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**Project:**

**Ref. Doc.:**

**Reply to:** Mr. John Lohmeyer  
Symbios Logic Inc.  
1635 Aeroplaza Dr.  
Colo Spgs, CO 80916  
(719) 573-3362



## X3 SUBGROUP ANNUAL REPORT

Annual Report for: **X3T10**  
Covering the Period: April 1995 to March 1996  
Title of X3 Subgroup: Lower Level Interfaces  
Informal Description of Work: X3T10 develops standards and technical reports on I/O interfaces, particularly the Small Computer System Interface (SCSI).

### I. Executive Summary

X3T10 continues to run smoothly with 33 projects. Most of the active projects are related to the SCSI-3 family of standards. X3T10 membership has declined to 48 voting organizations from last year's 58 organizations. This drop is due to at least two factors: 1) There have been several acquisitions in our industry and 2) The ATA family of standards projects were transferred to the new X3T13 technical committee.

Work continues to progress in mapping SCSI command sets to three serial interfaces: Fibre Channel, SSA, and IEEE 1394. Also, there has been a renewed interest in parallel SCSI. This is mostly due to work on a new driver technology called Low-Voltage Differential (LVD). This work extends SCSI's maximum cable lengths and the maximum data rates supported with only a slight increase in costs.

The X3T10.1 task group has benefited from its experienced leadership in 1995. However, due to a job change, Ken Hallam had to resign as Chair of X3T10.1. Larry Lamers, another experienced officer, is the acting Chair and has formally applied for the position. The first generation of SSA projects have been forwarded to X3 *ahead of schedule* for first public review.

### II. Projects

#### 1. Interfaces Between Flexible Disks and Their Host Controllers

- a. Project 0052-M, Interfaces Between Flexible Disks and Their Host Controllers
- b. Target date for dpANS to X3: ?  
Original target date:  
Previous target date:  
Current target date: Published
- c. Project Description: This is a maintenance project on ANSI/ISO/IEC 9315:[1994], which was previously identified as X3.80-1988, Interfaces Between Flexible Disks and Their Host Controllers.
- d. Publications during the past year: none.
- e. Statement of Progress or Accomplishments During Year: none.

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

**X3 Secretariat, Information Technology Industry Council (ITI)**  
1250 Eye Street NW, Suite 200, Washington, DC 20005-3922  
Email: x3sec@itic.nw.dc.us Telephone: 202-737-8888 FAX: 202-638-4922

- f. Statement of Status as of This Report: Maintenance Phase -- no activity.
- g. Future Plans: none.
- h. Reasons for Delay: none.

## 2. Storage Module Interfaces (SMD-E)

- a. Project 0053-RF Storage Module Interfaces (SMD-E)
- b. Target date for dpANS to X3: ?  
Original target date:  
Previous target date:  
Current target date: Published--Reaffirmed: October 12, 1992
- c. Project Description: This is a maintenance project on X3.91-1992, Storage Module Interfaces.
- d. Publications during the past year: none.
- e. Statement of Progress or Accomplishments During Year: none.
- f. Statement of Status as of This Report: Maintenance Phase -- 5yr review due in 1997.
- g. Future Plans: none.
- h. Reasons for Delay: none.

## 3. Small Computer System Interface (SCSI-2)

- a. Project 0375-R, Small Computer System Interface (SCSI-2)
- b. Target date for dpANS to X3:  
Original target date: January 1988  
Previous target date: December 1991  
Current target date: none -- BSR approved 1/31/94
- c. Project Description: This project revised X3.131-1990 (SCSI-2 Rev 10c), which was approved by ANSI 8/31/90, but never published at X3's request.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Two TIBs were published.
- f. Statement of Status as of This Report: Maintenance Phase -- 5yr review due in 1999.
- g. Future Plans: none for SCSI-2; work continues on the SCSI-3 family of standards.
- h. Reasons for Delay: none.

## 4. Device Level Interface for Streaming Cartridge and Cassette Tape Drives

- a. Project 0378-M, Device Level Interface for Streaming Cartridge and Cassette Tape Drives
- b. Target date for dpANS to X3:  
Original target date: ?  
Previous target date: ?

- Current target date: Published
- c. Project Description: This is a maintenance project on X3.146-1986 [R1992].
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: none.
- f. Statement of Status as of This Report: Maintenance Phase -- 5yr review due in 1997.
- g. Future Plans: none.
- h. Reasons for Delay: none.

#### 5. Enhanced Small Device Interface (ESDI)

- a. Project 0587-M, Enhanced Small Device Interface (ESDI)
- b. Target date for dpANS to X3:
  - Original target date: ?
  - Previous target date:
  - Current target date: Maintenance Phase -- 5yr review due in 1999.
- c. Project Description: This is a maintenance project on X3.170-1990[1994]/X3.170a-1991[1994].
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Reaffirmed on 11/14/94.
- f. Statement of Status as of This Report: Maintenance Phase -- 5yr review due in 1999.
- g. Future Plans: none.
- h. Reasons for Delay: none.

#### 6. SCSI Common Access Method (SCSI CAM)

- a. Project 0792-M, SCSI Common Access Method (SCSI CAM)
- b. Target date for dpANS to X3:
  - Original target date: August 1991
  - Previous target date: February 1995
  - Current target date: N/A
- c. Project Description: This project defines a common method to access SCSI devices through a standard software interface to SCSI host adapters for several popular operating systems. This should result in simplified integration of products.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: CAM passed its second public review, was approved by X3, and was approved by BSR on 2/5/96.
- f. Statement of Status as of This Report: Waiting for publication at ANSI.

- g. Future Plans: A CAM-3 project (0990-D) is in development phase.
- h. Reasons for Delay: none.

#### 7. **SCSI-3 Parallel Interface (SPI)**

- a. Project 0855-D, SCSI-3 Parallel Interface (SPI)
- b. Target date for dpANS to X3:
  - Original target date: April 1992
  - Previous target date: February 1995
  - Current target date: (BSR approved 8/17/95)
- c. Project Description: The SCSI-3 Parallel Interface standard maintains a high degree of compatibility with SCSI-2 while providing documentation for new capabilities including an option to permit 16-bit data transfers on a single cable and expanded bus connectivity options to increase the maximum number of SCSI devices on a cable from 8 to 16 or more. This standard does not address areas above the physical level (such as protocol and command sets). This standard is used in conjunction with the command sets defined in SCSI-2 and/or subsequent versions of SCSI.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: SPI passed its second public review, was approved by X3, and was approved by BSR on 8/17/95.
- f. Statement of Status as of This Report: SPI Revision 15a is in publication phase at ANSI. The ANSI publications department found that a drafting standard referenced by SPI (for four figures) has been superseded. The change in the referenced standard has caused a 30-day X3 letter ballot to approve the reference change and the resulting minor edits to the four figures. Other more serious errors were discovered recently that have resulted in a SPI Amendment project request (currently at X3 letter ballot). The draft amendment is nearly complete and may be forwarded at the May '96 X3T10 meeting
- g. Future Plans: A SPI-2 project is in development phase.
- h. Reasons for Delay: Caught in a "Catch-22" due to the superseded drafting standard.

#### 8. **SCSI-3 Interlocked Protocol (SIP)**

- a. Project 0856-D, SCSI-3 Interlocked Protocol (SIP)
- b. Target date for dpANS to X3:
  - Original target date: April 1992
  - Previous target date: July 1995
  - Current target date: March 1996
- c. Project Description: The SCSI-3 Interlocked Protocol standard maintains a high degree of compatibility with the equivalent functions in SCSI-2 while defining several new features and functions. The candidate new features are support of more than 8 devices and other evolutionary features. This standard is intended to be used in conjunction with the SCSI-3 Parallel Interface standard and the SCSI-3 command set standards.
- d. Publications During Past Year: none.

- e. Statement of Progress or Accomplishments During Year: Several revisions were prepared and X3T10 forwarded SIP Revision 9a to X3 in March '96 for first public review.
- f. Statement of Status as of This Report: Revision 9a is ready for 1PR.
- g. Future Plans: A SIP-2 project will likely be requested for future enhancements to SIP.
- h. Reasons for Delay: Previous project editors were overloaded and delays in SPI and SAM prevented progress on SIP. This project benefited enormously this past year from a motivated project editor (George Penokie).

#### 9. Serial Storage Architecture - Transport Layer - 1 (SSA-TL1)

- a. Project 0989-D, Serial Storage Architecture - Transport Layer (SSA-TL1)
- b. Target date for dpANS to X3:
  - Original target date: August 1996
  - Previous target date: August 1996
  - Current target date: March 1996
- c. Project Description: The SSA-TL1 standard will define a transport layer that uses the SSA physical layer to transport the protocol above it. The goals of SSA-TL1 are: 1) minimize gate count. 2) define a web that supports frame multiplexing. 3) define flow control that allows a tradeoff between distance and data rate. and 4) define a full duplex transfer mechanism.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: The Task Group finished work on this project and forwarded SSA-TL1 to X3T10 in December 1995. X3T10 forwarded SSA-TL1 to X3 in March 1996.
- f. Statement of Status as of This Report: At X3 ready for 1PR.
- g. Future Plans: The SSA-TL2 (project 1147-D) is in development.
- h. Reasons for Delay: Forwarded to X3 ahead of schedule!

#### 10. Common Access Method - 3 (CAM-3)

- a. Project 0990-D, Common Access Method - 3 (CAM-3)
- b. Target date for dpANS to X3:
  - Original target date: July 1994
  - Previous target date: July 1996
  - Current target date: July 1996
- c. Project Description: This project is intended to revise and enhance the SCSI Common Access Method (CAM) such as adding 64-bit addressing and additional queuing modes.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: A first draft document was distributed in March 1996.
- f. Statement of Status as of This Report: A first draft was recently distributed. Participation at meetings was been discouragingly low. Since most of the people who care about this topic are

highly motivated to use email, we plan to shift the focus to electronic development using the committee reflectors.

- g. Future Plans: none.
- h. Reasons for Delay: The CAM project completely consumed the resources of those interested in this project.

#### 11. SCSI-3 Generic Packetized Protocol (GPP)

- a. Project 0991-DT, SCSI-3 Generic Packetized Protocol (GPP)
- b. Target date for dpANTR to X3:
  - Original target date: June 1993
  - Previous target date: March 1995
  - Current target date:
- c. Project Description: The Generic Packetized Protocol is intended to provide a protocol that can take advantage of multiple physical interfaces in a length-independent manner (i.e., a minimum number of packets per I/O Process). The Generic Packetized Protocol encapsulates the SCSI protocol, functions, commands, status, and data requiring minimal services from the physical interface. This project was converted from a Standards project to a Technical Report project about a year ago.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: GPP was registered as X3/TR-16-1995.
- f. Statement of Status as of This Report: Project complete.
- g. Future Plans: none.
- h. Reasons for Delay: Controversy over the GPP scope.

#### 12. SCSI-3 Serial Bus Protocol (SBP)

- a. Project 0992-D, SCSI-3 Serial Bus Protocol (SBP)
- b. Target date for dpANS to X3:
  - Original target date: February 1994
  - Previous target date: December 1994
  - Current target date:
- c. Project Description: The Serial Bus Protocol is intended to provide a protocol that can take advantage of the capabilities provided by the High Performance Serial Bus (IEEE 1394) to support an efficient transport service for SCSI products.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Comments were received and addressed from the first public review. SBP is currently in 2PR.
- f. Statement of Status as of This Report: Second public review closes April 30, 1996. No comments were received as of April 2nd
- g. Future Plans: An SBP-2 project has been approved and is in development (Project 1155-D).

- h. Reasons for Delay: The IEEE 1394 project was delayed.

### 13. SCSI-3 Fibre Channel Protocol (FCP)

- a. Project 0993-D, SCSI-3 Fibre Channel Protocol (FCP)
- b. Target date for dpANS to X3:
  - Original target date: February 1994
  - Previous target date: December 1994
  - Current target date: December 1994
- c. Project Description: The SCSI-3 Fibre Channel Protocol is intended to provide a protocol that can take advantage of the capabilities provided by the Fibre Channel physical layer to support an efficient, low-overhead transport service for SCSI products. The FCP is one of the protocols used in the FC-4 layer of Fibre Channel.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Several comments were received and addressed from first public review. Second public review passed without comments.
- f. Statement of Status as of This Report: FCP is at BSR for approval.
- g. Future Plans: An FCP-2 project has been approved and is in development (Project 1144-D).
- h. Reasons for Delay: This project was dependent on SAM and FC-PH reaching stability.

### 14. SCSI-3 Architecture Model (SAM)

- a. Project 0994-D, SCSI-3 Architecture Model (SAM)
- b. Target date for dpANS to X3:
  - Original target date: February 1994
  - Previous target date: December 1994
  - Current target date: December 1994
- c. Project Description: The SCSI-3 Architecture Model defines the architecture of SCSI and provides a model for implementing several protocols on a variety of transport mechanisms. This standard will define a unifying framework for the implementation of SCSI.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Several comments were received and addressed from first public review. Second public review passed without comments.
- f. Statement of Status as of This Report: SAM is at BSR for approval.
- g. Future Plans: none.
- h. Reasons for Delay: Controversy on several SAM requirements lead to a longer than anticipated time to reach consensus on the working draft.

### 15. SCSI-3 Primary Commands (SPC)

- a. Project 0995-D, SCSI-3 Primary Commands (SPC)

- b. Target date for dpANS to X3:  
     Original target date: June 1994  
     Previous target date: September 1995  
     Current target date: May 1996
- c. Project Description: The SPC is intended to provide a definition of those commands absolutely necessary to function in an SCSI environment plus those commands that are defined consistently for more than one command set. This command set will provide the means to identify the device type and hence identify which command set is appropriate for the device.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: An X3T10 forwarding letter ballot passed in March 1996. X3T10 is addressing the letter ballot comments and expects to forward SPC to X3 in May '96.
- f. Statement of Status as of This Report: Addressing X3T10 letter ballot comments.
- g. Future Plans: An SPC-2 project proposal will likely be forwarded during the next year.
- h. Reasons for Delay: It was difficult to cut off development, especially since most of the other SCSI-3 command set documents are behind SPC in development.

#### 16. SCSI-3 Block Commands (SBC)

- a. Project 0996-D, SCSI-3 Block Commands (SBC)
- b. Target date for dpANS to X3:  
     Original target date: June 1994  
     Previous target date: September 1995  
     Current target date: June 1996
- c. Project Description: The SCSI-3 Block Commands is intended to provide a complete set of commands to complement the SCSI-3 Primary Commands, and will be applicable to devices which transfer data in fixed block sizes (e.g., disk drives).
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Revision 2 was reviewed at the March '96 SCSI ad hoc meeting.
- f. Statement of Status as of This Report: We now have a motivated project editor and active development is under way. An ad hoc meeting in May '96 has been scheduled to review SBC.
- g. Future Plans: none.
- h. Reasons for Delay: Lack of project editor resources.

#### 17. SCSI-3 Stream Commands (SSC)

- a. Project 0997-D, SCSI-3 Stream Commands (SSC)
- b. Target date for dpANS to X3:  
     Original target date: June 1994  
     Previous target date: September 1995  
     Current target date: May 1996



- c. Project Description: The SCSI-3 Stream Commands is intended to provide a complete set of commands to complement the SCSI-3 Primary Commands, and be applicable to devices which transfer data in a streaming manner (e.g., tape drives).
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Three working drafts were prepared.
- f. Statement of Status as of This Report: A forwarding letter ballot is scheduled following the May '96 X3T10 meeting.
- g. Future Plans: none.
- h. Reasons for Delay: Waiting on the other SCSI-3 command set documents to reach maturity.

#### 18. SCSI-3 Graphic Commands (SGC)

- a. Project 0998-D, SCSI-3 Graphic Commands (SGC)
- b. Target date for dpANS to X3:
  - Original target date: June 1994
  - Previous target date: April 1996
  - Current target date: ???
- c. Project Description: The SCSI-3 Graphic Commands is intended to provide a complete set of commands to complement the SCSI-3 Primary Commands, and be applicable to devices which transfer data from/to a visual representation to/from a computer.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: A first draft document was prepared.
- f. Statement of Status as of This Report: There has been almost no interest in this project. The X3T10 chair plans to introduce a motion to withdraw the project if no activity occurs before September 1996.
- g. Future Plans: none.
- h. Reasons for Delay: Lack of interest.

#### 19. SCSI-3 Medium Changer Commands (SMC)

- a. Project 0999-D, SCSI-3 Medium Changer Commands (SMC)
- b. Target date for dpANS to X3:
  - Original target date: June 1994
  - Previous target date: November 1995
  - Current target date: July 1996
- c. Project Description: The SCSI-3 Medium Changer Commands is intended to provide a complete set of commands to complement the SCSI-3 Primary Commands, and be applicable to devices which can relocate data from an inventory location to and from a device.
- d. Publications During Past Year: none.

- e. Statement of Progress or Accomplishments During Year: Two revisions of the working draft were prepared.
- f. Statement of Status as of This Report: An X3T10 forwarding ballot is planned following the July '96 meeting.
- g. Future Plans: none.
- h. Reasons for Delay: Waiting on the other SCSI-3 command set documents to reach maturity.

## 20. SCSI-3 Controller Commands (SCC)

- a. Project 1047-D, SCSI-3 Controller Commands (SCC)
- b. Target date for dpANS to X3:
  - Original target date: July 1995
  - Previous target date: February 1995
  - Current target date:
- c. Project Description: The SCSI-3 Controller Commands standard is intended to provide a complete set of commands to complement the SCSI-3 Primary Command Set, and be applicable to devices which act as subsystem controllers, such as a disk array controllers.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: This project forwarded last year ahead of schedule. Comments from the first public review were addressed and a second public review passed without comment.
- f. Statement of Status as of This Report: SCC is at BSR for approval.
- g. Future Plans: X3T10 plans to address an SCC-2 project proposal.
- h. Reasons for Delay: No delay!

## 21. SCSI-3 Multimedia Commands (MMC)

- a. Project 1048-D, SCSI-3 Multimedia Commands (MMC)
- b. Target date for dpANS to X3:
  - Original target date: December 1994
  - Previous target date: September 1995
  - Current target date: July 1996
- c. Project Description: The SCSI-3 Multimedia Commands standard is intended to provide, in conjunction with the SCSI-3 Primary Commands (SPC), a complete set of commands for CD devices, while maintaining a high degree of compatibility with SCSI-2 compliant CD-ROM devices.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: This project continues to receive a great deal of industry interest. Two working drafts were prepared and distributed.
- f. Statement of Status as of This Report: An X3T10 forwarding ballot is planned following the July '96 meeting.

- g. Future Plans: none.
- h. Reasons for Delay: There have been several recent developments in the CD-ROM industry that are extending the time to complete this project.

## 22. Serial Storage Architecture - SCSI-3 Protocol (SSA-S3P)

- a. Project 1051-D, Serial Storage Architecture - SCSI-3 Protocol (SSA-S3P)
- b. Target date for dpANS to X3:
  - Original target date: April 1997
  - Previous target date: February 1996 (before project was redefined)
  - Current target date: April 1997
- c. Project Description: The SSA-S3P standard will define a protocol that maps the SCSI-3 command sets onto the transport layer and physical interface. This standard will maintain compatibility with SCSI-3 and the SCSI-3 Architecture Model. The goals of SSA-S3P are:
  - a) support for dual port and alternate paths;
  - b) support for data field format extensions;
  - c) support for auto-sense;
  - d) support for third-party operations.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: This project was placed on the back burner while the SSA-S2P standard was developed. Now that SSA-S2P has been forwarded, active development on SSA-S3P is under way.
- f. Statement of Status as of This Report: In development.
- g. Future Plans: none.
- h. Reasons for Delay: Priority was given to SSA-S2P.

## 23. SCSI-3 Fast-20 Parallel Interface (Fast-20)

- a. Project 1071-D, SCSI-3 Fast-20 Parallel Interface (Fast-20)
- b. Target date for dpANS to X3:
  - Original target date: November 1995
  - Previous target date: May 1995
  - Current target date:
- c. Project Description: The Fast-20 standard is intended to document extensions to SPI to permit transfer rates of 20 mega-transfers per second, while maintaining a high degree of compatibility with SPI.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Fast-20 passed its first public review with no comments.
- f. Statement of Status as of This Report: Fast-20 is at BSR for approval.
- g. Future Plans: none.
- h. Reasons for Delay: No delay!

**24. Serial Storage Architecture - SCSI-2 Protocol (SSA-S2P)**

- a. Project 1121-D, Serial Storage Architecture - SCSI-2 Protocol (SSA-S2P)
- b. Target date for dpANS to X3:
  - Original target date: June 1996 (before project was redefined)
  - Previous target date: June 1996 (before project was redefined)
  - Current target date: August 1996
- c. Project Description: The SSA-S2P standard will define a protocol that maps the SCSI-2 command sets onto the transport layer and physical interface. This standard will maintain compatibility with SCSI-2 to the extent possible in a serial environment. The goals of SSA-S2P are: a) provide an easy migration path to a serial interface; b) minimize the impact in converting firmware in existing devices; c) provide an architected error recovery mode; d) improve performance by reducing command overhead; e) define the data field format; f) provide the support needed for concurrent I/O processing.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: SSA-S2P Revision 7 was forwarded to X3 in March 1996.
- f. Statement of Status as of This Report: At X3 for 1PR.
- g. Future Plans: SSA-S3P (project 1051-D) is in development.
- h. Reasons for Delay: Forwarded ahead of schedule.

**25. SCSI Parallel Interface - 2 (SPI-2)**

- a. Project 1142-D, SCSI Parallel Interface - 2 (SPI-2)
- b. Target date for dpANS to X3:
  - Original target date: July 1997
  - Previous target date:
  - Current target date: July 1997
- c. Project Description: The SPI-2 standard will define a physical layer that will support the SCSI-3 Interlocked Protocol (SIP) transport layer and the command sets above it, while maintaining a high degree of compatibility with the current SPI standard. Candidates for inclusion in the SPI-2 draft standard are: 1) definition of a new driver/receiver technology to increase data rates, enhance signal margins, enhance cable lengths, and increase device counts; 2) enhancements to the physical layer to reduce power consumption and to address emerging market for lower voltage devices; 3) Maintenance of the SCSI physical level standard that may result from further implementation of the SPI standard.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Several revisions of the draft standard were prepared. There is strong industry interest in the Low-Voltage Differential (LVD) driver technology being defined.
- f. Statement of Status as of This Report: In development.
- g. Future Plans: none.

- h. Reasons for Delay: none.

## 26. SCSI Enhanced Parallel Interface Technical Report (EPI)

- a. Project 1143-D, SCSI Enhanced Parallel Interface Technical Report (EPI)
- b. Target date for dpANS to X3:
  - Original target date: May 1997
  - Previous target date:
  - Current target date: May 1997
- c. Project Description: This technical report will address complex physical configurations of parallel SCSI having one or more of the following features: a) mixed single-ended and differential devices on separate segments of the same logical bus; b) higher device count (e.g. > 16 devices); c) physical bus segments with branches to improve transmission line effects; d) extended physical bus segment lengths allowed by the propagation delay assumptions already built into the parallel SCSI protocol; e) removal and replacement of devices on active buses; f) removal, replacement, and addition of physical bus segments in active systems; g) mixed power conditions in active systems.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Several revisions of the draft technical report were prepared.
- f. Statement of Status as of This Report: In development.
- g. Future Plans: none.
- h. Reasons for Delay: none.

## 27. SCSI Fibre Channel Protocol - 2 (FCP-2)

- a. Project 1144-D, SCSI Fibre Channel Protocol - 2 (FCP-2)
- b. Target date for dpANS to X3:
  - Original target date: November 1997
  - Previous target date:
  - Current target date: November 1997
- c. Project Description: The FCP-2 standard will define a mapping layer for the execution of SCSI operations as defined by the SCSI-3 Architectural Model, ANSI X3.270-199X on the Fibre Channel - Physical and Signaling Interface as defined by ANSI X3.230-1994. It will maintain a high degree of compatibility with the present FCP standard. Candidates for inclusion in the FCP-2 draft standard include defining an optional response confirmation protocol for certain Fibre Channel Class 3 environments.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: none.
- f. Statement of Status as of This Report: In development.
- g. Future Plans: none.
- h. Reasons for Delay: none.

**28. Serial Storage Architecture - Physical Layer - 1 (SSA-PH1)**

- a. Project 1145-D, Serial Storage Architecture - Physical Layer (SSA-PH1)
- b. Target date for dpANS to X3:
  - Original target date: June 1994
  - Previous target date: March 1996 (before project was redefined)
  - Current target date: August 1996
- c. Project Description: The SSA-PH1 standard will define a physical layer that will support the SSA transport layer and the protocol above it. The goals of SSA-PH1 are: a) minimize gate count; b) copper cable operation at 20MB/sec.; c) full duplex operation to achieve an aggregate 40MB/sec between two ports; d) connectors and cables sized for small form factor devices.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: The Task Group finished work on this project and forwarded SSA-PH1 to X3T10 in December 1995. X3T10 forwarded SSA-PH1 to X3 in March 1996.
- f. Statement of Status as of This Report: At X3 ready for 1PR.
- g. Future Plans: The SSA-PH2 (project 1146-D) is in development.
- h. Reasons for Delay: Forwarded ahead of schedule!

**29. Serial Storage Architecture - Physical Layer - 2 (SSA-PH2)**

- a. Project 1146-D, Serial Storage Architecture - Physical Layer (SSA-PH2)
- b. Target date for dpANS to X3:
  - Original target date: April 1997
  - Previous target date:
  - Current target date: April 1997
- c. Project Description: The SSA-PH2 standard will define a physical layer that will support the SSA transport layer and the protocol above it. The goals of SSA-PH2 are: a) extend the cable distance; b) copper cable operation at 40MB/sec or greater; c) full duplex operation to achieve an aggregate 80MB/sec between two ports; and d) consider an optical transmission option.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: none.
- f. Statement of Status as of This Report: In development.
- g. Future Plans: none.
- h. Reasons for Delay: none.

**30. Serial Storage Architecture - Transport Layer - 2 (SSA-TL2)**

- a. Project 1147-D, Serial Storage Architecture - Transport Layer (SSA-TL2)
- b. Target date for dpANS to X3:
  - Original target date: April 1997
  - Previous target date:

Current target date: April 1997

- c. Project Description: The SSA-TL2 standard will define a transport layer that uses the SSA physical layer to support the protocol above it. The goals of SSA-TL2 are: a) provide support for an extended distance option in the physical layer; b) provide support for higher data rates in the physical layer; and c) enhance packet formats and addressing methods.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: none.
- f. Statement of Status as of This Report: In development.
- g. Future Plans: none.
- h. Reasons for Delay: none.

### 31. Boot Considerations for Devices Greater than 8 GBytes Technical Report

- a. Project 1154-DT, Boot Considerations for Devices Greater than 8 GBytes Technical Report
- b. Target date for dpANTR to X3:
  - Original target date: March 1996
  - Previous target date:
  - Current target date: July 1996
- c. Project Description: The traditional personal computer firmware mechanism for accessing files on a hard disk has an intrinsic limit of 8 GByte total disk capacity. SCSI disks are now available that exceed 8GByte, and similar ATA drives will be available in the near future. There has been considerable confusion over how to deal with this situation. X3T10 has addressed this question and feels that the industry would be well served by a document describing the current limitation and a recommended solution..
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: Technical work is complete.
- f. Statement of Status as of This Report: Editorial work is needed to convert the technical document into proper format for an ANSI Technical Report.
- g. Future Plans: none.
- h. Reasons for Delay: Lack of resources to do the editorial work.

### 32. SCSI Serial Bus Protocol 2 (SBP-2)

- a. Project 1155-D, SCSI Serial Bus Protocol 2 (SBP-2)
- b. Target date for dpANS to X3:
  - Original target date: November 1997
  - Previous target date:
  - Current target date: November 1997
- c. Project Description: The SBP-2 standard will define extensions to the transport layer protocols of Serial Bus Protocol to take advantage of the continued evolution of the High Performance Serial Bus. Candidates for inclusion in the SBP-2 draft standard are: a) clarify the SBP paradigm and revise the sections that map SBP to the SCSI-3 Architecture Model so they

more accurately describe SBP compliance; b) develop functional specifications for SBP high-availability factors, possibly in connection with to be defined extensions to High Performance Serial Bus transport media; c) extend SBP functionality to incorporate the anticipated inclusion of gigabit and greater transfer rates by High Performance Serial Bus; d) extend SBP functional specifications as required for operations within a group of High Performance Serial Buses connected by bridges, e) maintenance of the Serial Bus Protocol standard that may result from further implementation of the SBP standard (particularly in the area of isochronous data).

- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: none.
- f. Statement of Status as of This Report: In development - a first draft is planned for July '96.
- g. Future Plans: none.
- h. Reasons for Delay: none.

### 33. SCSI Architecture Model - 2 (SAM-2)

- a. Project 1157-D, SCSI Architecture Model - 2 (SAM-2)
- b. Target date for dpANS to X3:
  - Original target date: November 1997
  - Previous target date:
  - Current target date: November 1997
- c. Project Description: The SAM-2 standard will define an abstract layered model specifying those common characteristics of an SCSI I/O subsystem that must be exhibited by all SCSI protocols and implementations to insure compatibility with device drivers and applications regardless of underlying interconnect technology. SAM-2 will maintain a high degree of compatibility with the present SAM standard. Candidates for inclusion in the SAM-2 draft standard include extensions to support high availability requirements.
- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: none.
- f. Statement of Status as of This Report: In development - initial work on this project is planned for the May '96 SCSI ad hoc meeting.
- g. Future Plans: none.
- h. Reasons for Delay: none.

### 34. SCSI-3 Parallel Interface Amendment (SPI Amnd)

- a. Project \_\_\_\_-D, SCSI-3 Parallel Interface Amendment (SPI Amnd))
- b. Target date for dpANS to X3:
  - Original target date: May 1996
  - Previous target date:
  - Current target date: May 1996
- c. Project Description: The proposed scope of work is to develop an amendment to SPI to correct the identified defects.



- d. Publications During Past Year: none.
- e. Statement of Progress or Accomplishments During Year: none.
- f. Statement of Status as of This Report: The X3 letter ballot on approval of this project closes April 26, 1996. Technical work on the amendment is nearly complete. We hope to complete the editorial work in time to issue a forwarding letter ballot in May '96 .
- g. Future Plans: none.
- h. Reasons for Delay: none.

**III. Committee Activities**

a. Previous Year's Meetings:

May 11, 1995; Harrisburg, PA  
 July 13, 1995; Colorado Springs, CO  
 September 14; Manchester, NH  
 November 9, 1995; Palm Springs, CA  
 January 11, 1996; Dallas, TX  
 March 14, 1996; San Diego, CA

Previous Year's Meetings X3T10.1:

May 9, 1995; Harrisburg, PA  
 June 29, 1995; San Jose, CA  
 August 30, 1995; Ithaca, NY  
 November 1, 1995; Botley, England  
 December 13, 1995; Milpitas, CA  
 February 28, 1996; Stateline, NV

b. Current Year's Planned Meetings X3T10:

May 9, 1996; Ft. Lauderdale, FL  
 July 18, 1996; Colorado Springs, CO  
 September 12, 1996; Natick, MA  
 November 7, 1996; Palm Springs, CA  
 January 9, 1997; Dallas, TX  
 March 13, 1997; San Diego, CA

Current Year's Planned Meetings X3T10.1:

May 1, 1996; South Burlington, VT  
 June 26, 1996; St. Petersburg Beach, FL  
 August 28, 1996; Ft. Collins, CO  
 October 30, 1996; San Jose, CA  
 December 11, 1996; (TBD)  
 February 26, 1996; (TBD)

- |              |                    |                             |
|--------------|--------------------|-----------------------------|
| c. Officers: | X3T10              | X3T10.1                     |
| Chair:       | John B. Lohmeyer   | Lawrence J. Lamers (acting) |
| Vicechair:   | Lawrence J. Lamers | Greg Kapraun                |
| Secretary:   | Ralph O. Weber     | Lawrence J. Lamers (*)      |

\* Larry is soliciting volunteers to take over the Secretary position.

- d. Membership: The current X3T10 and X3T10.1 membership lists are attached.

- e. Liaison Activities: X3T11, X3T13, ISO/IEC JTC1/SC25/WG4, IEEE P1394.1, IEEE P1285.
- f. Administrative Matters of Note:

X3T10 and X3T11 have spent a great deal of time debating the fairness of the IPF. The people who are members of multiple X3 committees are being billed for each committee membership (and their memberships are terminated if they do not pay) while IEEE members are encouraged to pay once for all of their IEEE committee memberships (on a strictly voluntary basis). This discrepancy is impossible to defend.

- g. Procedural Matters of Note:

I understand that PPC approved the "X3T10 Standards Development Policies and Procedures" (X3T10/94-198 r3) at their January '96 meeting. That document is attached in addition to previously adopted X3T10 procedures. An agenda item for the May '96 X3T10 meeting would revise the X3T10 Electronic Notification procedure to include performing letter ballots completely electronically.

- h. Recommendations:

I understand that PPC has recently addressed the recurring issue of abstentions on technical issues. I did not hear the outcome, but fully support SD-2 changes to permit abstentions on all ballots except document forwardings.

#### **IV. Anticipated Projects**

It is anticipated that one or more projects will be needed for next-generation versions of current X3T10 projects as these projects near completion.

#### **V. Future Trends in this Technical Area**

The lower-level I/O interface market is in a state of transition. This is largely the result of technological advances that permit physically smaller disk drives. These drives will trend toward I/O interfaces that directly attach to host system circuit cards without an interface cable. This has resulted in less emphasis on cabled connectors and more emphasis on connectors that can either plug directly into a backplane or into a device connector such as the PCMCIA.

Meanwhile, other I/O interface applications that typically reside outside the processor cabinet, such as magnetic tape, printers, and optical devices, are trending toward serial interfaces to reduce cabling costs. A key enabling technology for these applications is the higher clock rates now available in CMOS and other circuit technologies.

#### **Attachment 1: Committee Projects: SD-4 Data**

(To be attached by the X3 Secretariat)

**Attachment 2: Internal Procedures****Procedure for Funding X3T10 Technical Editors**

**Abstract:** The volume of work in X3T10 exceeds the capacity and capabilities of volunteer technical editors. This procedure provides funding for paid editors to support the development and publication efforts within X3T10. The necessary funds (Editors Fund) is collected by adding a nominal surcharge to the mailing subscription fee. Funds are distributed to the paid editors by the X3 Secretariat upon approval of an invoice by X3T10.

**Enactment:** This procedure shall be enacted upon approval by X3T9.2 and X3T9 (which they did in late 1992; X3T10 voted to carry the procedure over to X3T10). Upon enactment, the X3 Secretariat shall establish accounting procedures to collect and administer the Editor Fund.

**Funds Collection:** The Editors Fund shall be maintained by the X3 Secretariat. A surcharge of \$50.00 shall be added to the X3T10 Mailing Subscription Fee. The funds collected from this surcharge shall be accumulated in the Editors Fund. Moneys remaining in the Editors Fund at the end of the year shall be rolled over into the Editors Fund for the next year. X3T10 may adjust the amount of the surcharge to the Mailing Subscription Fee from year to year to reflect anticipated editing workload.

**Funds Accounting:** The X3 Secretariat shall report that status of the Editors Fund to X3T10 annually and whenever the X3 Secretariat receives an invoice for editing work.

**Funds Distribution:** Upon receipt of a written invoice for editing work, the X3 Secretariat shall notify the X3T10 Chair providing a copy of the invoice and the current balance in the Editors Fund. The X3T10 Chair shall either add an item to the agenda of the next X3T10 meeting or issue a letter ballot to authorize payment of the invoice. Upon X3T10 approval of the invoice, the X3T10 Chair shall notify the X3 Secretariat of the approval and the X3 Secretariat shall issue a check for payment of the invoice. X3T10 shall not authorize payment of an invoice which would exceed the balance in the Editors Fund.

**Editing Authorization:** X3T10 may contract editing work on approved projects as deemed appropriate by the Technical Committee providing such contract work does not exceed the funds available in the Editor Fund.

**Electronic Notification Procedure**

(A revision of this procedure is to be considered at the May 9, 1996 X3T10 meeting)

This document proposes a procedure for the technical committee X3T10, its working groups and affiliated activities regarding the notification of principal, alternate, and observer members of a meeting or teleconference.

A member is any principal, alternate, or observer as recorded in the X3T10 attendance database at the point in time that the notification is sent.

**1. Means of notification and distribution**

X3T10 intends to meet its stated requirements for notification and distribution through the use of electronic means. Each member is requested to provide an e-mail address that is accessible through internet for the purpose of receiving the notifications. Members without an e-mail address cannot be guaranteed timely access to information on activities.

The primary means of notification and distribution will be the SCSI reflector e-mail list. Each member is responsible for requesting that their e-mail address be added to the SCSI reflector list (by sending an e-mail request to [scsiadm@wchitaks.ncr.com](mailto:scsiadm@wchitaks.ncr.com)).

**2. Notification of meetings and tele-conferences**

Two weeks prior to the conducting of a meeting or tele-conference all members shall be notified of the event. It is recommended that the notice be sent three weeks prior to the event to allow time for transmission, holidays, weekends, and access to the medium.

The notification shall contain the date, time, location of the event. In addition a contact person shall be named and their telephone number provided for anyone desiring further information. The notification shall specify the subject of the meeting and contain a statement of the meeting objective or an agenda.

### **3. Notification of alternates on letter ballots**

X3T10 routinely uses letter ballots in the conduct of its activities. The requirement for notification of alternates regarding the occurrence of a letter ballot will be met by sending a notice to the SCSI reflector.

Note - Principal members will receive via the postal service a letter ballot and the necessary documents for voting.

### **4. Distribution of meetings minutes**

The convenor of the meeting or tele-conference is required post minutes of the activity to the SCSI reflector within ten working days of the conclusion of the event. (The X3 rules allow two weeks for the delivery of meeting minutes.)

The minutes shall contain a list of participants, and sufficient detail that a member familiar with the activity can adequately informed of the progress made.

### **5. Distribution of documents**

Documents sent to the SCSI reflector will be considered to have met the two week rule for taking action if the members receive them two weeks prior to the start of the X3T10 plenary meeting. Any document so distributed shall have a native format version posted to the SCSI BBS or FTP site with a document number to be considered a proposal.

## **X3T10 Standards Development Policies and Procedures**

(Please see X3T10/94-198 r3, attached as a separate file)

**Attachment 3: X3T10 Current Membership List** (Note: This is the attendance database, which may omit some people from the X3 Secretariat's database of those people receiving mailings, particularly those people who have not attended a meeting.)

Mr. Norm Harris (P)  
Adaptec, Inc.  
691 S. Milpitas Blvd.  
Milpitas, CA 95035  
Phone: (408) 945-8600 x2230  
FAX: (408) 957-7145  
Email: nharris@eng.adaptec.com

Mr. Tak Asami (A#)  
Adaptec, Inc.  
8105 Irvine Ctr. Dr.  
Irvine, CA 92718  
Phone: (714) 932-7621  
FAX: (714) 932-6496  
Email: asami@dt.wdc.com

Mr. Lawrence J. Lamers (A)  
Adaptec, Inc.  
691 S. Milpitas Blvd.  
Milpitas, CA 95035  
Phone: (408) 957-7817  
FAX: (408) 957-7193  
Email: ljlammers@aol.com

Mr. Kevin Calvert (O)  
Adaptec, Inc.  
2801 McGaw Ave.  
Irvine, CA 92714  
Phone: (714) 253-0522  
FAX: (714) 253-0913  
Email: kevinc@fdc.mhs.comuserve.com

Mr. Ajay Malik (O)  
Adaptec, Inc.  
691 S. Milpitas Blvd.  
Milpitas, CA 95035  
Phone: (408) 945-8600 x2178  
FAX:  
Email: ajay\_malik@corp.adaptec.com

Mr. Erik Falk (O)  
ADIC  
POB 2996  
Redmond, WA 98073-2996  
Phone: (206) 881-8004  
FAX: (206) 881-2296  
Email:

Mr. Ron Apt (O)  
Advanced Micro Devices  
One AMD Place MS 59  
P. O. Box 3453  
Sunnyvale, CA 94088-3453  
Phone: (408) 749-2578  
FAX: (408) 774-8449  
Email: Ronald.Apt@amd.com

Mr. Fernando L. Podio (L)  
AIIM C21 Chair  
NIST  
Bldg. 225, Room A61  
Gaithersburg, MD 20899  
Phone: (301) 975-2947  
FAX: (301) 216-1369  
Email: fernando@pegasus.ncsl.nist.gov

Mr. Edward Fong (P)  
Amdahl Corp.  
1250 E. Arques Ave. MS 193  
Sunnyvale, CA 94088-3470  
Phone: (408) 944-3780  
FAX: (408) 943-6620  
Email: esf10@amail.amdahl.com

Mr. Peter Haas (A)  
Amdahl Corp.  
1250 E Arques Avenue, MS 312  
Sunnyvale, CA 94088-3470  
Phone: (408) 944-5119  
FAX: (408) 733-2377  
Email:

Mr. Jerrie L. Allen (O)  
Amdahl Corp.  
1250 E Arques Ave. MS 312  
POB 3470  
Sunnyvale, CA 94088-3470  
Phone: (408) 944-3712  
FAX: (408) 943-6620

Mr. Kent Manabe (O)  
Amer Kotabuki Elec Ind, Inc  
100 Century Center Ct. #310  
San Jose, CA 95112  
Phone: (408) 441-9232  
FAX: (408) 441-9246  
Email: 102511.1602@compuserve.com

Email: Jerrie.Allen@cccmts.amdahl.com

Mr. Charles Brill (P)  
AMP, Inc.  
Mail Stop 210-20  
P. O. Box 3608  
Harrisburg, PA 17105  
Phone: (717) 558-6198  
FAX: (717) 558-6179  
Email: cebrill@amp.com

Mr. Bob Atkinson (O)  
AMP, Inc.  
PO Box 3608  
Harrisburg, PA 17105  
Phone: (717) 780-4274  
FAX: (717) 780-4113  
Email: rdatkins@amp.com

Mr. Geoff Zech (O)  
AMP, Inc.  
449 Eisenhower Blvd.  
Harrisburg, PA 17111  
Phone: (717) 780-6572  
FAX: (717) 780-4508  
Email: ghzech@amp.com

Mr. Bill Mable (A)  
Amphenol Interconnect  
20 Valley St.  
Endicott, NY 13760  
Phone: (607) 786-4236  
FAX: (607) 786-4311  
Email:

Mr. Jan V. Dedek (P)  
Ancot Corp.  
115 Constitution Dr.  
Menlo Park, CA 94025  
Phone: (415) 322-5322  
FAX: (415) 322-0455  
Email: dedek@ancot.com

Mr. Dennis Pak (P)  
Apple Computer  
3535 Monroe St., MS 69-G  
Santa Clara, CA 95051  
Phone: (408) 974-4874  
FAX: (408) 974-2898  
Email: dennis.pak@applelink.apple.com

Mr. Bob Whiteman (A)  
AMP, Inc.  
P. O. Box 3608 M/S 26-17  
Harrisburg, PA 17105  
Phone: (717) 780-7481  
FAX: (717) 780-7375  
Email: whiteman@cup.portal.com

Mr. John Fulponi (O)  
AMP, Inc.  
3705 Paxton Street  
Harrisburg, PA \_\_\_\_\_  
Phone: (717) 780-6160  
FAX: (717) 780-6735  
Email: JAFulpon@amp.com

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

Mr. Carl Booth (O)  
Amphenol/Spectra-Strip  
720 Sherman Ave.  
Hamden, CT 06514  
Phone: (203) 287-7455  
FAX: (203) 281-5872  
Email: 7480559@mci mail.com

Mr. Gary Porter (A)  
Ancot Corp.  
115 Constitution Dr.  
Menlo Park, CA 94025  
Phone: (415) 322-5322  
FAX: (415) 322-0455  
Email: garyp@ancot.com

Mr. Mike Eneboe (A#)  
Apple Computer  
1 Infinite Loop, MS: 60-10  
Cupertino, CA 95014  
Phone: (408) 974-0615  
FAX: (408) 974-6615  
Email: Mike\_Eneboe@quickmail.apple.com

**Mr. Ron Roberts (A)**  
**Apple Computer**  
 3535 Monroe St. MS: 69-G  
 Santa Clara, CA 95051  
 Phone: (916) 677-5714  
 FAX: (916) 677-1218  
 Email: rkroberts@aol.com

**Mr. Chris Brown (O)**  
**Apple Computer, Inc.**  
 3535 Monroe St., MS: 69-B  
 Santa Clara, CA 95051  
 Phone: (408) 862-3159  
 FAX: (408) 974-5713  
 Email: brown.c@applelink.apple.com

**Mr. Joe Lawlor (O)**  
**AT&T**  
 1100 E. Warrenville Rd.  
 Rm 2A-429  
 Naperville, IL 60566  
 Phone: (708) 979-0133  
 FAX: (708) 979-0291  
 Email:

**Mr. Douglas Wagner (O)**  
**Berg Electronics**  
 472 Delwood Ct.  
 Newbury Park, CA 91320-4819  
 Phone: (805) 498-0325  
 FAX: (805) 498-0325  
 Email:

**Mr. Dennis R. Haynes (O)**  
**Burr-Brown Corp.**  
 Mail Stop #122  
 P. O. Box 11400  
 Tucson, AZ 85734  
 Phone: (520) 746-7262  
 FAX: (520) 746-7401  
 Email: haynes\_dennis@bbrown.com

**Mr. Clifford E. Strang Jr. (P)**  
**BusLogic**  
 4151 Burton Dr.  
 Santa Clara, CA 95054  
 Phone: (408) 565-6940  
 FAX: (408) 970-0941  
 Email: skipe@buslogic.com

**Mr. Jaff Lin (A)**  
**BusLogic**  
 4151 Burton Dr.  
 Santa Clara, CA 95054  
 Phone: (408) 492-9090  
 FAX: (408) 492-1542  
 Email: jaffl@buslogic.com

**Mr. Bob Gannon (O)**  
**C&M Corp.**  
 PO Box 348  
 51 South Walnut St.  
 Wauregan, CT 06387  
 Phone: (203) 774-4812  
 FAX: (203) 774-7330  
 Email: bobg848740@aol.com

**Mr. Richard Wagner (O)**  
**Cable Design Technologies**  
 28 Sword Street  
 Auburn, MA 01501  
 Phone: (508) 791-3161  
 FAX: (508) 798-8353  
 Email:

**Mr. Gerry Johnsen (P)**  
**Ciprico Inc.**  
 2800 Campus Dr. Suite 60  
 Plymouth, MN 55441  
 Phone: (612) 551-4000  
 FAX: (612) 551-4002  
 Email: gerry@ciprico.com

**Mr. Raymond Gilson (A)**  
**Ciprico Inc.**  
 2800 Campus Drive  
 Suite 60  
 Plymouth, MN 55441  
 Phone: (612) 551-4047  
 FAX: (612) 551-4002  
 Email: rwg@ciprico.com

**Mr. Ian Morrell (P)**  
**Circuit Assembly Corp.**  
 18 Thomas St.  
 Irvine, CA 92718-2703  
 Phone: (714) 855-7887  
 FAX: (714) 855-4298  
 Email: crctassmbl@aol.com

**Mr. Dennis Lang (A)**  
**Circuit Assembly Corp.**

**Mr. Joe Chen (P)**  
**Cirrus Logic Inc.**

18 Thomas St.  
Irvine, CA 92718-2703  
Phone: (714) 855-7887  
FAX: (714) 855-4298  
Email: crctassmbl@aol.com

3100 W. Warren Ave.  
Fremont, CA 94538  
Phone: (510) 226-2101  
FAX: (510) 226-2170  
Email: chen@cirrus.com

Mr. Dhiru N. Desai (A#)  
Cirrus Logic Inc.  
3100 W. Warren Ave.  
Fremont, CA 94538  
Phone: (510) 226-2144  
FAX: (510) 226-2370  
Email: ddesai@cirrus.com

Mr. John Geldman (A)  
Cirrus Logic Inc.  
3100 W. Warren Ave.  
Fremont, CA 94538  
Phone: (510) 249-4953  
FAX: (510) 249-4940  
Email: johng@cirrus.com

Mr. Nicos Syrimis (A#)  
Cirrus Logic Inc.  
3100 W. Fremont Ave.  
Fremont, CA 94538  
Phone: (510) 226-2153  
FAX: (510) 226-2170  
Email: nicos@cirrus.com

Mr. Edward Haske (P)  
CMD Technology  
1 Vanderbilt  
Irvine, CA 92718  
Phone: (714) 454-0800  
FAX: (714) 455-1656  
Email:

Mr. Roger Wang (A)  
CMD Technology  
1 Vanderbilt  
Irvine, CA 92718  
Phone: (714) 454-0800  
FAX: (714) 455-1656  
Email:

Mr. Peter Johansson (P)  
Congruent Software, Inc.  
3998 Whittle Ave.  
Oakland, CA 94602  
Phone: (510) 531-5472  
FAX: (510) 531-2942  
Email: pjohansson@aol.com

Mr. Louis Grantham (P)  
Dallas Semiconductor  
4401 S. Beltwood Pkwy  
Dallas, TX 75244-3292  
Phone: (214) 450-8110  
FAX: (214) 450-3715  
Email: grantham@dalsemi.com

Mr. Michael Smith (A)  
Dallas Semiconductor  
4401 S. Beltwood Pkwy  
Dallas, TX 75244  
Phone: (214) 450-0457  
FAX: (214) 450-3715  
Email: msmith@dalsemi.com

Mr. Bill Anderson (O)  
DDK Electronics, Inc.  
3001 Oakmead Village Dr.  
Santa Clara, CA 95051  
Phone: (408) 980-8344  
FAX: (408) 980-9750  
Email: 103345.623@compuserve.com

Mr. Charles Monia (P)  
Digital Equipment Corp.  
SHR3-2/W04  
334 South Street  
Shrewsbury, MA 01545  
Phone: (508) 841-6757  
FAX: (508) 841-6100  
Email: monia@shr.dec.com

Mr. William Dallas (A#)  
Digital Equipment Corp.  
ZK03-3/T79  
110 Spit Brook Road

Mr. Douglas Hagerman (A#)  
Digital Equipment Corp.  
SHR3-2/W3  
334 South Street



Nashua, NH 03062- 2698  
 Phone: (603) 881- 2508  
 FAX: (603) 881- 2257  
 Email: dallas@wasted.enet.dec.com

Dr. William Ham (A#)  
 Digital Equipment Corp.  
 SHR3- 2/W04  
 334 South Street  
 Shrewsbury, MA 01545  
 Phone: (508) 841- 2629  
 FAX: (508) 841- 5266  
 Email: ham@subsys.enet.dec.com

Mr. Roger Cummings (0)  
 Distributed Processing Tech.  
 140 Candace Dr.  
 Maitland, FL 32751  
 Phone: (407) 830- 5522 x348  
 FAX: (407) 260- 5366  
 Email: cummings\_roger@dpt.com

Mr. Tom Treadway (0)  
 Distributed Processing Tech.  
 140 Candace Dr.  
 Maitland, FL 32751  
 Phone: (407) 830- 5522  
 FAX: (407) 260- 5366  
 Email: Treadway@dpt.com

Mr. Rick Bohn (A)  
 Eastman Kodak Co.  
 460 Buffalo Road  
 Rochester, NY 14652- 3816  
 Phone: (716) 722- 0997  
 FAX: (716) 588- 2624  
 Email: bohn@sector.kodak.com

Mr. I. Dal Allan (A)  
 ENDL  
 14426 Black Walnut Ct.  
 Saratoga, CA 95070  
 Phone: (408) 867- 6630  
 FAX: (408) 867- 2115  
 Email: dal\_allan@mci mail.com

Mr. Edward Lappin (P)  
 Exabyte Corp.  
 Mail Stop 7W1  
 1685 38th Street  
 Boulder, CO 80301  
 Phone: (303) 417- 7718

Shrewsbury, MA 01545  
 Phone: (508) 841- 2145  
 FAX: (508) 841- 6100  
 Email: hagerman@starch.enet.dec.com

Mr. Stephen J. Sicola (0)  
 Digital Equipment Corp.  
 301 Rockrimmon Blvd. So.  
 Colorado Springs, CO 80132  
 Phone: (719) 548- 2268  
 FAX: (719) 548- 2541  
 Email: sicola@peaks.dec.com

Mr. Dave Race (0)  
 Distributed Processing Tech.  
 140 Candace Dr.  
 Maitland, FL 32751  
 Phone: (407) 830- 5522 x227  
 FAX: (407) 260- 5366  
 Email: Race@dpt.com

Mr. Robert Reisch (P)  
 Eastman Kodak Co.  
 460 Buffalo Road  
 Rochester, NY 14652- 3816  
 Phone: (716) 588- 0573  
 FAX: (716) 588- 2624  
 Email: reisch@sector.kodak.com

Mr. James D. Converse (X0)  
 Eastman Kodak Co.  
 Corp. Standards X3 Chair  
 343 State Street  
 Rochester, NY 14650  
 Phone: (716) 781- 9091  
 FAX: (716) 724- 9023  
 Email: jdc@kodak.com

Mr. Ralph O. Weber (P)  
 ENDL Associate  
 13 Century Road  
 Nashua, NH 03060- 1187  
 Phone: (603) 883- 9274  
 FAX: (603) 594- 0647  
 Email: roweber@acm.org

Mr. David Andreatta (A)  
 Exabyte Corp.  
 Mail Stop 752  
 1685 38th Street  
 Boulder, CO 80301  
 Phone: (303) 447- 7966

FAX: (303) 417-7793  
Email: tedl@exabyte.com

Mr. Gary R. Stephens (P)  
FSI Consulting Services  
1825 N. Norton  
Tucson, AZ 85719  
Phone: (520) 321-1725  
FAX: (520) 321-1725  
Email: 6363897@mci mail . com

Mr. Andy Chen (A)  
Fujitsu Computer Prods Amer  
2904 Orchard Pkwy.  
San Jose, CA 95134-2009  
Phone: (408) 894-3840  
FAX: (408) 894-3748  
Email: achen@fcpa.fujitsu.com

Mr. Kevin R. Pokorney (A#)  
Fujitsu Computer Products, Am  
2402 Clover Basin Drive  
Longmont, CO 80503  
Phone: (303) 682-6649  
FAX: (303) 682-6401  
Email: pokorney@intellistor.com

Mr. Steve Caron (O)  
Furukawa Electric  
200 Westpark Dr. Suite 190  
Peachtree City, GA 30269  
Phone: (404) 487-1234  
FAX: (404) 487-9910  
Email:

Mr. William Martin (A#)  
Hewlett Packard Co.  
8000 Foothills Blvd MS 5601  
Roseville, CA 95747-5601  
Phone: (916) 785-4517  
FAX: (916) 785-2875  
Email: kc@core.rose.hp.com

Mr. Donald C. Loughry (X0)  
Hewlett Packard Co.  
M/S 43UC X3 Vice Chair  
19420 Homestead Rd.  
Cupertino, CA 95014  
Phone: (408) 447-2454  
FAX: (408) 447-2247  
Email: don\_loughry@hp6600.desk.hp.com

FAX: (303) 442-5146  
Email:

Mr. Mike Chennery (A#)  
Fujitsu  
2904 Orchard Pkwy.  
San Jose, CA 95134-2009  
Phone: (408) 894-3627  
FAX: (408) 894-3904  
Email: mchenery@fcpa.fujitsu.com

Mr. Robert Liu (P)  
Fujitsu Computer Products, Am  
2904 Orchard Pkwy.  
San Jose, CA 95134  
Phone: (408) 894-3790  
FAX: (408) 894-3748  
Email: rliu@fcpa.fujitsu.com

Mr. Tim Norman (A#)  
Fujitsu Microelectronics/ECD  
3545 North First Street  
San Jose, CA 95134-1804  
Phone: (408) 922-8928  
FAX: (408) 428-0640  
Email:

Mr. Stephen Holmstead (P)  
Hewlett Packard Co.  
MS 470  
11413 Chinden Blvd.  
Boise, ID 83714  
Phone: (208) 396-4739  
FAX: (208) 396-6858  
Email: stephen@mail.boi.hp.com

Mr. J. R. Sims (A)  
Hewlett Packard Co.  
800 S. Taft Ave.  
Loveland, CO 80537  
Phone: (970) 635-6774  
FAX: (970) 635-6610  
Email: robsims@depeche.lvl.d.hp.com

Mr. Pat Edsall (O)  
Hewlett Packard Co.  
11413 Chinden Blvd.  
Boise, ID 83714  
Phone: (208) 396-4804  
FAX: (208) 396-6858  
Email: edsall@hpdmd48.boi.hp.com

Mr. Bill Hutchison (O)  
 Hewlett Packard Co.  
 P. O. Box 15  
 Boise, ID 83707-0015  
 Phone: (208) 396-3369  
 FAX: (208) 396-5117  
 Email: hutch@boi.hp.com

Mr. Ruben Yomtoubian (A#)  
 Hitachi America  
 3101 Tasman Dr.  
 Santa Clara, CA 95054  
 Phone: (408) 986-9770 x467  
 FAX: (408) 986-1821  
 Email: r\_yomtoubian@hitachi.com

Mr. Anthony Yang (A#)  
 Hitachi America Ltd.  
 3101 Tasman Drive  
 Santa Clara, CA 95054  
 Phone: (408) 653-0315  
 FAX: (408) 653-0376  
 Email: yang\_a@hal.sp.hitachi.com

Mr. Zane Daggett (P)  
 Hitachi Cable Manchester, Inc  
 900 Holt Ave.  
 Manchester, NH 03109  
 Phone: (603) 669-4347 x236  
 FAX: (603) 669-9621  
 Email: zdaggett@hcm.hitachi.com

Mr. Paul Boulay (A#)  
 Hitachi Computer Products  
 3101 Tasman Drive  
 Santa Clara, CA 95054  
 Phone: (408) 986-9770 x205  
 FAX: (408) 986-1821  
 Email: p\_boulay@hitachi.com

Ms. Nancy Cheng (A#)  
 Hitachi Computer Products  
 3101 Tasman Dr.  
 Santa Clara, CA 94054  
 Phone: (408) 986-9770  
 FAX: (408) 986-1825  
 Email: n\_cheng@hitachi.com

Mr. S. Nadershahi (P)  
 Hitachi Micro Systems, Inc.  
 179 Tasman Dr.  
 San Jose, CA 95134  
 Phone: (408) 456-2006  
 FAX: (408) 433-0223  
 Email: mnadersh@hitachi.com

Mr. Danny Yeung (A)  
 Hitachi Micro Systems, Inc.  
 179 East Tasman Dr.  
 San Jose, CA 95134  
 Phone: (408) 922-4144  
 FAX: (408) 954-8507  
 Email:

Mr. David McFadden (P)  
 Honda Connectors  
 960 Corporate Woods Parkway  
 Vernon Hills, IL 60061  
 Phone: (708) 913-9566  
 FAX: (708) 913-9587  
 Email:

Mr. Thomas J. Kulesza (A)  
 Honda Connectors  
 960 Corporate Woods Parkway  
 Vernon Hill, IL 60061  
 Phone: (847) 913-9566  
 FAX: (847) 913-9587  
 Email:

Mr. George Penokie (P)  
 IBM Corp.  
 2B7/114-2  
 37st Highway 52 N.  
 Rochester, MN 55901-7829  
 Phone: (507) 253-5208  
 FAX: (507) 253-2432  
 Email: gop@rchvmp3.vnet.ibm.com

Mr. Dan Colegrove (A#)  
 IBM Corp.  
 Dept 805/012-2  
 5600 Cottle Rd.  
 San Jose, CA 95193  
 Phone: (408) 256-1978  
 FAX: (408) 256-1044  
 Email: colegrove@vnet.ibm.com

Mr. John P. Scheible (A)

Mr. Michael A. Brewer (O)

IBM Corp.  
 Bldg 815 MS 4051  
 11400 Burnett Rd.  
 Austin, TX 78758  
 Phone: (512) 823- 8208  
 FAX: (512) 823- 0758  
 Email: Scheible@vnet.ibm.com

Mr. Duncan Penman (P)  
 IIX Consulting  
 1045 Rubis Dr.  
 Sunnyvale, CA 94087  
 Phone: (408) 730- 2565  
 FAX: (408) 730- 5527  
 Email: penman@netcom.com

Mr. Geoffrey Barton (P)  
 Iomega Corp.  
 1821 West 4000 South  
 Roy, UT 84067  
 Phone: (801) 778- 3655  
 FAX: (801) 778- 4667  
 Email: glbarton@iomega.com

Mr. Gregory Weaver (O)  
 Iomega Corp.  
 1821 W. Iomega Way  
 Roy, Utah 84067  
 Phone: (801) 778- 3293  
 FAX: (801) 778- 4667  
 Email: weaver@iomega.com

Mr. David H. Shaff (O)  
 JAE  
 2857 NE 26 Street  
 Ft. Lauderdale, FL 33305  
 Phone: (305) 563- 3484  
 FAX: (305) 563- 3507  
 Email:

Mr. Jeff Kishida (O)  
 JVC Information Products Co.  
 17811 Mitchell Ave.  
 Irvine, CA 92714  
 Phone: (714) 261- 1292  
 FAX: (714) 261- 9690  
 Email: 75022.3003@compuserve.com

Mr. Richard Frobose (O)  
 Lawrence Livermore Nat'l Lab  
 7000 East Ave. MS:L-60

IBM Corp.  
 74m/031- 1  
 9000 S. Rita Rd.  
 Tucson, AZ 85744  
 Phone: (520) 799- 6984  
 FAX:  
 Email: mabrewer@vnet.ibm.com

Mr. David Lawson (O)  
 Interphase Corp.  
 13800 Senlac  
 Dallas, TX 75234- 8823  
 Phone: (214) 919- 9000  
 FAX: (214) 919- 9200  
 Email: lawson@i phase.com

Mr. Pat LaVarre (A)  
 Iomega Corp.  
 1821 West Iomega Way  
 Roy, UT 84067  
 Phone: (801) 778- 4402  
 FAX: (801) 778- 4667  
 Email: p.lavarre@ieee.org

Ms. Katrina Gray (L)  
 ITI (X3 Secretariat)  
 1250 Eye St. NW  
 Suite 200  
 Washington, DC 20005- 3922  
 Phone: (202) 626- 5741  
 FAX: (202) 638- 4922  
 Email: kgray@itinc.nw.dc.us

Mr. David J. Fox (O)  
 JAE Electronics  
 142 Technology Dr. #100  
 Irvine, CA 92718- 2401  
 Phone: (714) 753- 2600  
 FAX: (714) 753- 2699  
 Email:

Mr. Dennis Moore (P)  
 KnowledgeTek, Inc.  
 7230 West 119th Pl, Suite C  
 Broomfield, CO 80020  
 Phone: (303) 465- 1800  
 FAX: (303) 426- 1350  
 Email: dmoore@netcom.com

Mr. Dean Wallace (P)  
 Infinity Micro  
 11861 Western Ave.

Livermore, CA 94550-9900  
 Phone:  
 FAX:  
 Email:

Garden Grove, CA 92641  
 Phone: (714) 898-8121  
 FAX: (714) 893-2570  
 Email: 75671.3443@compuserve.com

Mr. Shufan Chan (A)  
 Linfinity Micro  
 11861 Western Ave.  
 Garden Grove, CA 92641  
 Phone: (714) 898-8121  
 FAX: (714) 893-2570  
 Email: 104041.2163@compuserve.com

Mr. Wayne E. Werner (O)  
 Lucent Technologies  
 1247 S. Cedar Crest Blvd.  
 Allentown, PA 18103  
 Phone: (610) 712-2234  
 FAX:  
 Email: wew@alupo.att.com

Mr. Robert Bellino (A#)  
 Madison Cable Corp.  
 125 Goddard Memorial Dr.  
 Worcester, MA 01603  
 Phone: (508) 752-7320  
 FAX: (508) 752-4230  
 Email: robert\_bellino@madisonusa.ccm

Mr. Ron Crouch (O)  
 Madison Cable Corp.  
 125 Goddard Memorial Drive  
 Worcester, MA 01603  
 Phone: (508) 752-2884  
 FAX: (508) 752-4230  
 Email:

Ms. Donna Pope (O)  
 Maxoptix Corp.  
 2520 Junction Ave.  
 San Jose, CA 95134  
 Phone: (408) 954-9700 x315  
 FAX: (408) 954-9711  
 Email: 6471084@mci mail.com

Mr. Pete McLean (P)  
 Maxtor Corp.  
 2190 Miller Dr.  
 Longmont, CO 80501  
 Phone: (303) 678-2149  
 FAX: (303) 678-2165  
 Email: pete\_mclean@maxtor.com

Mr. LeRoy Leach (O)  
 Maxtor Corp.  
 2190 Miller Dr.  
 Longmont, CO 80501-6744  
 Phone: (303) 678-2828  
 FAX: (303) 678-2308  
 Email: leroyleach@maxtor.com

Mr. Steve D. Schueler (P)  
 Methode Electronics, Inc.  
 7444 W. Wilson Ave.  
 Chicago, IL 60656  
 Phone: (708) 867-9600  
 FAX: (708) 867-9130  
 Email:

Mr. John Cannon (A)  
 Methode Electronics, Inc.  
 7444 West Wilson Ave  
 Chicago, IL 60656  
 Phone: (708) 867-9600  
 FAX: (708) 867-9130  
 Email:

Mr. Frank Samela (A#)  
 Methode Electronics, Inc.  
 7444 W. Wilson Ave.  
 Chicago, IL 60148  
 Phone: (708) 867-9600  
 FAX: (708) 867-0346  
 Email:

Mr. Chris Nieves (O)  
 Micropolis Corp.  
 21211 Nordhoff St.  
 Chatsworth, CA 91311  
 Phone: (818) 718-5163

Mr. Michael Aarons (O)  
 Mitsumi (Alpha Peripherals)  
 16842 Von Karman Ave.  
 Suite 100  
 Irvine, CA 92714

FAX: (818) 718- 5352  
 Email: Chris\_Nieves@microp.com

Phone: (714) 263- 6414  
 FAX: (714) 263- 6416  
 Email: m\_aarons@cerf.net

Mr. Joe Dambach (P)  
 Molex Inc.  
 2222 Wellington Court  
 Lisle, IL 60532  
 Phone: (708) 527- 4546  
 FAX: (708) 969- 1352  
 Email: jdambach@molex.com

Mr. Jay Neer (A)  
 Molex Inc.  
 399 W. Camino Gardens Blvd.  
 Suite 103  
 Boca Raton, FL 33432  
 Phone: (407) 447- 2907  
 FAX: (407) 447- 2908  
 Email: jneer@molex.com

Mr. Chris D'Iorio (O)  
 NEC Technologies  
 1255 Michael Dr.  
 Wood Dale, IL 60191  
 Phone: (708) 238- 7799  
 FAX: (708) 860- 7794  
 Email: CD-iorio@nectech.com

Mr. Peter Gossler (O)  
 NSM Jukebox GmbH  
 1M Tiergarten 20- 30  
 Bingen 55411 Germany  
 Phone: +49 6721 964- 394  
 FAX: +49 6721 407- 414  
 Email: PeterGossler@nsm.com

Mr. Dennis Van Dalsen (P)  
 Oak Technology, Inc.  
 139 Kifer Ct.  
 Sunnyvale, CA 94086  
 Phone: (408) 737- 0888  
 FAX: (408) 737- 3838  
 Email: dennis@oaktech.com

Mr. Wayne Baldwin (A#)  
 Oak Technology, Inc.  
 139 Kifer Ct.  
 Sunnyvale, CA 94086  
 Phone: (408) 737- 0888  
 FAX: (408) 774- 5352  
 Email: wayneb@corp.oaktech.com

Mr. Jack Chen (A#)  
 Oak Technology, Inc.  
 139 Kifer Court  
 Sunnyvale, CA 94086  
 Phone: (408) 523- 6665  
 FAX:  
 Email: jackc@oaktech.com

Mr. Mike Hetzel (A)  
 Oak Technology, Inc.  
 139 Kifer Ct.  
 Sunnyvale, CA 94086  
 Phone: (408) 737- 0888 x257  
 FAX: (408) 737- 3838  
 Email: mi keh@corp.oaktech.com

Mr. Edward A. Gardner (P)  
 Ophi dian Design  
 1262 Hofstead Terrace  
 Colorado Springs, CO 80907  
 Phone: (719) 593- 8866  
 FAX: (719) 593- 8989  
 Email: gardner@acm.org

Mr. Dan Davies (O)  
 Overland Data Inc.  
 8975 Balboa Ave.  
 San Diego, CA 92123- 1599  
 Phone: (619) 571- 5555 x213  
 FAX: (619) 571- 3664  
 Email: ddavies@ovrl and.com

Mr. Earl J. Perera (O)  
 P. E. Logic Corp.  
 22695 Old Canal Rd.  
 Yorba Linda, CA 92687  
 Phone: (714) 282- 6188  
 FAX: (714) 282- 6199  
 Email:

Mr. Stephen F. Heil (P)  
 Panasonic Technologies, Inc  
 2 Research Way, 3rd Floor  
 Princeton, New Jersey 08540  
 Phone: (609) 987- 3948  
 FAX: (609) 987- 0483  
 Email: sfh@research.panasonic.com

Dr. Akira James Miura (A)  
 Panasonic Technologies, Inc  
 1072 East Meadow Circle  
 Palo Alto, CA 94303-4270  
 Phone: (415) 858-1000  
 FAX: (415) 493-1930  
 Email: miura@tadw.research.panasonic.com

Mr. Bill McFerrin (O)  
 Philips KMG  
 4725 ArrowsWest Blvd.  
 Colorado Springs, CO 80907  
 Phone: (719) 593-4564  
 FAX: (719) 593-4271  
 Email: BMcFerrin@aol.com

Mr. Sunil Nethisinghe (O)  
 Philips Semiconductors MS 52  
 811 E. Arques Ave.  
 Sunnyvale, CA 94088  
 Phone: (408) 991-4540  
 FAX: (408) 991-4500  
 Email: nethisin@scs.philips.com

Mr. Param Panesar (O)  
 Pioneer Research  
 1745 Berkeley St.  
 Santa Monica, CA 90404  
 Phone: (310) 829-6751  
 FAX: (310) 453-3929  
 Email:

Mr. Marco Antonio Scocco (O)  
 Pirelli Cabos S/A  
 Engenharia De Telecomunicacoes  
 Av Pirelli 1100-Bairro Eden  
 18103-000 Sorocaba SP Brazil  
 Phone:  
 FAX:  
 Email:

Mr. Skip Jones (P)  
 QLogic Corp.  
 3545 Harbor Blvd.  
 Costa Mesa, CA 92626  
 Phone: (714) 668-5058  
 FAX: (714) 688-5008  
 Email: sk\_jones@qlc.com

Mr. Ting Li Chan (A)  
 QLogic Corp.  
 3545 Harbor Blvd.  
 P. O. Box 6725  
 Costa Mesa, CA 92626  
 Phone: (714) 668-5058  
 FAX: (714) 688-5008  
 Email: t\_chan@qlc.com

Mr. James McGrath (P)  
 Quantum Corp.  
 500 McCarthy Blvd.  
 Milpitas, CA 95035  
 Phone: (408) 894-4504  
 FAX: (408) 894-6375  
 Email: JMCGRATH@QNTM.COM

Mr. Mark Evans (A)  
 Quantum Corp.  
 500 McCarthy Blvd.  
 Milpitas, CA 95035  
 Phone: (408) 894-4019  
 FAX: (408) 894-4990  
 Email: mevans@qntm.com

Mr. John A. Fobel (O)  
 Rancho Technology, Inc.  
 10783 Bell Court  
 Rancho Cucamonga, CA 91730  
 Phone: (909) 987-3966  
 FAX: (909) 989-2365  
 Email: scsi@trancho.com

Dr. Tetsuro Motoyama (O)  
 Ricoh Corporation  
 3001 Orchard Parkway  
 San Jose, CA 95134-2088  
 Phone: (408) 954-5445  
 FAX: (408) 432-8398  
 Email: motoyama@str.ricoh.com

Mr. S. Jauher Zaidi (O)  
 Samsung Semiconductor  
 3655 N. First Street MS/E3  
 San Jose, CA 95134-1713  
 Phone: (408) 954-7005  
 FAX: (408) 954-7150  
 Email: syed@sam.com

Mr. Gene Milligan (P)  
 Seagate Technology  
 MS OKM 251  
 P. O. Box 12313  
 Oklahoma City, OK 73157  
 Phone: (405) 324-3070  
 FAX: (405) 324-3794  
 Email: Gene\_Milligan@notes.seagate.com

Mr. Michael Bryan (A#)  
 Seagate Technology  
 2400 Trade Centre  
 Longmont, CO 80503  
 Phone: (303) 682-8407  
 FAX: (303) 682-8787  
 Email: Mike.Bryan@conner.com

Mr. Brian N. Davis (A#)  
 Seagate Technology  
 4585 Scotts Valley Dr.  
 Scotts Valley, CA 95066-4544  
 Phone: (408) 439-7150  
 FAX: (408) 438-4846  
 Email: brian\_davis@notes.seagate.com

Mr. Timothy Feldman (A#)  
 Seagate Technology  
 2400 Trade Centre  
 Longmont, CO 80503  
 Phone: (303) 682-8329  
 FAX: (303) 682-8787  
 Email: Tim.Feldman@conner.com

Mr. Gerald Houlder (A)  
 Seagate Technology  
 MPS043  
 8001 E. Bloomington Freeway  
 Bloomington, MN 55420-1094  
 Phone: (612) 844-5869  
 FAX: (612) 844-5708  
 Email: Gerry\_Houlder@notes.seagate.com

Mr. Brian Johnson (A#)  
 Seagate Technology  
 2655 Park Center Dr.  
 Simi Valley, CA 93065  
 Phone: (805) 582-3808  
 FAX: (805) 583-8709  
 Email:

Mr. John Masiewicz (A#)  
 Seagate Technology  
 915 Disc Drive  
 Scotts Valley, CA 95066  
 Phone: (408) 439-7119  
 FAX: (408) 438-4846  
 Email: Masiewicz@notes.seagate.com

Mr. Joseph Wach (A#)  
 Seagate Technology  
 2400 Trade Centre  
 Longmont, CO 80503  
 Phone: (303) 682-8387  
 FAX: (303) 682-8787  
 Email: Joe.Wach@conner.com

Mr. Paul Entzel (0)  
 Seagate Technology  
 1650 Sunflower Ave.  
 Costa Mesa, CA 92626  
 Phone: (714) 966-2204  
 FAX: (714) 966-5577  
 Email: paul.entzel@conner.com

Mr. Edward Hoskins (0)  
 Seagate Technology  
 2655 Park Center Dr.  
 Simi Valley, CA 93065  
 Phone: (805) 582-3821  
 FAX: (805) 583-1493  
 Email: ed\_hoskins@notes.seagate.com

Mr. Ron Werbow (0)  
 Seagate Technology  
 2655 Park Center Dr.  
 Simi Valley, CA 93065  
 Phone: (805) 582-3815  
 FAX: (805) 583-1493  
 Email: ron\_werbow@notes.seagate.com

Mr. Thomas 'Rick' Tewell (0)  
 Sequoia Advanced Tech., Inc.  
 55 Shaver Street, Suite 240  
 San Rafael, CA 94901  
 Phone: (415) 459-7978  
 FAX: (415) 459-7988  
 Email: thomas.tewell@seqadvtech.com

Dr. Colin Whitby-Strevens (0)  
 SGS-Thomson/INMDS

Mr. Dave Guss (P)  
 Silicon Systems, Inc.



1000, Aztec West  
Almondsbury,  
Bristol, BS12 4SQ UK  
Phone: +44 454 611 500  
FAX: +44 454 619 796  
Email: colinws@isnet.inmos.co.uk

Mr. Stephen G. Finch (A)  
Silicon Systems, Inc.  
14351 Myford Road  
Tustin, CA 92680-7022  
Phone: (714) 573-6808  
FAX: (714) 573-6916  
Email: steve.finch@tus.ssi1.com

Mr. David Deming (O)  
Solution Technology  
P. O. Box 104  
Boulder Creek, CA 95006  
Phone: (408) 338-4285  
FAX: (408) 338-4374  
Email:

Mr. Doug Charnley (A)  
Storage Technology Corp.  
2270 South 88th St. MS 0211  
Louisville, CO 80028-0211  
Phone: (303) 661-7271  
FAX: (303) 673-8196  
Email: doug\_chnrley@stortek.com

Mr. Vit Novak (A)  
Sun Microsystems, Inc.  
Mail Stop 15-46  
2550 Garcia Ave.  
Mountain View, CA 94043-1100  
Phone: (415) 336-2455  
FAX: (415) 968-4873  
Email: vit.novak@sun.com

Mr. Greg Kapraun (A)  
Symbios Logic Inc.  
2001 Danfield Ct.  
Fort Collins, CO 80525  
Phone: (970) 225-4843  
FAX: (970) 226-9686  
Email: Greg.Kapraun@symbios.com

Mr. Akram Atallah (A)  
SyQuest Technology, Inc.  
3005 Center Green Drive  
Suite 100

14351 Myford Rd.  
Tustin, CA 92680  
Phone: (714) 573-6824  
FAX: (714) 573-6916  
Email: dave.guss@tus.ssi1.com

Mr. James Ryland (XO)  
Social Security Admin  
NCC Room 5110 OMC liaison  
6201 Security Blvd.  
Baltimore, MD 21234-0001  
Phone: (410) 965-2166  
FAX: (410) 966-1893  
Email: JRYLAND@SSA.SSW.DHHS.GOV

Mr. Erich Oetting (P)  
Storage Technology Corp.  
2270 South 88th St.  
Louisville, CO 80028-0268  
Phone: (303) 673-2178  
FAX: (303) 673-8196  
Email: Erich\_Oetting@Stortek.com

Mr. Robert N. Snively (P)  
Sun Microsystems Computer Co  
Mail Stop UMPK 12-204  
2550 Garcia Avenue  
Mountain View, CA 94043-1100  
Phone: (415) 786-6694  
FAX: (415) 786-6458  
Email: bob.snively@eng.sun.com

Mr. John Lohmeyer (P)  
Symbios Logic Inc.  
1635 Aeroplaza Dr.  
Colorado Springs, CO 80916  
Phone: (719) 573-3362  
FAX: (719) 573-3037  
Email: john.lohmeyer@symbios.com

Mr. Patrick Mercer (P)  
SyQuest Technology, Inc.  
47071 Bayside Parkway  
Fremont, CA 94538-6517  
Phone: (510) 226-4215  
FAX: (510) 226-4104  
Email: patrick.mercer@syquest.com

Mr. John Moy (P)  
Tandem Computers  
Loc 100-03  
10555 Ridgeview Ct.

Boulder, CO 80301  
 Phone: (303) 938-2925  
 FAX: (303) 938-2987  
 Email: akram atallah@syquest.com

Mr. Pete Tobias (A)  
 Tandem Computers  
 Loc 100-03  
 10555 Ridgeview Ct.  
 Cupertino, CA 95014-0789  
 Phone: (408) 285-9913  
 FAX: (408) 285-9924  
 Email: tobias\_pete@tandem.com

Mr. Steven Walker (O)  
 Thomas & Betts  
 1555 Lynnfield Rd.  
 Memphis, TN 38119  
 Phone: (901) 680-5992  
 FAX: (901) 537-8805  
 Email: walkertnb@aol.com

Mr. Gary M Watson (O)  
 Trimm Technologies  
 350 Pilot Rd.  
 Las Vegas, NV 89119  
 Phone: (800) 423-2024  
 FAX:  
 Email: trimm@netcom.com

Mr. Arlan P. Stone (A)  
 UNISYS Corporation  
 MS 201  
 25725 Jeronemo Rd.  
 Mission Viejo, CA 92691  
 Phone: (714) 380-5982  
 FAX: (714) 380-6099  
 Email: arlan.stone@mv.unisys.com

Mr. Matthew Thomas (A)  
 Unitrode Integrated Circuits  
 7 Continental Blvd  
 Merrimack, NH 03054-0399  
 Phone: (603) 429-8947  
 FAX: (603) 424-3460  
 Email: thomasm@ui.cc.com

Mr. Michael G. Kaminski (O)  
 Volex Inc.  
 835 Sinclair Frontage Road  
 Milpitas, CA 95035  
 Phone: (408) 945-7766  
 FAX: (408) 945-4360

Cupertino, CA 95014-0789  
 Phone: (408) 285-0463  
 FAX: (408) 285-9924  
 Email: moy\_john@tandem.com

Mr. Bill Boyd (O)  
 Texas Instruments  
 MS 8218  
 8360 LBJ Freeway  
 Dallas, TX 75265  
 Phone: (214) 997-3673  
 FAX: (214) 997-5962  
 Email: bboy%mi mi@magi.c.itg.ti.com

Mr. Tokuyuki Totani (P)  
 Toshiba America  
 226 Airport Pkwy, Suite 310  
 San Jose, CA 95110  
 Phone: (408) 451-6960  
 FAX: (408) 451-9750  
 Email: totani@ix.netcom.com

Mr. Kenneth J. Hallam (P)  
 UNISYS Corporation  
 MW201  
 25725 Jeronemo Road  
 Mission Viejo, CA 92691  
 Phone: (714) 380-5115  
 FAX: (714) 380-5858  
 Email: ken.hallam@mv.unisys.com

Mr. Paul D. Aloisi (P)  
 Unitrode Integrated Circuits  
 7 Continental Blvd  
 Merrimack, NH 03054  
 Phone: (603) 429-8687  
 FAX: (603) 424-8963  
 Email: Aloisi@ui.cc.com

Mr. Eric Swartz (O)  
 Verisys  
 2901-B Research Park Dr.  
 Soquel, CA 95073  
 Phone: (408) 464-4292  
 FAX: (408) 464-4250  
 Email: eric@verisys.com

Mr. Francesco Liburdi (O)  
 Wearnsi Hollingsworth  
 1425 Elmira St.  
 Endicott, NY 13760  
 Phone: (607) 786-3721  
 FAX: (607) 786-3806

Email: Mike\_Kaminski@vol ex. com

Email:

Mr. Jeff Stai (P)  
Western Digital Corporation  
8105 Irvine Ctr. Dr.  
Irvine, CA 92718  
Phone: (714) 932-7644  
FAX: (714) 932-6496  
Email: stai@dt. wdc. com

Mr. Jeffrey L. Williams (A#)  
Western Digital Corporation  
1599 N. Broadway Ave.  
Rochester, MN 55906  
Phone: (507) 286-7589  
FAX: (507) 286-7528  
Email: jwilliam@wdroc. wdc. com

Mr. Devon Worrell (A#)  
Western Digital Corporation  
8105 Irvine Ctr. Dr.  
Irvine, CA 92718  
Phone: (714) 932-7042  
FAX: (714) 932-7796  
Email: worrell@dt. wdc. com

Mr. Carl Bonke (O)  
Western Digital Corporation  
8105 Irvine Ctr. Dr.  
Irvine, CA 92718  
Phone: (714) 932-7622  
FAX: (714) 932-7798  
Email: bonke@dt. wdc. com

Mr. Jonathan L. Hanmann (O)  
Western Digital Corporation  
8105 Irvine Ctr. Dr.  
Irvine, CA 92718  
Phone: (714) 932-5189  
FAX: (714) 932-7097  
Email: hanmann\_j@a1. wdc. com

Mr. Doug Piper (P)  
Woven Electronics  
PO Box 189  
Mauldin, SC 29662  
Phone: (803) 967-1751  
FAX: (803) 963-1761  
Email: 549.9900@mci mail. com

Mr. E. J. Mondor (A)  
Woven Electronics  
PO Box 189  
Mauldin, SC 29662  
Phone: (803) 967-1739  
FAX: (803) 963-1761  
Email: 549.9900@mci mail. com

Mr. Arnold Limjoco (O)  
Yamaichi Electronics  
2235 Zanker Rd.  
San Jose, CA 95131  
Phone: (408) 456-0797  
FAX: (408) 456-0799  
Email: 6371175@mci mail. com

**Attachment 4: X3T10.1 Current Membership List** (Note: This is the attendance database, which may omit some people from the X3 Secretariat's database of those people receiving mailings, particularly those people who have not attended a meeting.)

James M Avery (P)  
Adaptec  
6150 Lookout RD.  
Boulder, CO. 80301  
Phone: 303- 516- 4743  
FAX: 303- 581- 1088  
Email: jima@btc.adaptec.com

Lawrence Lamers (A)  
Adaptec  
MS 95  
691 South Milpitas Blvd  
Milpitas, CA 95035  
Phone: 408- 957- 7817  
FAX: 408- 957- 7193  
Email: ljlammers@aol.com

Victor Pecone (A)  
Adaptec  
6150 Lookout Rd.  
Boulder CO. 80301  
Phone: 303- 516- 4793  
FAX: 303- 581- 1088  
Email: victorp@btc.adaptec.com

Edward Fong (O)  
Amdahl Corp  
1250 E. Arques Ave MS 354  
P. O. Box 3470  
Sunnyvale, CA 94088- 3470  
Phone: 408- 944- 3780  
FAX: 408- 943- 6620  
Email: esf10@amail.amdahl.com

Charles Brill (P)  
AMP, Inc  
MS 210- 020  
P. O. Box 3608  
Harrisburg, PA 17105  
Phone: 717- 592- 6198  
FAX: 717- 592- 6179  
Email: cebrill@amp.com

Bob Atkinson (A)  
AMP, Inc  
449 Eisenhower Blvd  
Harrisburg, PA 17105- 3608  
Phone: 717- 780- 4274  
FAX: 717- 780- 4113  
Email: rdatkins@amp.com

Robert Bellino (A)  
AMP, Inc  
125 Goddard Memorial Drive  
Worcester, MA 01603  
Phone: 508- 752- 7320  
FAX: 508- 752- 4230  
Email:

Michael Wingard (P)  
Amphenol Interconnect Products  
20 Valley St.  
Endicott, NY. 13760  
Phone: 607- 786- 4241  
FAX: 607- 786- 4311  
Email:

Bill Mable (A)  
Amphenol Interconnect Products  
20 Valley Street  
Endicott, NY 13760  
Phone: 607- 786- 4236  
FAX: 607- 786- 4311  
Email:

Richard Wagner (O)  
Cable Design Technologies  
28 Sword St.  
Auburn, MA 01501  
Phone: 508- 791- 3161  
FAX: 508- 798- 8353  
Email: rwagner@mcdt3.iii.net

Ian Morrell (P)  
Circuit Assembly Corp  
18 Thomas Street  
Irvine, CA 92718  
Phone: 714- 855- 7887  
FAX: 714- 855- 4298  
Email: crctassmbl@aol.com

Ram Gopalan (P)  
Cirrus Logic  
3100 W. Warren Ave  
Fremont, CA 94538  
Phone: 510- 624- 7081  
FAX: 510- 226- 2170  
Email: gopalan@corp.cirrus.com

Ben Chang (A)

Bill Ham (P)

**Cirrus Logic**  
 3100 West Warren Ave  
 Fremont, CA 94538  
 Phone: 510-226-2394  
 FAX: 510-226-2170  
 Email: ben@cirrus.com

**Charles Monia (A)**  
 Digital Equipment Corp.  
 334 South Street  
 Shrewsbury, MA 01545  
 Phone: 508-841-6757  
 FAX: 508-841-6100  
 Email: monia@shr.dec.com

**Paul Boulay (P)**  
 Hitachi Computer Products  
 3101 Tasman Drive  
 Santa Clara, CA 95054  
 Phone: 408-986-9770 x205  
 FAX: 408-986-1821  
 Email: p\_boulay@hitachi.com

**Sam Karunanthi (A)**  
 Hitachi Micro Systems Inc.  
 179 east Tasman Drive  
 San Jose, CA 95134  
 Phone: 408-456-2186  
 FAX: 408-433-0223  
 Email: skarunan@hmsi.hitachi.com

**David McFadden (O)**  
 Honda Connectors  
 960 Corporate Woods Parkway  
 Vernon Hills, IL 60061  
 Phone: 708-913-9566  
 FAX: 708-913-9587  
 Email:

**Adge Hawes (A)**  
 IBM Corporation  
 Dept 26/19  
 P. O. Box 6  
 Havant Hants P09 1SA England  
 Phone: 011-44-1705-486363  
 FAX: 011-44-1705-499278  
 Email: adge@vnet.ibm.com

**Wolfgang Driehelt (A)**  
 ITT Cannon  
 Cannonstr 1  
 271384 Weinstadt  
 Phone: 49-7151 699 233

**Digital Equipment Corp.**  
 334 South Street  
 SHR3-2/W8  
 Shrewsbury, MA 01545  
 Phone: 508-841-2629  
 FAX: 508-841-5266  
 Email: ham@subsys.enet.dec.com

**Kevin Pokorney (O)**  
 Fujitsu Computer Products of America  
 Intellistor R&D Operation  
 2402 Clover basin Drive  
 Longmont, CO 80503  
 Phone: 303-682-6449  
 FAX: 303-682-6401  
 Email: pokorney@intellistor.com

**Nancy Cheng (A)**  
 Hitachi Computer Products  
 3101 Tasman Drive  
 Santa Clara, CA 95054  
 Phone: 408-986-9770  
 FAX: 408-986-1825  
 Email: n\_cheng@hitachi.com

**Tom Kulesza (O)**  
 Honda Connectors  
 960 Corporate Woods Pkwy  
 Vernon Hills, IL 60061  
 Phone: 708-913-9566  
 FAX: 708-913-9587  
 Email:

**John Scheible (P)**  
 IBM Corporation  
 Building 815 MS 3950  
 11400 Burnet Road  
 Austin, TX 75758  
 Phone: 512-823-8208  
 FAX: 512-823-0758  
 Email: scheible@vnet.ibm.com

**Monica Roy (P)**  
 ITT Cannon  
 1851 E. Deere Avenue  
 Santa Ana, CA 92626  
 Phone: 714-757-8472  
 FAX: 714-757-8303  
 Email: monicar@mailgw.cannon.itt.com

**Rich Moore (A)**  
 ITT Cannon  
 3000 Alpine Rd.  
 Menlo Park, CA 94028  
 Phone: 415-854-6977

FAX: 49-7151-699-221  
 Email: 101573.2601@compuserve.com

Karl Nakamura (P)  
 LSI Logic Inc.  
 1551 McCarthy Blvd  
 M S. G-713  
 Milpitas, CA 95035  
 Phone: 408-433-4516  
 FAX: 408-433-4907  
 Email: karln@lsil.com

Greg Farrin (P)  
 Mi cropolis  
 21211 Nordhoff Street  
 Chatsworth, CA 91311  
 Phone: 818-709-3463  
 FAX: 818-709-3497  
 Email:

Gary Manchester (P)  
 Molex, Inc.  
 2222 Wellington Court  
 Lisle, IL 60532  
 Phone: 708-527-4043  
 FAX: 708-969-1352  
 Email: gmanchester@usa.molex.com

Mark DeWilde (P)  
 Pathlight Technology  
 767 Warrior Road  
 Ithaca, NY 14850  
 Phone: 607-266-4000  
 FAX: 607-266-0352  
 Email: mark@ironics.com

Ken Erickson (P)  
 Samsung  
 3655 N. First St.  
 San Jose, CA. 95134-1713  
 Phone: 408-232-3641  
 FAX: 408-232-3665  
 Email: kerickso@samsung.com

Kazushi ge Yoshi no (O)  
 Sanyo Electric Co., Ltd.  
 453 Ravendale Dr. Suite G  
 Mountain View, CA 94043  
 Phone: 415-960-8582  
 FAX: 415-960-8591  
 Email:

David Deming (P)  
 Solution Technology

FAX: 415-854-6340  
 Email: ITTCANNON@AOL.COM

Richard Egan (A)  
 LSI Logic Inc.  
 1551 McCarthy Blvd.  
 M/S G-780  
 Milpitas, CA 95035  
 Phone: 408-433-6841  
 FAX: 408-954-4764  
 Email: egan@lsil.com

Phil Bryan (A)  
 Mi cropolis  
 15 Kenilworth Rd.  
 SALE Cheshire, M33-5DU  
 England  
 Phone: +44 161 973 8359  
 FAX:  
 Email: Phil\_Bryan@mi crop.com

Jay Neer (A)  
 Molex, Inc.  
 902 Clint Moore Road  
 Suite 224  
 Boca Raton, FL 33487  
 Phone: 407-241-9371 x3889  
 FAX: 407-241-0338  
 Email: jneer@usa.molex.com

Said Rahmani (A)  
 Pathlight Technology  
 767 Warren Rd.  
 Ithaca, NY 14850  
 Phone: 607-226-4000  
 FAX: 607-226-4010  
 Email: saidr@pathlight.com

Chuck Gibson (A)  
 Samsung  
 3655 N. First Street  
 San Jose, CA 95134-1713  
 Phone: 408-232-3613  
 FAX: 408-232-3665  
 Email: cgi bson@samsung.com

Stephen Finch (P)  
 Silicon Systems, Inc  
 14351 Myford Road  
 Tustin, CA 92680-7022  
 Phone: 714-573-6808  
 FAX: 714-573-6916  
 Email: 5723283@mci mail.com

Greg Kapraun (P)  
 Symbios Logic Inc.

**P. O. Box 104**  
**Boulder Creek, CA 95006**  
**Phone: 408-338-4285**  
**FAX: 408-338-4374**  
**Email: ddemi ng@scruznet. com**

**John Lohmeyer (A)**  
**Symbi os Logi c Inc.**  
**1635 Aeroplaza Drive**  
**Colorado Springs, CO 80916**  
**Phone: 719-573-3362**  
**FAX: 719-597-8225**  
**Email: john. lohme yer@symbi os. com**

**Michael Knowles (A)**  
**Tandem Computers**  
**10555 Ri dgevi ew Court**  
**LOC 100-03**  
**Cupertino, CA 95015-0789**  
**Phone: 408-285-9957**  
**FAX: 408-285-9924**  
**Email: knowl es\_mi chael@tandem. com**

**Gary M Watson (P)**  
**Tri mm Technol ogi es**  
**350 Pilot Rd.**  
**Las Vegas, NV 89119**  
**Phone: 702-263-2310**  
**FAX: 702-361-8692**  
**Email: tri mm@netcom. com**

**Sam Sanyal (A)**  
**VLSI Technol ogy, Inc.**  
**1109 McKay Drive, MS 33**  
**San Jose, CA 95131**  
**Phone: 408-922-5371**  
**FAX: 408-434-7866**  
**Email: sanyal \_s@sanj ose. vl si . com**

**Herb Silverman (A)**  
**Xyratex**  
**4101 Westerly Place**  
**Suite 105**  
**Newport Beach, CA 92660**  
**Phone: 714-476-1016**  
**FAX: 714-476-1916**  
**Email: herb@cerf. net**

**2001 Danfi eld Court**  
**Fort Collins, CO 80525**  
**Phone: 970-225-4843**  
**FAX: 970-226-9686**  
**Email: greg. kapraun@symbi os. com**

**Jackson Wang (P)**  
**Tandem Computers**  
**10555 Ri dgevi ew Ct, LOC 100-03**  
**Cupertino, CA 95015-0789**  
**Phone: 408-285-9914**  
**FAX: 408-285-9924**  
**Email: wang\_j ackson@tandem. com**

**Pete Tobias (A)**  
**Tandem Computers**  
**10555 Ri dgevi ew Ct.**  
**Cupertino, CA. 95014**  
**Phone: 408-285-9913**  
**FAX: 408-285-9924**  
**Email: tobi as\_pete@tandem. com**

**Brad Kitson (P)**  
**VLSI Technol ogy, Inc.**  
**1109 McKay Dr.**  
**SAN Jose, CA 95131**  
**Phone: 408-434-7553**  
**FAX: 408-922-5252**  
**Email: brad. ki tson@ustc. vl si . com**

**Neil Edmunds (P)**  
**Xyratex**  
**Langstone Road**  
**Havant Hants UK**  
**Phone: 011-44-1705-486363**  
**FAX: 011-44-1705-498158**  
**Email: neil edmunds@uk. xyratex. com**