**Project Proposal
For a New
X3 Standard**

**Serial Storage Architecture
Physical Layer 2**

(SSA-PH2)

July 13, 1995

1. IDENTIFICATION OF PROPOSED PROJECT

1.1 TITLE: Serial Storage Architecture - Physical Layer 2 (SSA-PH2).

1.2 PROPOSER: X3T10.

1.3 DATE SUBMITTED: July 13, 1995

1.4 PROJECT TYPE: D - Development of a standard within an X3 TC.

2. JUSTIFICATION OF PROPOSED STANDARD

2.1 NEEDS:

The Serial Storage Architecture fills a need in the evolution from parallel to serial interfaces for storage devices. It meets the space constraints and cabling considerations for high-density storage arrays with a commensurate improvement in reliability and configurational capability.

The reliability improvements are derived from an architected error recovery, redundant paths to devices, a wrap mode for self-test, and a balanced signaling scheme that achieves a low error rate.

The configurational capability results from the ability to hot-plug devices, the self-configuration capability, and the point to point cabling.

The physical layer requires a CMOS implementation to achieve an economical and small package size. An efficient use of bandwidth, a small frame size to reduce buffer expense and the capability for self-configuration are also needed. The physical requirements include at least a 10 meter distance per cable segment, a small number of signals to limit connector and cable expense, and a low voltage implementation.

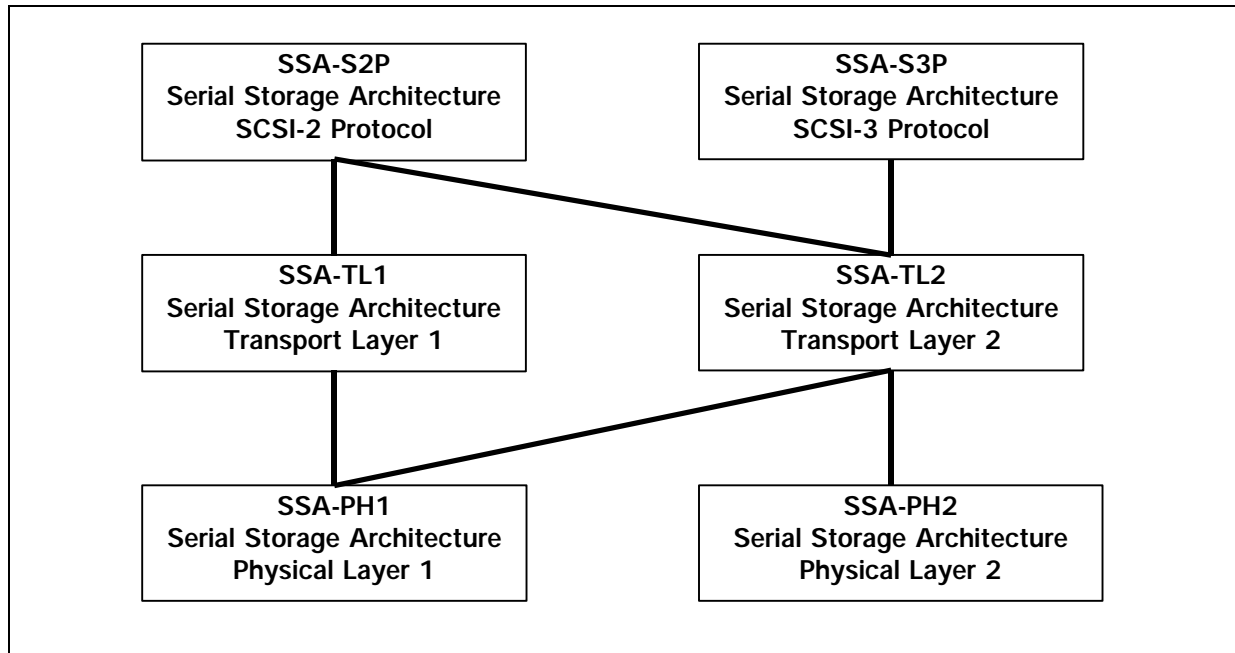### 2.2 RECOMMENDED SCOPE OF STANDARD:

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.
  d)   consider an optical transmission option.
  e)   other capabilities that fit within the scope of SSA-TL2 that may be proposed during the
           development phase by the participants in the project.

2.3 EXISTING PRACTICE IN AREA OF PROPOSED STANDARD:

The SSA-PH2 standard is part of an evolving family of standards related to the Serial Storage Architecture. There are no known existing implementations that exist with the distance and speed goals of this project that support the SSA protocol.

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|                                                                  |
|   +-----------------------+         +-----------------------+     |
|   |       SSA-S2P         |         |       SSA-S3P         |     |
|   | Serial Storage Arch.  |         | Serial Storage Arch.  |     |
|   |    SCSI-2 Protocol    |         |    SCSI-3 Protocol     |    |
|   +-----------------------+         +-----------------------+     |
|                                                                  |
|   +-----------------------+         +-----------------------+     |
|   |       SSA-TL1         |         |       SSA-TL2         |     |
|   | Serial Storage Arch.  |         | Serial Storage Arch.  |     |
|   |   Transport Layer 1   |         |   Transport Layer 2   |     |
|   +-----------------------+         +-----------------------+     |
|                                                                  |
|   +-----------------------+         +-----------------------+     |
|   |       SSA-PH1         |         |       SSA-PH2         |     |
|   | Serial Storage Arch.  |         | Serial Storage Arch.  |     |
|   |    Physical Layer 1   |         |    Physical Layer 2   |    |
|   +-----------------------+         +-----------------------+     |
|                                                                  |
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2.4 EXPECTED STABILITY OF PROPOSED STANDARD WITH RESPECT TO CURRENT AND POTENTIAL TECHNOLOGICAL ADVANCE:

This standard provides a physical layer definition for a 40MB/sec serial interface, which can transport upper layer command and status information. This is a logical upgrade path from SSA-PH1.

3. DESCRIPTION OF PROPOSED PROJECT:

3.1 TYPE OF DOCUMENT: Standard.

3.2 DEFINITION OF CONCEPTS AND SPECIAL TERMS: None.

3.3 EXPECTED RELATIONSHIP WITH APPROVED X3 REFERENCE MODELS:

The SSA-PH2 standard is intended for use in closed systems.

3.4 RECOMMENDED PROGRAM OF WORK:

The following program of work is planned for the SSA-PH2:

(1)   Solicit continuing participation by the current membership of X3T10.1 through X3 procedures. Invite comments by industry consortia (i.e., SSA-UIG) and end-user organizations and invite proposals from organizations that may have a contribution.

(2)   Establish functional requirements for SSA-PH2.

(3)   Prepare a draft proposed standard based on proposals submitted and other information gathered during the initial investigation.

(4)   Consider the results of SSA-PH2 testing as may be available to the committee through the voluntary efforts of the X3T10.1 membership.

(5)   Submit the draft proposed standard to X3 for further processing.

3.5 RESOURCES - INDIVIDUALS AND ORGANIZATIONS COMPETENT IN THE SUBJECT MATTER:

The current membership of X3T10.1 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 X3T10.1 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 projects.

3.6 RECOMMENDED X3 DEVELOPMENT TECHNICAL COMMITTEE:

It is recommended that the development work be done in Task Group X3T10.1 of Technical Committee X3T10 which is responsible for developing the family of Serial Storage Architecture standards.

3.7 ANTICIPATED FREQUENCY AND DURATION OF MEETINGS:

Technical Committee X3T10.1 meets bimonthly. 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: April 1997.

3.9 ESTIMATED USEFUL LIFE OF STANDARD:

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

4. IMPLEMENTATION IMPACTS

4.1 IMPACT ON EXISTING USER PRACTICES AND INVESTMENTS:

The proposed SSA-PH2 standard will provide an implementation point 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 SSA-PH2 standard will provide an implementation point 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 SSA-PH2 testing as may be available to the committee through the voluntary efforts of the various participants in X3T10.1. 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:

There are no known legal considerations other than an IBM patent on the 8B/10B coding scheme, which IBM has agreed to license in accordance with the ANSI patent policy. A Call for Patents will be made.

5. CLOSELY RELATED STANDARDS ACTIVITIES

5.1 EXISTING STANDARDS:
None

5.2 X3 STANDARDS DEVELOPMENT PROJECTS:

BSR Number	Title	Project
	SSA-Physical Layer 1	see note
	SSA-Transport Layer 1	X3T10/0989-D
	SSA-SCSI-2 Protocol	X3T10/1121-DT
	SSA-SCSI-3 Protocol	X3T10/1051-D

Note: This work is currently included within the scope of project 0989-D.

5.3 X3 STUDY GROUPS: None.

5.4 OTHER RELATED DOMESTIC STANDARDS EFFORTS: None.

5.5 ISO/IEC JTC 1 STANDARDS DEVELOPMENT PROJECTS: It is anticipated that SSA-PH2 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.