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SBus – Chip and module interconnect bus

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Abstract: An input/output expansion bus with a 32- or 64-bit width is described in this standard. The SBus is designed for systems requiring a small number expansion ports. SBus Cards may be connected to a standard Sbus Connector mounted on the motherboard. SBus Devices may also be attached to the SBus directly on the system's motherboard. The dimensions of the SBus Card are 83,8 mm by 146,7 mm, making the cards appropriate for small computer systems that make extensive use of highly integrated circuits. The SBus Cards are designed to be installed in a plane parallel to the system's motherboard as mezzanine cards. They are designed to provide connections for devices external to the computer system through an exposed back panel. The form factor is useful in Futurebus+, VMEbus, desktop computers, and similar applications. The SBus has the capability of transferring data at rates up to 168 Mbytes/s, depending on the implementation options selected.

SBus Cards may either serve as Masters on the bus, providing all virtual address information as well as the data to be transferred, or they may serve as Slaves on the bus, providing data transfer according to the requirements of some other SBus Master. The SBus Master for a data transfer is selected by an arbitration process managed by the single SBus Controller on the SBus. The SBus Controller provides a virtual to physical address translation service.

Keywords: I/O bus, SBus, SBus Card, Standard for Boot Firmware.

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CONTENTS

Page

Clause Page

SBus – CHIP AND MODULE INTERCONNECT BUS

FOREWORD

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Annexes A and B are for information only.

This standard must be used in conjunction with the latest edition of the following standard: IEEE Std 1275.

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INTRODUCTION

(This introduction is not a normative part of ISO/IEC 15205:2000, but is included for information only.)

This IEEE standard documents the implementation of the popular SBus interface. The SBus, originally developed and documented by Sun Microsystems as an I/O expansion bus, uses a standard form factor SBus Card that is a suitable size for the use of VLSI circuits in small computers. It has a high bandwidth and is capable of data transfer 8, 16, 32, or 64 bits in width. This standard includes the set of functionality originally documented by the *SBus Specification B.0* (Sun Microsystems Part #800.5922-10, Revision A, December 1990) and clarifies, corrects, and extends that functionality as required. The IEEE P1275 Working Group is developing a standard for boot firmware, which will define and document the initialization and boot interface for SBus Cards.

Special thanks are due to Bob Snively (P1496 Working Group draft technical editor) for the many hours spent in converting this document from the original *SBus Specification B.0* and editing it into its final form. Also deserving of thanks are Jim Lyle (P1496 Working Group vice Chair), Barbara Vance (P1496 Working Group former Secretary), Bob Gianni (P1496 Working Group Secretary), and Steve Hix (P1496 draft document editor) for their support in the Committee work and the generation of this document.

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SBus – CHIP AND MODULE INTERCONNECT BUS

1 General

1.1 Scope and object

SBus is a high performance computer I/O interface for connecting integrated circuits and SBus Cards to a computer system motherboard. This standard defines the mechanical, electrical, environmental, and protocol requirements for the design of SBus Cards and the computer system motherboard that supports those cards.

Every SBus Card shall implement appropriate self-descriptive and initialization firmware using FCode, which is similar to the Forth programming language. The details of this firmware standard are beyond the scope of this standard.[1)] In addition, other software interfaces may be used for communication with SBus Cards.

SBus is intended to provide a high performance I/O bus interface with a small mechanical form factor. The small size, high levels of integration, and low power usage of SBus Cards enable them to be used in laptop computers, compact desktop computers, and other applications requiring similar characteristics. SBus Cards are mounted in a plane parallel to the motherboard of the computer system, allowing the computer system to have a low profile. SBus is not designed as a general purpose backplane bus.

SBus allows transfers to be in units of 8, 16, 32, or 64 bits. Burst transfers are allowed to further improve performance. SBus allows a number of SBus Master devices to arbitrate for access to the bus. The chosen SBus Master provides a 32-bit virtual address which the SBus Controller maps to the selection of the proper SBus Slave and the development of the 28-bit physical address for that Slave. The selected SBus Slave then performs the data transfers requested by the SBus Master. Simple SBus Cards may be designed to operate solely as Slaves on the SBus.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEEE Std 1275:1994, IEEE Standard for Boot (Initialization Configuration) Firmware: Core Requirements and Practices[2)]

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1) A firmware interface standard is under consideration.

2) IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA (standards.ieee.org/).