TO: X3T9.2 Membership
FROM: John Schieble
DATE: 10/27/92

1. Identification of Proposed Project

1.1 Title: Serial Storage Architecture - Physical Layer (SSA-PH)

1.2 Proposer

This project is proposed by John P. Scheible. For additional information, please contact either John P. Scheible (proposed chairman), or Skip Jones (proposed vice chairman) at the addresses shown below:

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1.3 Date Submitted: December 1992

1.4 Project Type: Development

2. Justification of Proposed Standard or Technical Report

2.1 Needs

The rapid technical advancement of storage sub-systems has outstripped the ability of current physical interfaces. A new serial interface is required to meet the space constraints and performance needs of tomorrow's storage solutions. Based on a survey performed by IBM, a serial interface for storage sub-systems needs to have the following requirements for performance, reliability, cost, and physical connections. The performance requirements include

high data rate, full duplex, do not rely on arbitration, have architecture independent of data rate, and have fast recovery time from errors and cabling changes. The reliability requirements include high data integrity, low raw error rate, architected error recovery, hot pluggable units, and failure tolerance via redundant paths to devices. Cost requirements call for a small package (a single CMOS chip or a part of a CMOS chip), economical use of bandwidth, small frame size (for buffer expense reduction), and self-configuration capabilities. The physical requirements include 10 meter distance per cable segment, high connectivity, small signal count, low voltage (3.3 V), extensibility (higher speeds and optical capable) and the elimination of jumpers (and extra cables) for address and spindle sync. IBM has worked with members of the industry to define a serial interface proposal named Serial Storage Architecture Physical layer (hereafter known as SSA-PH), which is tailored to meet those needs.

2.2 Recommended Scope of Standard or Technical Report

The SSA-PH interface proposal is a cable interface for storage products that is capable of transporting a variety of protocols.

Functions which will be considered for incorporation include:

a) Definition of the packet format and addressing method.
b) Definition of the physical characteristics of interface and the signal definitions.
c) Define the various algorithms to determine the topology of the network, perform error recovery, determine the protocol being used by a device, and any other algorithms necessary to implement the physical layer.
d) Other capabilities which fit within the scope of the Serial Storage Architecture Physical layer that may be proposed during the development phase by the participants in the project.

2.3 Existing Practice in Area of Proposed Standard or Technical Report

Considerable work has been done in the private sector that will be used as the basis for this standard.

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

This standard is possible due to the latest technology advancements, and is expected to be viable for at least 10 years. The interface is extendable by advanced technology that will become commercially feasible within the lifetime of this standard.

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):

SSA-PH is an acronym for Serial Storage Architecture, PHysical layer. Device refers to an addressable entity on the SSA-PH interface.

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

The Serial Storage Architecture physical layer is for use in closed systems.

3.4 Recommended Program of Work

The following program of work is planned for the SSA-PH standard:

- Solicit participation from members of the storage industry through X3T9 procedures and through press releases. Invite comments by end-user organizations and invite proposals from organizations that may have a contribution to a viable SSA-PH standard.
- Develop a viable SSA-PH standard.
- Prepare a draft standard based on proposals submitted and other information gathered during the initial investigation.
- Consider the results of SSA-PH 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 includes representatives from all parts of the computer industry from semiconductor chip manufacturers to large mainframe system manufacturers as well as Government agencies. Initial ground work has been done, and a poll taken of interested parties. A significant number of people in the industry have volunteered 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 a new task group of X3T9 be established to develop this standard.

3.7 Anticipated Frequency and Duration of Meetings

The proposed SSA-PH task group will meet 1 day bi-monthly. Specific task ad hoc groups would be assigned as 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): June 1994

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 SSA-PH standard will provide an evolutionary path to an improved physical interface and allow interface protocols that could preserve existing software (system device driver, device controller microcode) investment. 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 SSA-PH standard will provide an evolutionary path to an improved physical interface and allow interface protocols that could preserve existing software (system device driver, device controller microcode) investment. 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 SSA-PH 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

The proposed SSA-PH standard provides an alternative physical layer that enables protocols that use the SCSI-2 and SCSI-3 command sets.

5.1 Existing Standards: none

5.2 X3 Standards Development Projects

The proposed SSA-PH standard enables protocols that could be part of the overall SCSI-3 family of standards (either a new standard under SCSI-3 or may fall within the Generic Packetized Protocol (GPP) standard).

5.3 X3/SPARC Study Groups: none

5.4 Other Related Domestic Standards Efforts: FC-PH

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: FC-PH

5.7 Recommendations for Coordinating Liaison: X3T9.2, X3T9.3

5.8 Recommendations for Close Liaison: none