

1. Identification of Proposed Project

1.1 Title: SCSI-3 Interlocked Protocol

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, 3718 N. Rock Rd., Wichita, KS 67226 (Phone: 316-636-8703 FAX: 316-636-8889) 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: December 7, 1990

1.4 Project Type: Development

2. Justification of Proposed Standard or Technical Report

2.1 Needs

SCSI (X3.131-1986) and SCSI-2 (X3.131-1990) have proven to be extremely successful standards for the attachment of a wide range of peripherals to computer systems. As the popularity of the interface has increased, its application area has grown outside the originally intended small systems to encompass larger systems.

This project proposal is one of a family of proposed SCSI-3 projects. Some areas of I/O interface technology are advancing at a faster rate than others. By structuring SCSI-3 into several standards, these can proceed independently, permitting the different standards to advance as the technology advances. A side benefit of such a structure is that the command sets are independent of the physical interface. This will facilitate using the SCSI command sets on emerging interfaces such as Fiber Channel.

The SCSI-3 Parallel Interface project extends the parallel copper physical interface. The SCSI-3 Command Set project extends the SCSI command sets. This project extends the protocol for using the SCSI-3 Command Set with the SCSI-3 Parallel Interface. Another proposed SCSI-3 project, SCSI-3 Fiber Channel Protocol, defines how to use the SCSI-3 Command Set with the Fiber Channel interface (755-D).

2.2 Recommended Scope of Standard or Technical Report

The proposed SCSI-3 Interlocked Protocol standard should maintain a high degree of compatibility with SCSI-2 while providing the protocol to support the new capabilities defined by the SCSI-3 Parallel Interface, as well as adding functional features such as:

- a) Support more than 8 directly addressable devices.
- b) Define a method for dual port operations. This will provide a means for systems which require continuous operations to have redundant transfer paths to the same data.
- c) Define other capabilities which fit within the general application scope of enhancing the SCSI-2 protocol, and other capabilities that may be proposed during the development phase by the participants in the project.

It is not intended that the standard developed by this proposed project would address areas above the protocol such as command sets. It is intended that the standard would be used in conjunction with the command sets defined in SCSI-2 and/or the SCSI-3 Command Set.

It is not intended that the resulting standard would address physical areas such as drivers/receivers, cables, and connectors. It is intended that the standard would be used in conjunction with the SCSI-3 Parallel Interface.

2.3 Existing Practice in Area of Proposed Standard or Technical Report

The proposed project principally involves enhancing the SCSI-2 interface protocol and structuring it into a separate document. It will be based upon the SCSI protocol contained in X3.131-1990 and extended to control the new capabilities in the SCSI-3 Parallel Interface and to provide appropriate new services to support the SCSI-3 Command Set.

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

The nature of the proposed project is to insure that SCSI has an upward, highly-compatible growth path. This will insure users who have current investments in SCSI are provided with the ability to handle the growth in the number of devices used in systems employing SCSI to attach peripherals.

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 SCSI-3 Interlocked Protocol is for use in closed systems.

3.4 Recommended Program of Work

The following program of work is planned for the SCSI-3 Interlocked Protocol standard:

- Solicit continuing participation by the present SCSI-2 participants through X3T9.2 procedures and new participants through press releases. Invite comments by end-user organizations and invite proposals from SCSI development organizations and other organizations that may have a contribution to a viable SCSI-3 Interlocked Protocol standard.
- Establish requirements for SCSI functional additions along with downward compatibility requirements.
- Prepare a draft standard based on appropriate sections of SCSI-2, proposals submitted, and other information gathered during the initial investigation.
- Consider the results of SCSI-3 Interlocked 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 which was responsible for developing the SCSI-1 and SCSI-2 standards.

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): April 1992

3.9 Estimated Useful Life of Standard or Technical Report

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 SCSI-3 Interlocked Protocol standard will provide an upward growth path complementary to the 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 SCSI-3 Interlocked Protocol standard will provide an upward growth path complementary to the 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 SCSI-3 Interlocked 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 attendant with SCSI and in accordance with accepted X3 patent policies.

5. Closely Related Standards Activities

5.1 Existing Standards

X3.131-1986 Small Computer System Interface (SCSI)
X3.131-1990 Small Computer System Interface (SCSI-2)

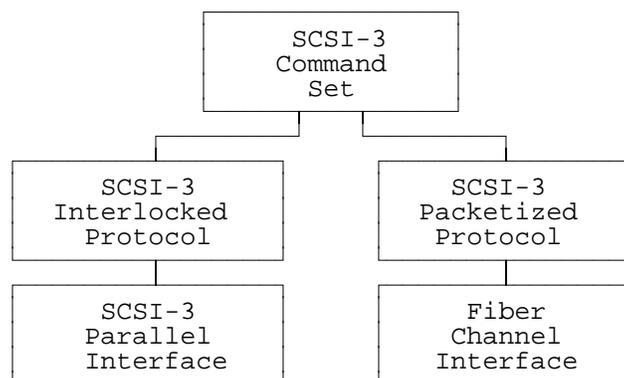
5.2 X3 Standards Development Projects

A project (685-D) has been approved to develop a single SCSI-3 standard which would include all of the work proposed for the SCSI-3 Parallel Interface, the SCSI-3 Interlocked Protocol, and the SCSI-3 Command Set. As X3T9.2 began working on this project it became apparent that SCSI-3 would benefit from restructuring the draft standard into three draft standards. The benefits include:

- a) The individual standards could proceed at their own pace as interface technology advances.
- b) The SCSI-3 Command Set would become independent of the physical interface which would facilitate using this command set on other physical interfaces such as Fiber Channel.
- c) The single-document approach used in SCSI-1 and SCSI-2 has become unwieldy. SCSI-1 was 212 pages and SCSI-2 grew to nearly 600 pages. A single-document SCSI-3 standard would likely be much larger. Such large documents are difficult to edit, review, or comprehend.

Consequently, a revised project proposal for 685-D and three additional project proposals have been prepared. The revised SCSI-3 project proposal would only include the SCSI-3 Command Set. Two additional project proposals have been prepared to include the SCSI-3 Interlocked Protocol and the SCSI-3 Parallel Interface, previously included in 685-D.

The third new project proposal, SCSI-3 Fiber Channel Protocol, would define how to map the SCSI-3 Command Set onto the Fiber Channel Interface (755-D). Pictorially, the relationship of these projects is as follows:



5.3 X3/SPARC Study Groups: none

5.4 Other Related Domestic Standards Efforts: none

5.5 ISO Standards Development Projects

IS 9316 (SCSI-1) has been published. DP 10288 (SCSI-2) is in development in ISO JTC1/SC25 WG4.

5.6 Other Related International Standards Development Projects

ECMA SCSI (ECMA-111:1985). This is partly equivalent to ANSI SCSI-1 (X3.131-1986). There are no current development activities within ECMA on SCSI.

5.7 Recommendations for Coordinating Liaison: none

5.8 Recommendations for Close Liaison: none