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IEEE Standard Microcomputer Environmental Specification for Computer Modules

Sponsor

**Microprocessor and Microcomputer Standards Committee
of the
IEEE Computer Society**

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Abstract: Fundamental information on minimum environmental withstand conditions is provided. The information is intended to be used in those cases in which a generic or detail specification for a certain module has been prepared. The intent is to achieve uniformity and reproducibility in the test conditions for all modules that may make up larger systems and are purported to have a rated environmental performance level. The specifications pertain to both the natural and artificial environments to which modules may be exposed. These conditions include, but are not limited to, thermal, mechanical, electrical, and atmospheric stresses.

Keywords: environmental withstand conditions, performance level qualification

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Introduction

(This introduction is not part of IEEE Std 1156.1-1993, IEEE Standard for Microcomputer Environmental Specifications for Computer Modules.)

With the introduction of numerous standards for computer hardware, components, circuit packs, backplanes, etc., the Microprocessor and Microcomputer Standards Subcommittee of the IEEE Computer Society found it appropriate to write a separate standard for core environmental withstand conditions for computers.

This standard provides design engineers and system engineers with requirements for core environmental withstand conditions that all components and modules used in computers should be able to withstand. These conditions include (but are not limited to) thermal, atmospheric, shock, vibration, and corrosion during storage and operation.

At the time that this standard was approved, the working group had the following membership:

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IEEE Standard for Microcomputer Environmental Specifications for Computer Modules

1. Overview

This standard contains fundamental information on minimum environmental withstand conditions.

It is intended to be used in those cases in which a generic or detail specification for a certain module has been prepared. This standard is intended to achieve uniformity and reproducibility in the test conditions for all modules that may make up larger systems and that are purported to have a rated environmental performance level.

The terms “environmental withstand” or “environmental testing” cover the natural and artificial environments to which modules may be exposed so that an assessment of their performance can be made under the conditions of use, transport, and storage to which they may be exposed in practice. These conditions include, but are not limited to, thermal, mechanical, electrical, and atmospheric stresses.

The requirements for the performance of the modules are not listed in this standard. The relevant specification for the module under test defines the minimum permissible performance limits.

A list of suggested tests for electronic equipment is given in annex A of IEC 512-1¹. Particular electrical test sequences shall be specified in the detail specification of the relevant module document.

2. Scope

This specification is designed for use in conjunction with other families of documents such as IEEE Std 1101.x, IEEE Standard for Mechanical Core Specifications for Microcomputers; IEEE Std 896.x, IEEE Standard Backplane Bus Specification for Multiprocessor Architectures: Futurebus+; IEEE Std 1596-1992, IEEE Standard for Scalable Coherent Interface (SCI); IEEE Std 1014-1987, IEEE Standard for a Versatile Backplane Bus: VMEbus; IEEE Std 1296-1987, IEEE Standard for a High-Performance Synchronous 32-Bit Bus: MULTIBUS®² II; and IEEE Std 1301-1991, IEEE Standard for a Metric Equipment Practice for Microcomputers—Coordinating Document.

This standard is intended to be used as a core specification. It contains the minimum environmental withstand conditions that are applicable to computer modules/circuit boards and all of the components attached to those modules. It has been created to provide general environmental withstand conditions for one or more of the previously listed computer buses or interconnect standards. It may also apply to electronic equipment in general.

¹Information on references can be found in clause 4.

²MULTIBUS is a registered trademark of Intel Corporation.

While this document was specifically created for use with IEEE computer bus standards, nothing herein is intended to restrict its use for other applications, where applicable. A supplier and user may agree to more or less restrictive environmental specifications than those listed in this standard. However, if their specifications are less restrictive than those listed herein, neither supplier nor user may claim conformance to this document.

3. Purpose

The purpose of this standard is to provide a common set of specifications for physical integrity and environmental performance levels for computer modules and their components.

It is the responsibility of the system designer to evaluate the relationship between this module-level environmental specification and the system-level environmental specification for the enclosure that contains the modules. For example, in some applications, the modules are conduction cooled and a system-level thermal “model” is required to determine the relationship between the module's heat sink and the system-level cooling medium.

4. References

This standard shall be used in conjunction with the following documents, which form a part of this standard to the extent specified herein. When any of these standards are superseded by an approved revision, the latest revision shall apply.

ANSI C63.4-1991, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.³

ANSI C63.12-1987, American National Standard Recommended Practice for Electromagnetic Compatibility Limits.

ASTM B827-92, Standard Practice for Conducting Mixed Flowing Gas (MFG) Environmental Testing.⁴

ASTM D2863-87, Standard Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).

Federal Communications CommiIEC 50, International

IEC 68-2-1 (1990), Basic Environmental Testing Procedures, Part 2: Test A: Cold.⁵

IEC 68-2-2 (1974), Basic Environmental Testing Procedures, Part 2: Test B: Dry heat.

IEC 68-2-3 (1969), Basic Environmental Testing Procedures, Part 2: Test Ca: Damp heat, steady state.

IEC 68-2-6 (1982), Basic Environmental Testing Procedures, Part 2: Test Fc and guidance: Vibration (sinusoidal).

IEC 68-2-10 (1988), Basic Environmental Testing Procedures, Part 2: Test J and guidance: Mould growth.

IEC 68-2-11 (1981), Basic Environmental Testing Procedures, Part 2: Test Ka: Salt mist.

³ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

⁴ASTM publications are available from the Customer Service Department, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103, USA.

⁵IEC publications are available from IEC Sales Department, Case Postale 131, 3 rue de Varembe, CH-1211, Genève 20, Switzerland/Suisse. IEC publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.