1.   Identification of Proposed Project

1.1   Title: SCSI-3 Fibre Channel Protocol (FCP)

1.2   Proposer

This project is proposed by the X3T9 Technical Committee. For additional information, please contact John B. Lohmeyer, X3T9.2 Chairman, at NCR Corporation, 1635 Aeroplaza Dr, Colorado Springs, CO 80916, (Phone: 719-596-5795 FAX: 719-597-8225) or Dal Allan, X3T9.2 Vice-Chairman at ENDL, 14426 Black Walnut Ct, Saratoga, CA 95070 (Phone: 408-867-6630 Fax: 408-867-2115).

1.3   Date Submitted: June 1992

1.4   Project Type: Development

2.   Justification of Proposed Standard or Technical Report

2.1   Needs

The Small Computer System Interface (SCSI) has been expanded to attach peripherals on larger and faster processing systems. The distance and transfer speed capabilities of the existing physical interface are limitations in these applications. The Fibre Channel proposed standard, (Project 755-D), is an appropriate physical interface to meet these requirements, however a protocol for SCSI is necessary.

2.2   Recommended Scope of Standard or Technical Report

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 fiber channel.

Functions which will be considered for incorporation include:

a)   Alignment of SCSI protocol functions with their equivalent functions in the Fibre Channel physical layer.

b)   Provide a mapping for SCSI I/O Processes so that they can be transported over the Fibre Channel physical layer.

c)   Enhance the ability to multiplex request for concurrent execution.

d)   Other capabilities which fit within the scope of the SCSI-3 Fibre Channel Protocol that may be proposed during the development phase by the participants in the project.

This proposed standard will conform to the requirements of the SCSI-3 Architecture Model proposed standard. While Fibre Channel Protocol defines a specific transport protocol for the Fibre Channel physical layer, the command, data, and status information content specified by the SCSI-3 Architecture Model is transport-protocol independent. Additional optional functions may be defined by Fibre Channel Protocol which are not required by the SCSI-3 Architecture Model, but such functions shall not be required to comply with the protocol.

2.3   Existing Practice in Area of Proposed Standard or Technical Report

None.

2.4   Expected Stability of Proposed Standard or Technical Report with Respect to Current and Potential Technological Advances

The nature of the proposed project is to integrate Fibre Channel Protocol in a manner which expands the alternatives available to host system manufacturers and peripheral suppliers.

3.   Description of Proposed Project

3.1   Type of Document (Standard or Technical Report):   Standard

3.2   Definition of Concepts and Special Terms (if any):   none

3.3   Expected Relationship with Approved X3 Reference Models (e.g., DBMS, OSI)

The Fibre Channel Protocol is for use in closed systems.

3.4   Recommended Program of Work

The following program of work is planned for the Fibre Channel Protocol standard:

- Solicit participation from present and future SCSI participants through X3T9.2 procedures and through press releases. Invite comments by end-user organizations and invite proposals from organizations that may have a contribution to a viable Fibre Channel Protocol standard.
- Establish functional requirements for Fibre Channel Protocol functional additions.
- Prepare a draft standard based on proposals submitted and other information gathered during the initial investigation.
- Consider the results of Fibre Channel Protocol testing as may be available to the committee through the voluntary efforts of the various participants in X3T9 and its assigned task group.
- Submit the draft proposed standard to X3 for further processing.

3.5   Resources - Individuals and Organizations Competent in Subject Matter

The current membership of X3T9.2 includes representatives from all parts of the computer industry from semiconductor chip manufacturers to large mainframe system manufacturers as well as Government agencies. The members of X3T9.2 have expressed their desire to participate and cooperate in the development of this proposed standard.

There are sufficient resources to complete the development of this standard without delaying work on other standards.

3.6   Recommended X3 Development Technical Committees (Existing or New)

It is recommended that the development work be done in task group X3T9.2.

3.7   Anticipated Frequency and Duration of Meetings

Task group X3T9.2 meets for two days bi-monthly. Specific task ad hoc groups are called as may be required for one to three days between the regular meetings but their results are not binding.

3.8   Target Date for dpANS to X3 (Milestone 10):   February 1994

3.9   Estimated Useful Life of Standard or Technical Report

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It is anticipated that this standard will have a life of over 10 years.

4.   Implementation Impacts

4.1   Impact on Existing User Practices and Investments

The proposed Fibre Channel Protocol standard will provide an upward growth path which complements existing practices and investments. It is likely that any isolated negative impacts would occur in any case through non-standard evolution or revolution.

4.2   Impact on Supplier Products and Support

The proposed Fibre Channel Protocol standard will provide an upward growth path which complements existing practices and investments. It is likely that any isolated negative impacts would occur in any case through non-standard evolution or revolution.

4.3   Techniques and Costs for Compliance Verification

The committee will consider the results of Fibre Channel Protocol testing as may be available to the committee through the voluntary efforts of the various participants in X3T9 and its assigned task group. With this method all costs are borne by the organizations of the various participants and have for the most part been mainly an adjunct of their normal development costs.

4.4   Legal Considerations

No new legal considerations are expected that are not already in accordance with accepted X3 patent policies.
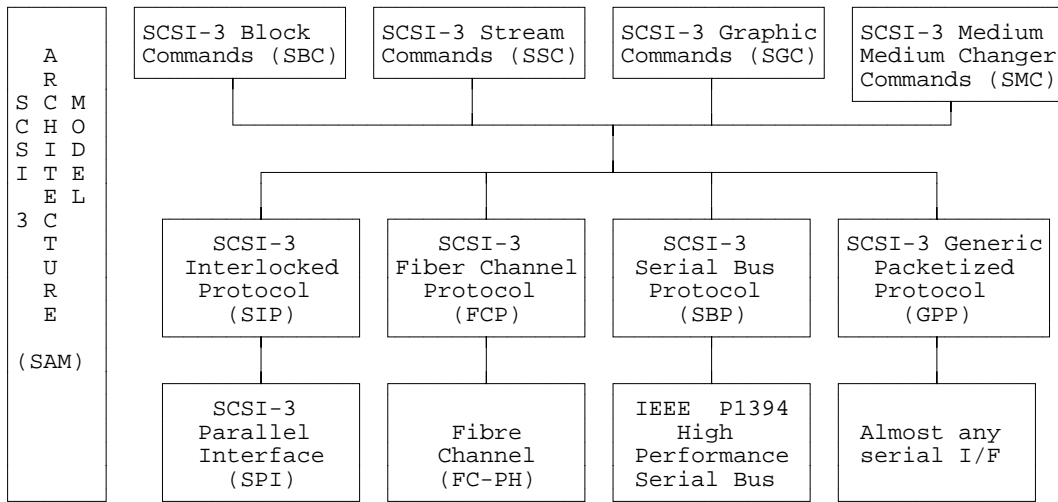
5.   Closely Related Standards Activities

This standard extends and enhances the SCSI-2 (X3.131-199x) and is a member of the SCSI-3 family of standards (see 5.2, below).

5.1   Existing Standards: none

5.2   X3 Standards Development Projects

The SCSI-3 Fibre Channel Protocol is one part of the overall SCSI-3 family of standards:

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┌─────────┐ ┌──────────────┐ ┌──────────────┐ ┌──────────────┐ ┌──────────────┐
│    A    │ │SCSI-3 Block  │ │SCSI-3 Stream │ │SCSI-3 Graphic│ │SCSI-3 Medium │
│    R    │ │Commands (SBC)│ │Commands (SSC)│ │Commands (SGC)│ │Medium Changer│
│ S  C  M │ │              │ │              │ │              │ │Commands (SMC)│
│ C  H  O │ └──────┬───────┘ └──────┬───────┘ └──────┬───────┘ └──────────────┘
│ S  I  D │        │                │                │
│ I  T  E │        └────────────────┴───────┬────────┘
│    E  L │                                 │
│ 3  C    │        ┌────────────────┬───────┴────────┬────────────────┐
│    T    │ ┌──────┴───────┐ ┌──────┴───────┐ ┌──────┴───────┐ ┌──────┴───────┐
│    U    │ │   SCSI-3     │ │   SCSI-3     │ │   SCSI-3     │ │SCSI-3 Generic│
│    R    │ │  Interlocked │ │Fiber Channel │ │  Serial Bus  │ │  Packetized  │
│    E    │ │   Protocol   │ │   Protocol   │ │   Protocol   │ │   Protocol   │
│         │ │    (SIP)     │ │    (FCP)     │ │    (SBP)     │ │    (GPP)     │
│ (SAM)   │ └──────┬───────┘ └──────┬───────┘ └──────┬───────┘ └──────┬───────┘
│         │ ┌──────┴───────┐ ┌──────┴───────┐ ┌──────┴───────┐ ┌──────┴───────┐
│         │ │   SCSI-3     │ │              │ │ IEEE  P1394  │ │              │
│         │ │   Parallel   │ │    Fibre     │ │    High      │ │  Almost any  │
│         │ │  Interface   │ │   Channel    │ │ Performance  │ │  serial I/F  │
│         │ │    (SPI)     │ │   (FC-PH)    │ │  Serial Bus  │ │              │
└─────────┘ └──────────────┘ └──────────────┘ └──────────────┘ └──────────────┘
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5.3   X3/SPARC Study Groups: none

5.   4Other Related Domestic Standards Efforts: none

5.5   ISO Standards Development Projects

It is anticipated that this standard will be proposed to JTC1/SC25/WG4.

5.6   Other Related International Standards Development Projects: none

5.7   Recommendations for Coordinating Liaison: none

5.8   Recommendations for Close Liaison: none