robinson]
13. Review of Action Items
14. Meeting Schedule
    14.1   Authorization of Working Group Meetings
15. Adjournment

Results of Meeting

1.   Opening Remarks

John Lohmeyer, the T10 Chair, called the meeting to order at 9:10 a.m., Thursday July 18, 2002. He thanked LSI Logic for hosting the meeting.

John said that INCITS Subgroup Membership forms and the T10 Mailing Subscription form were available from the head table. He said that people should use the INCITS forms to insure the INCITS Secretariat has the latest membership information. These forms should be mailed directly to the INCITS Secretariat.

As is customary, the people attending introduced themselves and a copy of the attendance list was circulated. Copies of the draft agenda and general information on T10 were made available to those attending.

2. Approval of Agenda

The draft agenda was approved with the following additions/changes:

    10.2.1   SAS PHY recommendations
    10.2.2   SAS Protocol recommendations
    10.3.2   Actions on recommendations for SAM-3
    10.3.3   Actions on recommendations for SPC-3
    10.3.4   Actions on recommendations for SES-2

The following agenda items were added/revised during the course of the meeting:

    10.3.1   Actions on recommendations for more than one document
    11.2.2   Standard for Control and Status Register (CSR) Architecture for Microcomputer Buses (IEEE Std. 1212)

3. Attendance and Membership

The membership requirements were reviewed. INCITS rules permit one vote per organization. An individual from a new organization must attend at least one T10 plenary meeting as an Advisory Member. He/she may apply for voting membership at this meeting, which becomes effective following adjournment of the meeting. Voting privileges begin upon receipt by the INCITS Secretariat of applicable fees for the membership year.

To maintain membership, organizations must pay the INCITS Service Fee ($800).

John briefly discussed the mailing fees. Complete pricing information is contained in the 2002 membership form (available at ftp://ftp.t10.org/t10/mem_form.txt).

There are also minimum attendance requirements to maintain voting membership on T10. If a member organization fails to attend two of the last three T10 meetings, they are warned that failing to attend the next T10 meeting would result in their membership being terminated.

The Chair said he had sent letters to 11 people from 6 organizations informing them that their membership was in jeopardy due to non-attendance (see 02-186r0) and that their membership would be terminated if they did not attend this meeting. The following organizations were in attendance jeopardy:

Andiamo Systems, Inc.
Congruent Software, Inc.
General Dynamics
KnowledgeTek, Inc.
Silicon Image
TycoElectronics

All organizations in attendance jeopardy were present.

Had any of the organizations failed to attend, the members from that organization would have been changed to non-voting status.

No organizations joined the committee at this meeting.

John noted that the Hewlett Packard and Compaq merger had completed, so we lost one voting organization since last time.

The T10 membership during the meeting was 46 organizations down from 47 following the last meeting. Enclosure (1) is the list of the people present at the meeting and enclosure (2) is the current T10 membership list.

The following organizations requested membership in T10 to take effect after the meeting:

Honda Connectors
QLogic Corporation

John Lohmeyer reminded members that failure to vote on two out of the last three letter ballots also would result in membership jeopardy and then reported on the status of companies that have not voted on recent letter ballots. Document 02-156r0 contains current letter ballot jeopardy information.

4.   Approval of Minutes - May 2002 Meeting - Nashua, NH (T10/02-162r0)

The minutes were approved as written.

5.   Document Distribution

Members who have any problems with their mailing subscription should deal directly with Monica Vago (mvago@itic.org) (202) 626-5741.

John Lohmeyer requested that all documents for the next mailing be in his hands in electronic format by 10:30 a.m. on Thursday July 25, 2002. Documents received after this time may go into a subsequent mailing.

John reminded the committee of the requirements for document submission. Since T10 meets its document retention requirements by preparing mailings, documents included in the mailing must be suitable for archiving. This means that native-format and/or Portable Document Format (PDF) electronic originals with proper identification must be submitted.

People can obtain T10 document numbers and revised T10 document numbers by filling out a web form at http://www.t10.org/members/. The assigned T10 document number will be sent to the requestor by e-mail. The requestor may then reply to this email, including the document to be posted as an attachment. The document will be automatically posted on the T10 web site.

T10 members can complete this entire process using their personal T10 password. John explained that members who do not know their password should surf to the above URL and click on the "forgot password" link to have their password sent to them via e-mail.

John noted that non-members can also use the above document number process, but their requests will require approval by an administrator.

Minutes are available on the T10 World Wide Web page (see below), and are distributed to the T10 Reflector.

To be added to the T10 Reflector, send an e-mail to majordomo@t10.org with the line 'subscribe t10' in the message body.

The INCITS Secretariat maintains a World Wide Web page at:

   http://www.incits.org/.

LSI Logic maintains a web site on behalf of T10 on a server donated by the SCSI Trade Association at:

 http://www.t10.org/

There is also a mirror site at:

 http://www.t11.org/t10/

The T10 document register is available at:

 ftp://ftp.t10.org/t10/dr.txt

6.   Call for Patents

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

A document is available from ANSI, "Procedures for the Development and Coordination of American National Standards", at no charge. This document is also on the WWW at http://www.incits.org/help/ansi_sdo.html. Section 1.2.11 contains the ANSI patent policy. Amy Marasco manages patent issues for ANSI and can be contacted at amarasco@ansi.org or 212-642-4954. Gene Milligan prepared a useful "Handy dandy Technical Committee's Patents Guide", which is available at ftp://ftp.t10.org/t10/document.99/99-291r0.pdf.

John presented a foil containing a summary of the ANSI patent policy prepared by Gary Robinson. The summary is also included on the Rules and Procedures (plus Patent Information) page on the T10 web site.

Cris Simpson reported that a statement of the Intel patent policy can be found in T10/01-041r0.

John Lohmeyer announced that he had received a letter (02-195r0) from Ronald Epstein stating the Brocade patent policy with respect to present and future T10 standards.

John asked that anyone who knows of applicable patents contact him.

There were no responses to the call for patents.

7.   Review of Old Action Items

472   Russ Brown will provide the SPI-5 editor with information suitable to developing the receive masks for Fast 320. *Complete.*
473   John Lohmeyer will to forward 02-098r0 to INCITS as a new project proposal for Serial Attached SCSI (SAS). *Complete.*
474   John Lohmeyer will to forward 02-118r1 to INCITS as a new project proposal for SCSI Architecture Model - 3 (SAM-3). *Complete.*
475   John Lohmeyer will to forward 02-138r1 to INCITS as a new project proposal for Fibre Channel Protocol -3 (FCP-3). *Complete.*
476   George Penokie will prepare SPI-4 revision 10 including the resolution to the public review comment (02-129r0), the approve proposals 02-151r1, 02-150r1, and other editorial corrections agreed by the working group. *Complete.*
477   John Lohmeyer will to forward SPI-4 revision 10 including substantive changes to INCITS for processing towards second public review. *Complete.*
478   John Lohmeyer will formally respond to the public review comment on SPI-4. *Complete.*

8.   Project Status Reports

8.1   Project Status Summary and INCITS Liaison [Lohmeyer]

John Lohmeyer said that the current T10 project status summary was included in the T10 Information Packages distributed prior to the meeting and will be included in the mailing as usual.

John Lohmeyer noted that INCITS had made a change to the two-thirds voting rule last year without much fanfare. While the SD-2 still contains some errors in its examples, the net effect of the change is that abstain really means abstain. Abstain votes do not count toward the two-thirds of those voting nor toward the majority of the committee. Pete McLean said that he had been told at his INCITS training session that those members not present are also to be subtracted for the purposes of calculating the majority of the membership in the two-thirds rule. This effectively boils down to a question of what is meant by the phrase 'eligible to vote' in the two-thirds rule (SD-2 section 4.4.3.2). Is a person who is a committee member but not present at the meeting 'eligible to vote'? John said he would contact INCITS to get a ruling on this point.

Terry Nelson reported that the last INCITS meeting considered the request to create an obsolete category and assigned the task to Dave Thewlis. It was noted that progress is being made in the effort but formal INCITS action is not expected at the upcoming meeting. Terry thinks we can achieve the objective by changing the policy so that withdrawn standards are still available on the INCITS web site but not to create a new obsolete category. John Lohmeyer spoke for the committee, stating the belief that maintaining withdrawn standards on the INCITS web site would address the committee's concerns.

8.1.1   INCITS Antitrust Guidelines

John Lohmeyer reported that INCITS has developed a new set of antitrust guidelines that they require be included in each subgroups minutes periodically.

There is a link to these guidelines on the T10 web site at http://www.t10.org/t10_info.htm.

8.2   SCSI Fibre Channel Protocol - 2 (FCP-2) {Project 1144-D} [Snively]

John Lohmeyer reported that FCP-2 received a negative vote on the INCITS approval letter ballot that was discussed at the CAP working group (minutes in 02-272). He noted that another INCITS negative comment is anticipated on the INCITS reconsideration ballot.

Because the negative comments have not stopped arriving, Dave Peterson asked the group to plan on holding a meeting targeted specifically at resolving the comments during the September meeting. Scheduling this meeting was covered under item 14.

8.3   SCSI Architecture Model - 2 (SAM-2) {Project 1157-D} [Weber]

Ralph Weber reported that resolution of the SAM-2 letter ballot comments will continue in a meeting this afternoon and that the resolution will be ready for approval at the September meeting.

8.4   MultiMedia Command Set - 3 (MMC-3) {Project 1363-D} [McFerrin]

Bill McFerrin reported that an error has been found in MMC-3 and that he is working with John Lohmeyer to take the steps necessary to create an amendment to correct the error.

8.5   SCSI Parallel Interface - 4 (SPI-4) {Project 1365-D} [Penokie]

John Lohmeyer reported that the second public review on SPI-4 closed on 1 July with no comments and that INCITS is taking the actions necessary to approve and publish it.

8.6   SCSI Domain Validation Technical Report (SDV) {Project 1378-DT} [Gibbons]

John Lohmeyer reported that the reasons are unclear regarding why SDV has not been published yet.

8.7   SCSI Medium Changer Commands - 2 (SMC-2) {Project 1383-D} [Oetting]

Erich Oetting reported that SMC-2 revision 5 was posted recently. He stated plans to conduct a letter ballot on forwarding SMC-2 before the next meeting.

8.8   SCSI Signal Modeling (SSM) {Project 1414-DT} [Aloisi/Barnes]

Larry Barnes reported that all ANSI editorial comments have been addressed. As far as we know it should be published but that has not happened yet.

8.9   SCSI RDMA Protocol (SRP) {Project 1415-D} [Simpson]

Cris Simpson reported that 01-328r8 resolving the SRP letter ballot comments was posted almost three weeks ago and that SRP revision 16a was posted a day later.

Cris Simpson moved that T10 accept 01-328r8 as resolving the SRP letter ballot comments and that SRP revision 16a be accepted as resolving the letter ballot comment and that SRP revision 16a be forwarded to INCITS for further processing toward first public review. The motion was seconded by Peter Johansson.

The motion passed on a two-thirds vote of 39:0:0:7=46.

John Lohmeyer took an action item to forward SRP revision 16a to INCITS for processing towards first public review.

George Penokie, Ed Gardner, and Cris Simpson asked that their negative votes on the letter ballot be changed to affirmative as a result of the satisfactory resolution of the letter ballot comments.

8.10 SCSI Primary Commands - 3 (SPC-3) {Project 1416-D} [Weber]

Ralph Weber reported that SPC-3 revision 8 incorporating all changes approved by this meeting will be available in time for the next mailing.

Ralph Weber requested that the committee support setting the target letter ballot date for SPC-3 as November 2003. He noted that based on this letter ballot date editing review meetings will begin in January 2003 and that five editing review meetings will be held covering the following topics:

    READ/WRITE ATTRIBUTE commands (MAM)
    Asymmetric logical unit behavior
    Well known logical units
    Access Controls
    Protocol specific data
    Persistent Reservations Model
    Persistent Reservations Commands
    REQUEST SENSE command
    REPORT SUPPORTED OPERATIONS command

Control mode page

8.11 SCSI Block Commands - 2 (SBC-2) {Project 1417-D} [Elliott]

Rob Elliott reported that SBC-2 revision 7 will be posted before the next meeting incorporating the proposals accepted today.

8.12 Object-based Storage Devices Commands (OSD) {Project 1355-D} [Weber]

Ralph Weber reported that completion of OSD revision 6 has been delayed by work to substantially rewrite the object attributes definition. OSD revision 6 may not be completed in time for the next mailing.

Ralph stated that the target for a letter ballot on OSD is May 2003.

8.13 SCSI Stream Commands - 2 (SSC-2) {Project 1434-D} [Peterson]

Dave Peterson reported on the activities of the SSC-2 working group on letter ballot comments resolution (minutes in 02-237). This SSC-2 letter ballot comments resolution document is 02-081.

8.14 SCSI Passive Interconnect Performance (PIP) {Project 1439-D} [Daggett]

Paul Aloisi reported that the PIP working group is holding a series of editing meetings on the document. The schedule for these meetings was discussed in item 14.

8.15 SCSI Serial Bus Protocol -3 (SBP-3) {Project 1467-D} [Johansson]

Peter Johansson reported that the SBP-3 working group met May 29 - 30 at Timberline Lodge, OR and July 16 - 17 in Colorado Springs, CO. Work continues in two principal areas:

    a) isochronous facilities and
    b) bridge-awareness for IEEE P1394.1.

The latter is essentially complete but awaits the recirculation ballot of IEEE P1394.1. See the working group minutes for additional detail (02-208r0 for the May meeting and 02-282r0 for the July meeting).

8.16 SCSI Signal Modeling - 2 (SSM-2) {Project 1514-D} [Aloisi/Manildi]

Paul Aloisi reported on the activities of the SSM-2 working group (minutes in 02-263) and provided an electronic report in 02-285r0.

8.17 SCSI RDMA Protocol - 2 (SRP-2) {Project 1524-D} [Simpson]

Cris Simpson reported that the requirements for SRP-2 were discussed during the CAP working group (minutes in 02-272).

8.18 SCSI Parallel Interface - 5 (SPI-5) {Project 1525-D} [Penokie]

George Penokie reported on the activities of the SCSI Parallel Working group (minutes in 02-270). He stated that SPI-5 revision 2 will be prepared before the next meeting and that a letter ballot on forwarding SPI-5 is anticipated following the September meeting week.

8.19 SCSI Management Server Commands (MSC) {Project 1528-D} [Penokie/Elliott]

George Penokie reported that MSC work will be restarting toward the end of the year.

8.20 MultiMedia Command Set - 4 (MMC-4) {Project 1545-D} [McFerrin]

Bill McFerrin reported on the activities of the MMC-4 working group (minutes in 02-290). He informed the committee that the use of a 16-byte command to report the media serial number is causing problems for MMC-4 devices where 16-byte commands are not supported by the BIOS. He indicated that a smaller command or a read only mode page are under consideration by the working group.

8.21 Automation/Drive Interface - Physical Layer (ADP) {Project 1556-D} [Suhler/Griswold]

Bob Griswold reported on the activities of the ADI working group (minutes in 02-239).

8.22 Automation/Drive Interface - Transport Protocol (ADT) {Project 1557-D} [Suhler/Griswold]

This topic was covered in item 8.21.

8.23 Automation/Drive Interface - Commands (ADC) {Project 1558-D} [Suhler/Griswold]

This topic was covered in item 8.21.

8.24 SCSI Enclosure Services - 2 (SES-2) {Project 1559-D} [Elliott]

Rob Elliott reported that SES-2 revision 0 was posted following the last meeting. He described the SES-2 activities at the CAP working group (minutes in 02-272).

8.25 Fibre Channel Protocol - 3 (FCP-3) {Project 1560-D} [Peterson]

Dave Peterson reported that activity on FCP-3 will commence after work on FCP-2 is concluded.

8.26 SCSI Architecture Model - 3 (SAM-3) {Project 1561-D} [Weber]

Ralph Weber reported that SAM-3 revision 0 is available on the T10 web site. SAM-3 revision 0 is identical to SAM-2 revision 23 except that it contains no change bars.

He stated that revision 1 will be prepared prior to the next meeting and include the changes approved by this meeting.

Ralph stated that the target for a letter ballot on SAM-3 is May 2004.

8.27 Serial Attached SCSI (SAS) {Project 1562-D} [Elliott]

Rob Elliott reported on the activities of the SAS working group (minutes in 02-271).

9.   Old Business

9.1 Style Guide [Moore]

Dennis Moore reported that a new revision of the style guide will be prepared before the next meeting. He noted that two new clauses have been proposed for the style guide; one covering things that must be included in a protocol standard and the other covering what must be included in a command set standard. Dennis solicited comments regarding what should be in these new clauses.

The committee requested that a meeting be scheduled to review the new style guide material and the plans were discussed under item 14.

9.2 Project Proposal for a SCSI Parallel Interface - 6 (SPI-6) Standard (01-145) [Lohmeyer]

John Lohmeyer asked that this topic be dropped from future agendas.

9.3 A/V Direct-Access Project Proposal (01-337) [Johansson]

Peter Johansson asked that discussion of this topic be deferred to the next meeting.

10. New Business

10.1 Actions on Parallel SCSI Working Group Recommendations

George Penokie and Bill Galloway reviewed the proposals recommended for incorporation in SPI-5:

    02-209r1 Proposal for SPI-5 for decreasing deskew error during training for Ultra640 SCSI
    02-264r0 Proposal for SPI-5 for Ultra640 receiver masks
    02-181r1 (r0 revised) PPR PCOMP_EN description for fast-320 in SPI-5 (10:1:1)
    02-226r1 (r0 revised) Termination table note addition for SPI-5

Bill Galloway moved that 02-209r1, 02-264r0, 02-181r1, and 02-226r1 be approved for inclusion in SPI-5. Paul Aloisi seconded the motion. Ron Roberts expressed concerns about the effects of 02-181r1 on current implementations. The motion passed on a vote of 33:1:0:12=46.

10.2 Actions on SAS Working Group Recommendations

10.2.1   SAS PHY recommendations

George Penokie, Vit Novak, and John Lohmeyer reported that the SAS PHY working group has recommended the following proposals for inclusion in SAS:

    02-210r2 Proposed changes for SAS driver and receiver electrical characteristics [Brown] (7:0:3)
    02-289r0 SAS PHY working group revision to Section 5 of SAS specification
    02-288r0 Minutes of SAS PHY working group July 16, 2002 -- Item 3

Mark Evans moved that 02-210r2, 02-289r0, and item 3 in 02-288r0 be approved for inclusion in SAS. Bill Galloway seconded the motion. The motion passed on a vote of 32:0:2:12=46.

10.2.2   SAS Protocol recommendations

George Penokie and Bill Galloway reported that SAS working group has recommended the following proposals proposals for inclusion in SAS:

    02-169r2 SAS XFER_RDY Rules [Galloway]
    02-170r1 SAS Wide Link Rules [Galloway]
    02-179r1 (r0 as revised) SAS PHY MARGIN CONTROL request modifications [Roberts]
    02-211r1 (r0 as revised) SAS address frame field checking [Elliott]
    02-212r1 (r0 as revised) Response IU Format [Galloway]
    02-218r0 Proposal to remove Far-end retimed loopback [Coomes]
    02-217r0 Proposal set destination OPEN_REJECT Priorities [Coomes]
    02-214r1 SAS Hash Transport Checking [Galloway]

02-204r1 Dealing with extra ACK and NAK primitives in SAS [Byan]
02-197r2 (r1 as revised) SAS Identification state machine [Penokie]
02-201r3 (r2 as revised) SAS transmission of a DONE primitive to close an SSP connection [Evans]
02-205r3 (r2 as revised) SAS connection: behavior when receiving a BREAK primitive [Evans]
02-219r3 (r2 as revised) SAS bit and byte order for scrambling, CRC and transmission [Coomes]
02-231r2 (r1 as revised) SAS CRC Generation and Scrambling [Coomes]
02-216r5 (r4 as revised) SAS SMP transport layer state diagrams [Penokie]
02-230r2 (r1 as revised) SAS transport layer state machines for SSP [Evans]
02-215r1 SAS Credit Not Ready [Galloway]
02-256r2 (r1 as revised) SAS Pathway Recovery [Hoglund]
02-198r6 (r5 as revised) SAS OOB timing [Elliott]

Bill Galloway moved that 02-169r2, 02-170r1, 02-179r1, 02-211r1, 02-212r1, 02-218r0, 02-217r0, 02-214r1, 02-204r1, 02-197r2, 02-201r3, 02-205r3, 02-219r3, 02-231r2, 02-216r5, 02-230r2, 02-215r1, 02-256r2, and 02-198r6, be approved for inclusion in SAS. Mark Evans seconded the motion. The motion passed on a vote of 30:0:2:14=46.

George reported that the SAS working group has recommended that the SAS editor be instructed to perform the following:

   o   Remove the SMP FER Loopback function; and
   o   In revision 00c figure 69 in state SMP_SFR1 the protocol violation and the failed frame confirmations be deleted and any corresponding text be deleted.

Bill Galloway moved that the SAS editor be instructed to:

   a) Remove the SMP FER Loopback function; and
   b) In revision 00c figure 69 in state SMP_SFR1, delete the protocol violation and the failed frame confirmations and any corresponding text.

Mark Evans seconded the motion. The motion passed on a vote of 30:0:2:14=46.

George Penokie described the history of the 02-196r2 (r1 as revised) AEN on SAS, noting that the CAP working group proposed changing SAM not to require AEN and rejecting this proposal (CAP minutes in 02-272).

John Lohmeyer moved that 02-196r2 be remanded back to the SAS Protocol working group. Ron Roberts seconded the motion. The motion passed on a vote of 32:1:1:12=46.

John Lohmeyer moved that SAS revision 01 (revision 00e as modified by the changes approved by this meeting) be approved as the committee draft for project 1562-D. Mark Evans seconded the motion. The motion passed on a vote of 35:0:0:11=46.

10.3 Actions on CAP Working Group Recommendations

10.3.1   Actions on recommendations for more than one document

George Penokie reviewed the proposals that have been recommended by the CAP working group (minutes in 02-272) for inclusion in more than one working draft:

   02-260r1 (r0 as revised) SPC-3: Mandatory REPORT LUNS Support [Peterson]
            recommended for inclusion in SPC-3, SBC-2, SSC-2, SMC-2, SES-2, and OSD
   02-277r1 SSC-2/SBC-2/SES-2:Follow-on to Obsoleting Reserve/Release [Peterson]
            recommended for inclusion in SBC-2, SSC-2, and SES-2

Bill Galloway moved:
    a) that 02-260r1 be approved for inclusion in SPC-3, SBC-2, SSC-2, SMC-2, SES-2, and OSD; and
    b) that 02-277r1 be approved for inclusion in SBC-2, SSC-2 and SES-2.

Mark Evans seconded the motion. The motion passed on a vote of 34:1:1:10=46.

10.3.2 Actions on recommendations for SAM-3

George Penokie reviewed the proposals recommended by the CAP working group (minutes in 02-272):

    02-278r0 SAM-3 Query Task [Galloway]
    02-245r0 SAM-3 Identifiers and names for SAS SSP [Elliott]

Bill Galloway moved that 02-278r0 and 02-245r0 be accepted for inclusion in SAM-3. Mark Evans seconded the motion. The motion passed on a vote of 34:0:0:12=46.

Ralph Weber moved that the SAM-3 editor be instructed to change the 'shall' to a 'may' in the third sentence of the Asynchronous Event Reporting clause in SAM-3. Ed Gardner seconded the motion. The motion passed on a vote of 31:0:2:13=46.

10.3.3 Actions on recommendations for SPC-3

George Penokie, Rob Elliott, and Dave Peterson reviewed the proposals recommended by the CAP working group:

    02-149r1 SPC-3 Port-specific mode page clarifications [Elliott]
    02-246r1 (r0 as revised) SPC-3 protocol-specific changes for SAS [Elliott]
    02-286r1 (r0 as revised) Extended Copy Write Filemarks Segment Descriptor Immediate Bit [Griswold]
    02-035r3 MD-5 Logical Unit Identifier [Peterson]

Bill Galloway moved that 02-149r1, 02-246r1, 02-286r1, 02-035r3, and 02-260r1 be accepted for inclusion in SPC-3. Mark Evans seconded the motion. The motion passed on a vote of 37:0:0:9=46.

10.3.4 Actions on recommendations for SES-2

George Penokie and Rob Elliott reviewed the proposals recommended for inclusion in SES-2:

    02-192r0 SES-2 IDENT control for each element [Spicher & Elliott]
    02-190r0 SES-2 Enclosure busy indication [Spicher & Elliott]
    02-249r1 (r0 as revised) SES-2 Nonvolatile cache element cache size [Nguyen & Elliott]
    02-248r1 (r0 as revised) SES-2 Cooling element fan speed in RPM [Nguyen & Elliott]
    02-250r1 (r0 as revised) SES-2 New Enclosure element [Nguyen & Elliott]
    02-191r1 (r0 as revised) SES-2 New Invalid Operation Reason element [Spicher & Elliott]
    02-193r0 SES-2 INVOP for Threshold In page [Spicher & Elliott]
    02-194r1 (r0 as revised) SES-2 Protocol-specific device element information [Spicher & Elliott]
    02-251r1 (r0 as revised) SES-2 Enclosure Status element bypass status enhancement [Spicher & Elliott]

Bill Galloway moved that 02-192r0, 02-190r0, 02-249r1, 02-248r1, 02-250r1, 02-191r1, 02-193r0, 02-194r1, and 02-251r1 be approved for inclusion in SES-2. Mark Evans seconded the motion. The motion passed on a vote of 36:0:0:10=46.

10.4 Actions on Other Working Group Recommendations

No recommendations from other working groups were brought before the committee.

10.5 Negative ballot on ITLB 4450 approving INCITS 350 (FCP-2) (02-262) [Deborah J. Donovan]

John Lohmeyer reported on the activities with respect to the negative comment on FCP-2 in the CAP working group (minutes in 02-272). John noted that no action will be taken on the negative comment because additional negative comments are anticipated.

11. ISO/IEC

11.1 ISO/IEC Report [Robinson]

Gary Robinson reported to the committee on ISO/IEC activities and provided an electronic report in 02-292.

11.2 ISO/IEC Business [Robinson]

11.2.1   Proposal for a New Work Item on High Performance Serial Bus (IEEE Std. 1394-1995 and 1394a-2000)

Gary Robinson moved that the IR be instructed to report to JTC 1 that T10 has reviewed the new work item proposal, and recommends that the US National Member vote to approve the new work item proposal JTC 1 N 6676, High Performance Serial Bus (IEEE Std. 1394-1995 and 1394a-2000), project 1.25.13.15.01 and that all six questions be answered yes and Peter Johansson be named as the editor. Peter Johansson seconded the motion. The motion passed on a two-thirds roll call vote of 32:2:2:10=46. Details of the vote were as follows:

```
Organization                Stat Name                    Yes No Abs NP
Adaptec, Inc.               P    Mr. Ron Roberts          1
Amphenol Interconnect       P    Mr. Michael Wingard      1
Andiamo Systems, Inc.       P    Dr. Claudio DeSanti      1
BREA Technologies, Inc.                                             1
Brocade Comm. Systems, Inc.                                         1
Cisco Systems, Inc.         P    Mr. David Peterson       1
Conexant/Mindspeed                                                  1
Congruent Software, Inc.    P    Mr. Peter Johansson      1
Crossroads Systems, Inc.    P    Mr. Robert Griswold      1
Dallas Semiconductor        A    Mr. James A. Lott, Jr.   1
Dell Computer Corp.         P    Mr. Kevin Marks          1
EMC Corp.                   P    Mr. Gary S. Robinson     1
Emulex                      P    Mr. Robert H. Nixon         1
ENDL Texas                  P    Mr. Ralph O. Weber       1
Exabyte Corp.               P    Mr. Joe Breher           1
FCI                         P    Mr. Douglas Wagner       1
Fujitsu                                                          1
General Dynamics            A    Mr. Tim Mackley          1
Hewlett Packard Co.         P    Mr. Rob Elliott          1
Hitachi Cable Manchester    A    Mr. Randy Wasylak        1
IBM / Tivoli Systems        P    Mr. George O. Penokie    1
Intel Corp.                 P    Mr. Cris Simpson            1
Iomega Corp.                                                        1
KnowledgeTek, Inc.          P    Mr. Dennis Moore         1
LSI Logic Corp.             P    Mr. John Lohmeyer        1
Madison Cable Corp.         P    Ms. Jie Fan              1
Maxtor Corp.                P    Mr. Mark Evans              1
Microsoft Corp.             A    Mr. Rob Haydt            1
Molex Inc.                  P    Mr. Jay Neer             1
Network Appliance Inc.      P    Mr. James R. (Bob) Davis 1
```

```
Nishan Systems Inc.                                                     1
Ophidian Designs            P    Mr. Edward A. Gardner        1
Panasonic Technologies, Inc P    Dr. Terence J. Nelson        1
Philips Electronics/CD Edge P    Mr. William P. McFerrin      1
Pirus Networks                                                          1
Quantum Corp.               P    Mr. Paul Entzel              1
Seagate Technology          P    Mr. Gerald Houlder           1
Silicon Image               A    Mr. Ed Haske                 1
Storage Technology Corp.    P    Mr. Erich Oetting            1
Sun Microsystems, Inc.      P    Mr. Vit Novak                1
Texas Instruments           P    Mr. Paul D. Aloisi           1
Toshiba America Elec. Comp. P    Mr. Tasuku Kasebayashi       1
UNISYS Corporation                                                1
Veritas Software                                                  1
Vixel Corp.                 P    Mr. Kenneth Hirata           1
Western Digital Corporation                                       1

                                                    32  2   2  10 = 46
```

Ed Gardner stated that his reason for voting against the motion was an objection to T10 wasting its time and resources on a document over which it has no influence, control, or responsibility. In particular, T10 does not 'have a major contribution or reference document' ready for submittal, nor can it, since the copyright on any such document is owned by IEEE and has not been made available to either T10 or INCITS. Mark Evans stated that his reason for voting against the motion was identical to Ed's.

Cris Simpson stated that his abstention was based on not being materially affected by the decision. Bob Nixon stated that his abstention was based on lack of familiarity with the issue being voted upon.

Gary Robinson stated that the IEEE copyright has been provided for ISO. Gary stated that T10 is responsible for voting on documents for the JTC 1 and this action in consistent with T10's responsibilities.

Gary Robinson took an action item to report to JTC 1 that T10 has reviewed the new work item proposal, and recommends that the US National Member vote to approve the new work item proposal JTC 1 N 6676, High Performance Serial Bus (IEEE Std. 1394-1995 and 1394a-2000), project 1.25.13.15.01 and that all six questions be answered yes and Peter Johansson be named as the editor.

11.2.2   Standard for Control and Status Register (CSR) Architecture for Microcomputer Buses (IEEE Std. 1212)

Gary Robinson moved that T10 recognizes the completion of IEEE 1212, Standard for a Control and Status Registers (CSR) Architecture for Microcomputer Buses, and requests that the IR prepare a NWIP that will be forwarded to JTC1 SC25 upon approval by T10 and that T10 editor will be Peter Jonhasson. Peter Johansson seconded the motion. The motion passed on a vote of 25:4:5:12=46.

Gary Robinson took an action item to prepare a NWIP for IEEE 1212, Standard for Control and Status Register (CSR) Architecture for Microcomputer Buses.

12. Liaison Reports

12.1 T11 Liaison Report (02-252) [Forbes]

Brian Forbes was not present, but he provided a T11 liaison report contained in T10/02-252r0, which John Lohmeyer presented.

12.2 T13 Liaison Report [Colegrove]

Pete McLean presented the following electronic report:

> T13 Liaison Report - July 1, 2002

> T13 met last in Irvine, CA on June 25 and 26 with 23 people present. Membership is currently 22 voting organizations.

> INCITS public review to withdraw ATA-3 closed June 24 with no comments.

> The ATA/ATAPI-6 draft standard, T13/1410D, closed second public review 13 May 2002 with no comments.

> BIOS Enhanced Disk Drive Services - 2 draft standard, T13/1484D, closed first public review 13 May 2002 with no comments.

> Host Adapter Standard, T13/1510D, was reviewed. Technical content appears to be complete. There will be a page by page review of the draft standard at the August meeting.

> The ATA/ATAPI-7, T13/1532D,.is in development. Proposals to add leakage current spec to the RESET signal, add a conveyance self-test, add forced units access writes, and add editorial changes to the 1.8 inch form factor were approved.

> A project proposal to begin the development of an Enhanced Disk Drive Services - 3 standard was approved.

> Minutes of the meeting are available at www.t13.org under "Documents 2002".

> Maxtor Corporation will host the next plenary meeting August 20-22, 2002 at the Raintree Plaza Hotel, 1900 Ken Pratt Blvd., Longmont, C0 80501. The meeting will start at 9 AM.

> For further T13 information access ftp.t13.org or www.t13.org.

12.3 SFF Industry Group [Allan]

In the absence of Dal Allan, no report was available.

12.4 IEEE 1394 [Johansson]

Peter Johansson reported that IEEE Std. 1394b-2002, High Performance Serial Bus---Amendment 2, has been approved as an IEEE standard, but has not yet been published by the IEEE. This amendment extends Serial Bus to speeds in the range of 800 Mbps to 1600 Mbps and provides for fiber-optic media. Contact the Chair, David Wooten (WD@Cypress.com) for details.

The Ballot Response Committee (BRC) for IEEE P1394.1, High Performance Serial Bus Bridges, has resolved approximately two-thirds of the comments received during Sponsor Ballot. A recirculation ballot is anticipated this year, with approval as an IEEE standard likely in 2003. Contact the Chair, Peter Johansson (PJohansson@ACM.org) for details.

The BRC for IEEE P1394.3, Peer to Peer Data Transport, a protocol built upon SBP-2, has a single unresolved comment to address. Resolution is expected very soon, with a recirculation ballot to follow immediately. Contact the Vice Chair, Alan Berkema (Alan_Berkema@HP.com) for details.

The 1394 Trade Association Wireless working group is developing a "protocol adaptation layer" (PAL) to enable IEEE 1394 applications to interoperate with like applications in IEEE P802.11e devices. Some of the work is active in the IEEE P802.11e (quality of service) working group. Contact John Fuller (JFuller@Computer.org) for details.

12.5 SCSI Trade Association (STA) [Jones/Aloisi]

Paul Also reported on the activities of STA and STA Tech and provided an electronic report that can be found in 02-284r0.

12.6 IETF SCSI over IP [Black/Robinson]

In the absence of David Black, no report was available.

13. Review of Action Items

479   John Lohmeyer will forward SRP revision 16a to INCITS for processing towards first public review.
480   Gary Robinson will report to JTC 1 that T10 has reviewed the new work item proposal, and recommends that the US National Member vote to approve the new work item proposal JTC 1 N 6676, High Performance Serial Bus (IEEE Std. 1394-1995 and 1394a-2000), project 1.25.13.15.01 and that all six questions be answered yes and that Peter Johansson be named as the editor.
481   Gary Robinson will prepare a NWIP for IEEE 1212, Standard for Control and Status Register (CSR) Architecture for Microcomputer Busses.

14. Meeting Schedule

The next plenary meeting of T10 will be Thursday September 12, 2002 in Minneapolis, MN at the Hilton Minneapolis/St. Paul Airport Hotel (952-854-2100), hosted by Cisco Systems. The meeting will begin at 9:00 a.m. on Thursday.

The meeting list for the next plenary week is:

```
                         September 2002 Meeting Map
                            (2002/07/18 Version)
Monday 9/9           9   10  11  12  1   2   3   4   5   6   7   8   9
                     +=================================+=======+
                     | SSC-2 WG                        | FCP-2 |      (20)
                     +==============+====================+===+===+
                     | Par. SCSI WG |SAS Protocol WG       |           (50)
                     +==============+======================+
                                    | SAS PHY WG           |           (25)
                                    +======================+

Tuesday 9/10   8     9   10  11  12  1   2   3   4   5   6   7   8   9
                     +=================================+
                     | SAS Protocol WG                 |               (50)
                     +===============================+===========+
                     | SAS PHY WG                    |               (25)
                     +=============================+
                     | ADI WG (tape library)       |               (15)
                     +=============================+---+
                     | T11 Ad Hocs                 |               (15)
                     +-----------------------------+

Wednesday 9/11       9   10  11  12  1   2   3   4   5   6   7   8   9
                     +=========================================+
                     | SCSI Commands, Arch., & Protocol WG      |      (35)
                     +================================+==========+
                     | MMC WG                         |               (10)
                     +==================+===========+-------+
                                        | SFF SSWG           |      (20)
                     +---+----------+-------+
                     | STA Marcom    |<--{Closed meeting} (15)
                     +---------------+

Thursday 9/12  8     9   10  11  12  1   2   3   4   5   6   7   8
                     +================+============+
                     | T10 Plenary    /T10 Edit (*)|              (50/10)
                   +-+================+=====+======+
                     | SCSI Trade Association  |<--{Closed meeting}   (25)
                     +------------------------+
 (*) - Meeting begins 1 hour after T10 meeting

Friday 9/13    8     9   10  11  12  1   2   3   4   5   6   7   8
                 (no meetings planned for Friday)
Meetings marked with == are T10-authorized meetings.
Meetings marked with -- are other groups and may change without notice.
```

 Other T10-authorized meetings:

Meeting	Date	Location / Contact
SAS Prot Calls	Weekly Tuesday am	To be announced via T10 reflector
SAS PHY Calls	Weekly Monday pm	To be announced via T10 reflector
PIP Edit	08/13/02	Buena Park, CA / Actuone-Foxconn
PIP WG	08/14/02	Buena Park, CA / Actuone-Foxconn
SSM WG	08/15/02	Buena Park, CA / Actuone-Foxconn
SAS Prot WG	08/21-23/02	Shrewsbury, MA / Evans
SSM Edit	10/15/02	Worcester, MA / Tyco/Madison
SSM WG	10/16/02	Worcester, MA / Tyco/Madison
PIP WG	10/17/02	Worcester, MA / Tyco/Madison
SBP-3 WG	11/5-6/02	Huntington Beach, CA / QLogic

```
 Map Abbreviation Key:
ADI:          Automation Drive Interface (tape library interface)
Amnd:         Amendment
CAP:          Commands, Architecture, and Protocols
Fast-80:      Data Transfer at 80 Mega-transfers/sec. (a.k.a., Ultra3,Ultra160)
Fast-160:     Data Transfer at 160 Mega-transfers/sec. (a.k.a., Ultra320)
FC:           Fibre Channel
I/F:          Interface
IETF:         Internet Engineering Task Force (the group that sets
              Internet standards)
iFC:          Internet Fibre Channel
IPS:          Internet Protocol SCSI
iSCSI:        Internet SCSI
LB:           Letter Ballot
MMC:          Multimedia Commands (CD-ROM, DVD, etc.)
OSD:          Object-based Storage Device
Par.:         Parallel (e.g., SPI-n)
PH or PHY:    Physical (Connectors, Cables, Transceivers, etc.)
PIP:          (SCSI) Passive Interconnect Performance
Plenary:      Full Committee Meeting
Res:          Resolution
SAS:          Serial Attached SCSI
SBC-2:        SCSI Block Commands - 2
SBP-3:        Serial Bus Protocol - 3
SCSI:         Small Computer System Interface
SES:          SCSI Enclosure Services
SFF:          SFF Industry Group (not an INCITS activity)
SG:           Study Group
SMC-2:        SCSI Medium Changer - 2 Commands
SPC-3:        SCSI Primary Commands - 2 (3rd generation)
SPI-4:        Fourth Generation SCSI Parallel Interface
SPI-5:        Fifth Generation SCSI Parallel Interface
SRP:          SCSI RDMA Protocol (was SVP)
SRP-2:        SCSI RDMA Protocol (2nd generation)
SSC-2:        SCSI Stream Commands - 2 (includes Tape)
SSM-2:        SCSI Signal Modeling (2nd generation)
SSWGs:        Specific-Subject Working Groups
STA:          SCSI Trade Association (Closed meeting -- not an INCITS activity)
STA Marcom:   STA Marketing Communications (Closed meeting -- not an INCITS activity)
STA Tech:     STA Technical Meeting (T10 members invited)
T10:          Lower Level Interfaces Technical Committee
T11:          Device Level Interfaces Technical Committee
WG:           Working Group (same as Ad Hoc Group)
```

For more information about T10 activities, please contact the following people:

```
Activity                    Contact         Telephone/Email
--------------------------- --------------- ------------------------------
ADP, ADT, ADC               Bob Griswold    (512) 928-7272
                                            rgriswold@crossroads.com
EPI                         Bill Ham        (508) 841-2629
                                            bill_ham@ix.netcom.com
PIP, PIP-2                  Zane Daggett    (603) 669-4347 x236
                                            zdaggett@hcm.hitachi.com
FCP-2, SES                  Robert Snively  (408) 487-8135
                                            rsnively@brocade.com
SBC-2, SES-2, SAS           Rob Elliott     (281) 518-5037
                                            Robert.Elliott@compaq.com
MMC-2, MMC-3, MMC-4         Bill McFerrin   (303) 651-5400
                                            bill.mcferrin@cdedge.com
SBP-2 or RBC                Pete McLean     (303) 678-2149
                                            pete_mclean@maxtor.com
SBP-2, SBP-3                Peter Johansson (510) 527-3926
                                                    PJohansson@ACM.org
SCC-2, SPI-4, SPI-5, MSC    George Penokie  (507) 253-5208
                                            gpenokie@tivoli.com
SDV                         Terry Gibbons   (719 533-7499
                                            terry.gibbons@lsil.com
SMC, SMC-2                  Erich Oetting   (303) 673-2178
                                            Erich_Oetting@Stortek.com
SPC-3, SAM-2, SAM-3, OSD    Ralph Weber     (214) 912-1373
                                            roweber@acm.org
SSC, SSC-2, FCP-3           Dave Peterson   (612) 802-3299
                                            dap@cisco.com
SRP, SRP-2                  Cris Simpson    (503) 712-4333
                                            cris.simpson@intel.com
SSM, SSM-2                  Paul Aloisi     (603) 222-8687
                                            paul_aloisi@ti.com
Other Activities            John Lohmeyer   (719) 533-7560
                                            lohmeyer@t10.org
```

The long-term T10 meeting week schedule is:

```
Date                Location                 Host/Comments
------------------  -----------------------  -----------------------------
Nov  4-8, 2002      Huntington Beach, CA     QLogic
Jan 13-17, 2003     Portland, OR             Intel
Mar 10-14, 2003     Dallas, TX               T.I.
May 5-9, 2003       Nashua, NH               Hitachi Cable
Jul 14-18, 2003     Colorado Springs, CO     LSI Logic
Sep 8-12, 2003      Seattle, WA              Microsoft
Nov 3-7, 2003       Austin, TX               Crossroads
Proposed 2004 dates:
Jan 12-16, 2004
Mar 8-12, 2004
May 3-7, 2004
Jul 12-16, 2004
Sep 13-17, 2004
Nov 8-12, 2004
```

John Lohmeyer moved that the 2004 dates listed above be approved. Gerry Houlder seconded the motion. In the absence of any objections, the motion passed unanimously. John issued a call for meeting hosts for 2004.

14.1 Authorization of Working Group Meetings

John noted that the working group meetings are required to operate under the same voting procedures as does T10 (that is, one vote per organization) and the results of a working group are not binding on the parent committee. Ad hoc groups should strive to achieve consensus prior to bringing issues to T10.

Erich Oetting moved that T10 authorize the T10-related meetings and events in the list above that had not previously been approved through the end of October 2002. Mark Evans seconded the motion. In the absence of any objections, the motion passed unanimously.

15. Adjournment

The meeting was adjourned at 12:05 p.m. on Thursday July 18, 2002.

Enclosure(1) -- Meeting Attendees

```
        Name           S       Organization        Electronic Mail Address
---------------------- -- ------------------------ ------------------------
Mr. Ron Roberts        P  Adaptec, Inc.            Ron_Roberts@adaptec.com
Mr. Michael Wingard    P  Amphenol Interconnect    mikwingard@aol.com
Dr. Claudio DeSanti    P  Andiamo Systems, Inc.    cds@andiamo.com
Mr. Bill Galloway      P  BREA Technologies, Inc.  billg@breatech.com
Mr. David Peterson     P  Cisco Systems, Inc.      dap@cisco.com
Mr. Peter Johansson    P  Congruent Software, Inc. PJohansson@ACM.org
Mr. Robert Griswold    P  Crossroads Systems, Inc. rgriswold@crossroads.com
Mr. James A. Lott, Jr. A  Dallas Semiconductor     jim.lott@dalsemi.com
Mr. Kevin Marks        P  Dell Computer Corp.      kevin_marks@dell.com
Mr. Gary S. Robinson   P  EMC Corp.                robinson_gary@emc.com
Mr. Robert H. Nixon    P  Emulex                   bob.nixon@emulex.com
Mr. Ralph O. Weber     P  ENDL Texas               roweber@acm.org
Mr. Joe Breher         P  Exabyte Corp.            joebre@exabyte.com
Mr. Douglas Wagner     P  FCI                      dwagner@fciconnect.com
Mr. Mike Fitzpatrick   P  Fujitsu                  mfitzpatrick@fcpa.
                                                   fujitsu.com
Mr. Tim Mackley        A  General Dynamics         timothy.a.mackley@gd-ais.
                                                   com
Mr. Rob Elliott        P  Hewlett Packard Co.      Elliott@hp.com
Mr. Werner Glinka      AV Hitachi America          werner.glinka@attglobal.
                                                   net
Mr. Randy Wasylak      A  Hitachi Cable Manchester rwasylak@hcm.hitachi.com
Mr. Thomas J. Kulesza  P  Honda Connectors         tkulesza@hondaconnectors.
                                                   com
Mr. George O. Penokie  P  IBM / Tivoli Systems     gop@us.ibm.com
Mr. Cris Simpson       P  Intel Corp.              cris.simpson@intel.com
Mr. Dennis Moore       P  KnowledgeTek, Inc.       dmoore@ix.netcom.com
Mr. John Lohmeyer      P  LSI Logic Corp.          lohmeyer@t10.org
Ms. Jie Fan            P  Madison Cable Corp.      jie.fan@madisoncable.com
Mr. Mark Evans         P  Maxtor Corp.             mark_evans@maxtor.com
Mr. Pete McLean        A  Maxtor Corp.             pete_mclean@maxtor.com
Mr. Rob Haydt          A  Microsoft Corp.          robhay@microsoft.com
Mr. Jay Neer           P  Molex Inc.               jneer@molex.com
Mr. James R. (Bob)     P  Network Appliance Inc.   bob@netapp.com
Davis
Mr. Edward A. Gardner  P  Ophidian Designs         eag@ophidian.com
Dr. Terence J. Nelson  P  Panasonic Technologies,  terry@tjnelson.com
                          Inc
Mr. William P.         P  Philips Electronics/CD   bill.mcferrin@cdedge.com
McFerrin                  Edge
Mr. Skip Jones         P  QLogic Corp.             skip.jones@qlogic.com
Mr. Lawrence Barnes    V  QLogic Corp.             larry.barnes@qlogic.com
Mr. Paul Entzel        P  Quantum Corp.            paul.entzel@quantum.com
Mr. Gerald Houlder     P  Seagate Technology       gerry_houlder@seagate.com
Mr. Edward Haske       A  Silicon Image            haske@siliconimage.com
Mr. Erich Oetting      P  Storage Technology Corp. erich_oetting@stortek.com
Mr. Vit Novak          P  Sun Microsystems, Inc.   vit.novak@sun.com
Mr. Paul D. Aloisi     P  Texas Instruments        Paul_Aloisi@ti.com
Mr. Tasuku Kasebayashi P  Toshiba America Elec.    task.kasebayashi@tais.
                          Comp.                    toshiba.com
Mr. Michael Wamsley    A# TycoElectronics          mjwalmsl@tycoelectronics.
                                                   com
Mr. Charles Brill      V  TycoElectronics          cbrill@tycoelectronics.
                                                   com
Mr. Phil Shelton       A  UNISYS Corporation       phil.shelton@unisys.com
```

Mr. Kenneth Hirata   P Vixel Corp.   Ken.Hirata@Vixel.com

46 People Present

Status Key: P   - Principal
             A,A# - Alternate
             AV   - Advisory Member
             L   - Liaison
             V   - Visitor

Enclosure(2) -- T10 Attendance Database
         Generated on 2002/07/19 at 11:02:23

Mr. Ron Roberts (P)   Phone: (408) 957-5640
Adaptec, Inc.   Fax: (530) 677-1218
691 S. Milpitas Blvd.   Email: Ron_Roberts@adaptec.com
Milpitas, CA 95035

Mr. Ram Rangarajan (AV)   Phone: (408) 383-5719
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Mr. Steven P. Ego (AV)   Phone: (512) 258-2303
Aeronics Inc.   Fax: (512) 258-4392
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Austin, TX 78759

Mr. Bernhard Laschinsky (AV)   Phone: (610) 712-7937
Agere Systems   Fax: (610) 712-4574
Room 12D-225B   Email: blaschinsky@agere.com
1110 American Parkway NE
Allentown, PA 18109-9138

Mr. Ken Paist (AV)   Phone: (610) 712-3265
Agere Systems   Fax:
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1110 American Parkway NE
Allentown, PA 18109-9138

Mr. Litko Chan (AV)   Phone: (408) 970-3020
Agilent Technologies   Fax:
3175 Bowers Ave., MS 88R   Email: lito_chan@agilent.com
Santa Clara, CA 95054

Mr. Matt Wakeley (AV)   Phone: (916) 788-5670
Agilent Technologies   Fax:
1101 Creekside Ridge Dr #100   Email: matt_wakeley@agilent.com
P.O. Box 619051
Roseville, CA 95661-9051

Mr. Michael Wingard (P)   Phone: (607) 786-4241
Amphenol Interconnect   Fax: (607) 786-4311
20 Valley St.   Email: mikwingard@aol.com
Endicott, NY 13760

Mr. John Majernik (A)   Phone: (607) 786-4249
Amphenol Interconnect   Fax: (607) 786-4311
20 Valley St.   Email: john.majernik@aipce.com
Endicott, NY 13760

Mr. Bart Raudebaugh (AV)   Phone: (415) 322-5322
Ancot Corp.   Fax: (415) 322-0455

```
115 Constitution Dr.            Email: bart@ancot.com
Menlo Park, CA 94025


Mr. Ward Winburn  (AV)          Phone: (650) 322-5322
Ancot Corp.                       Fax: (650) 322-0455
115 Constitution Dr.            Email: ward@ancot.com
Menlo Park, CA 94025


Dr. Claudio DeSanti  (P)        Phone: (408) 853-9172
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