

IEEE Standard for Additional Mechanical Specifications for Microcomputers Using the IEEE Std 1101.1-1991 Equipment Practice

Sponsor

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Abstract: A generic standard that may be applied in all fields of electronics where equipment and installations are required to conform to the 482.6 mm (19 in) equipment practice based on IEEE 1101.1-1991, IEC 297-3 (1984), and IEC 297-4 (1995). Dimensions are provided that will ensure mechanical interchangeability of subracks and plug-in units.

Keywords: dimensions, mechanical interchangeability, plug-in units, subracks

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Introduction

(This introduction is not part of IEEE Std 1101.10-1996, IEEE Standard for Additional Mechanical Specifications for Microcomputers Using the IEEE Std 1101.1-1991 Equipment Practice.)

With the widespread acceptance of international (IEC) microcomputer architectures based on the Eurocard form factor, the IEEE Computer Society Technical Committee on Microcomputers and Microprocessors found it appropriate to form an IEEE standard to expand upon IEEE Std 1101.1-1991 and the IEC 297 series of standards, Dimensions of Mechanical Structures of the 482.6 mm (19 in) Series (IEC 297-1, IEC 297-3 and IEC 297-4).

This additional standard provides design engineers with the dimensions and tolerances necessary to ensure mechanical, electromagnetic compatibility (EMC), and electrostatic discharge (ESD) function compatibility. This additional standard will be in conformance with IEC Drafts 48D/1587-1 and 48D/1587-3.

This additional standard offers mechanical, EMC, and ESD system integration details. It offers advantages such as reduction in design and development time, manufacturing cost savings, and distinct marketing advantages.

This standard covers additional standardized dimensions of a range of EMC subracks and associated EMC plug-in units, injector, extractor and keying device handles for plug-in units and associated subracks, printed board and backplane related dimensions for the IEC 603-2 Type C, 3-row and expanded 5-row connector series and a plug-in unit/subrack ESD protection concept.

At the time this standard was completed, the IEEE Std 1101.10-1996 Working Group had the following membership:

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1. Overview

1.1 Scope

This generic standard may be applied in all fields of electronics where equipment and installations are required to conform to the 482.6 mm (19 in) equipment practice based on IEEE Std 1101.1-1991, IEC 297-3 (1984), and IEC 297-4 (1995).¹

1.1.1 Dimensions of electromagnetic compatibility (EMC) subracks and associated EMC plug-in units

This standard covers additional dimensions for a range of modular EMC subracks based on IEEE Std 1101.1-1991, IEC 297-3 (1984), and IEC 297-4 (1995) for mounting in equipment according to ANSI/EIA 310-D and IEC 297-1 (1988), together with the basic additional dimensions of a compatible range of EMC plug-in units. This standard covers additional requirements as proposed in IEC 48D /1587-3.

1.1.2 Dimensions for plug-in unit injector and extractor handles

This standard covers additional dimensions for plug-in unit injector and extractor handles suitable for a compatible range of subracks based on IEEE Std 1101.1-1991, IEC 297-3 (1984), and IEC 297-4 (1995).

1.1.3 Dimensions for plug-in unit keying

This standard covers additional dimensions for keying plug-in units into/with a compatible range of subracks based on IEEE Std 1101.1-1991, IEC 297-3 (1984), and IEC 297-4 (1995).

¹Information on references can be found in Clause 2.

1.1.4 Dimensions for electrostatic discharge (ESD) protection

This standard covers additional dimensions for ESD protection suitable for a compatible range of plug-in units and subracks based on IEEE Std 1101.1-1991, IEC 297-3 (1984), and IEC 297-4 (1995).

1.1.5 Alignment pin

This standard covers additional dimensions for a compatible alignment pin solution based on IEEE Std 1101.1-1991, IEC 297-3 (1984) and IEC 297-4 (1995)

1.1.6 Protective solder side PB covers

This standard covers additional dimensions for a compatible range of protective solder side covers based on IEEE Std 1101.1-1991, IEC 297-3 (1984), IEC 297-4 (1995), and IEC 603-2 (1995).

1.1.7 Dimensions for printed boards and backplanes using IEC 603-2 (1995) Type C 3-row and expanded 5-row connectors

This standard covers additional dimensions for the mounting of a IEC 603-2 (1995) compatible 5-row connectors. These plug-in unit and/or backplane mounted connector's mounting detail is based on IEEE Std 1101.1-1991, IEC 297-3 (1984), IEC 297-4 (1995).

1.1.8 Dimensions for Printed Boards and Backplanes using center mounted connectors

This standard covers additional dimensions for the mounting of a IEC 603-2 (1995) compatible center mounted connectors to be placed between two or more IEC 603-2 (1995) plug-in unit and/or backplane mounted connectors based on IEEE Std 1101.1-1991, IEC 297-3 (1984), IEC 297-4 (1995).

1.2 Purpose

The purpose of this standard is to specify dimensions which will ensure the mechanical and "Requirements and Tests of Environmental Conditions for Structures for Electronic Equipment" interchangeability of subracks and plug-in units, based on IEEE Std 1101.1-1991, IEC 297-3 (1984), IEC 297-4 (1995), using IEC 603-2 (1995) based connectors and IEC 48D /1587-1 and IEC 48D /1587-3 requirements.

NOTE — IEEE Std 1101.1-1991, IEC 297-3 (1984), and IEC 297-4 (1995) subrack systems not complying with these additional standard requirements have limited compatibility.

2. References

The following publications should be used in conjunction with this standard. When a standard is superseded by an approved revision, the revision shall apply.

ANSI/EIA 310-D-1992, Racks, Panels and Associated Equipment.²

ANSI/VITA 1-1994 VME64 Specification

IEC 48D/1587-1, Draft for Part 3: Draft for Mechanical aspects/climatic tests for Cabinets, Racks, and Subracks for the IEC 917-... and the IEC 297-... Series.

²ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

IEC48D/1587-3, Draft for Electromagnetic shielding performance tests for Cabinets, Racks, and Subracks for the IEC 917-... and IEC 297-... Series.

IEC 50, International Electrotechnical Vocabulary.³

IEC 297-1 (1986), Dimensions of mechanical structures of the 482.6 mm (19 in) series. Part 1: Panels and Racks.

IEC 297-3 (1984), Dimensions of mechanical structures of the 482.6 mm (19 in) series. Part 3: Subracks and associated Plug-In Units.

IEC 297-4 (1995), Mechanical structures for electronic equipment—Dimensions of mechanical structures of the 482,6 mm (19 in) series—Part 4: Subracks and associated Plug-In Units—Additional dimensions.

IEC 603-2 (1995), Connectors for frequencies below 3 MHz for use with printed boards—Part 2: Detail-specification for two-part connectors with assessed quality, for printed boards, for basic grid of 2.54 mm (0.1 in) with common mounting features.

IEC 821 (1991), VMEbus—Microprocessor system bus for 1 byte to 4 byte data

IEC 916 (1988), Mechanical structures for electronic equipment—Terminology.

IEC 48D/1587-1, Mechanical aspects/climatic tests for Cabinets, Racks and Subracks for the IEC 917-... and the IEC 297-... Series.⁴

IEC 48D/1587-3, Electromagnetic shielding performance tests for Cabinets Racks and Subracks for the IEC 917-... and the IEC 297-... Series.⁵

IEEE Std 1101.1-1991, IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 603.2 Connectors (ANSI).⁶

EEE P1386 (Draft 2, April 1995), Common Mezzanine Card Family: CMC.⁷

IEEE P1386.1 (Draft 2 April 1995), Physical/Environmental Layers for PCI Mezzanine Cards: PMC.

ISO 1101:1983, Technical drawings—Geometrical tolerancing—Tolerancing of form orientation, location and run-out—Generalities, definitions, symbols, indications on drawings.⁸

PICMG, CompactPCI Specification.⁹

VITA - 1X- 199X, VIPA Specifications¹⁰

VITA - 1.1-199X, VME64 Extensions Specifications.

³IEC 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.

⁴Presently at the Draft stage. Contact the IEC for information on its current status.

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⁶IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

⁷Numbers preceded by P are IEEE authorized standards projects that were not approved by the IEEE Standards Board at the time this publication went to press. For information about obtaining drafts, contact the IEEE.

⁸ISO publications are available from the ISO Central Secretariat, Case Postale 56, 1 rue de Varembe, CH-1211, Genève 20, Switzerland/Suisse. ISO 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.

⁹This document is available from Rogers Communications, 301 Edgewater place, Suite 220, Wakefield, MA 01880, USA.

¹⁰VITA publications are available from VFEA International Trade Association, 7825 E. Gelding Dr., Suite 104, Scottsdale, AZ 85260, USA.

3. Terminology

3.1 Abbreviations

The following abbreviations are used in this standard:

Da	See IEEE Std 1101.1-1991 and IEC 297-4 (1995)
Db	See IEEE Std 1101.1-1991, IEC 297-3 (1984-01) and IEC 297-4 (1995)
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
F	See IEEE Std 1101.1-1991 and IEC 297-3 (1984), IEC 297-4 (1995)
Hb	See IEEE Std 1101.1-1991 and IEC 297-3 (1984), IEC 297-4 (1995)
HP	Horizontal Pitch of 5.08 mm (See IEEE Std 1101.1-1991)
G	See IEEE Std 1101.1-1991 and IEC 297-3 (1984-01), IEC 297-4 (1995)
mm	Millimeter
n	$N \times 5.08 \pm 0.1$
N	Multiples of
PB	Printed Board (See IEC 50)
U	Units of 44.45 mm (1.75 in) [See ANSI/EIA-310D-1992 and IEC 297-1 (1986)]
GND	Ground
I/O	Input/Output

3.2 Special word usage

may: A key word indicating flexibility of choice with no implied preference.

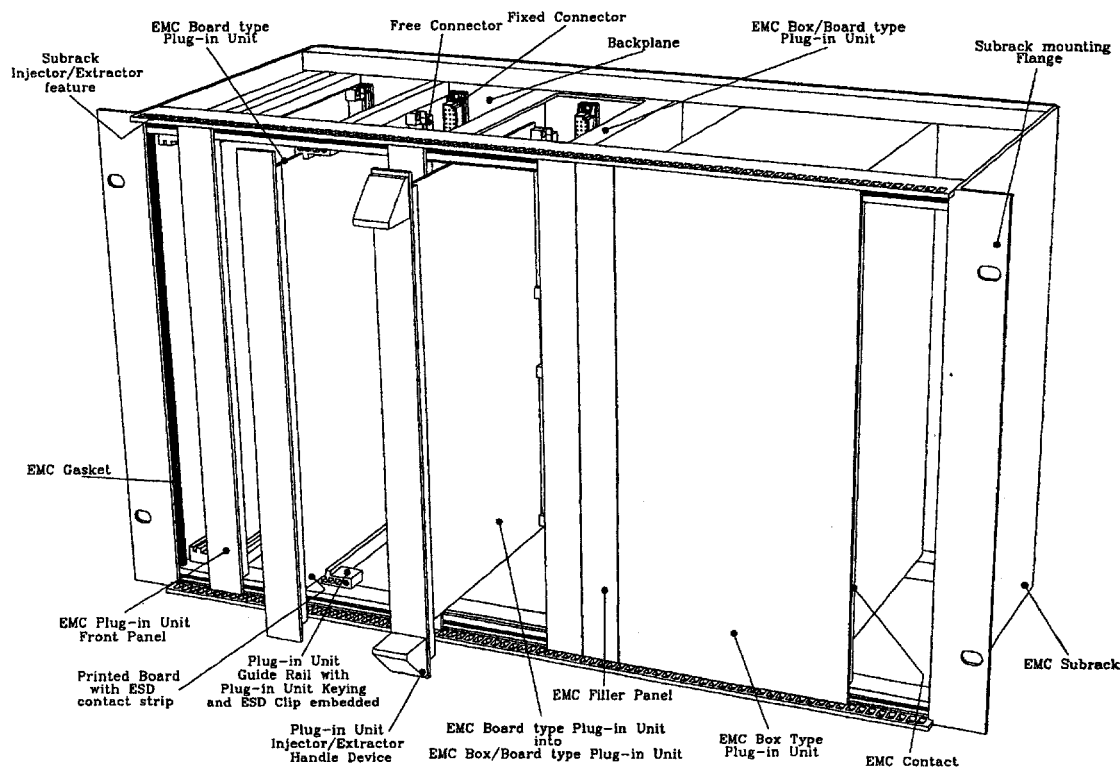
shall: A key word indicating a mandatory requirement. Designers shall implement such mandatory requirements to ensure interchangeability and to claim conformance with the specification.

should: A key word indicating flexibility of choice with a strongly preferred implementation.

complementary: A keyword indicating that there is no standard as yet defined but product is in design or is available and relate to the referred standard, yet may differ or expand mechanically and/or electrically in certain areas of the standard.

4. General arrangement

Generally, sub racks featuring EMC, ESD, injector/extractor handle, plug-in unit, and keying compliance, are equipped with a range of compatible filler panels and/or compatible plug-in units.



NOTES

- 1—The drawings in this specification are not intended to indicate details of design. All dimensions are given in millimeters.
- 2—All drawings in this specification are shown in first angle projection according to ISO 1101. () dimensions are for reference only.
- 3—Terminology is as per IEC 50 and IEC 916.

Figure 1— General arrangement

5. EMC

EMC sub racks and plug-in units are designed to maintain an EMC environment compatible with IEC 48D /1587-3 Electromagnetic shielding performance tests for cabinets, racks and sub racks for the IEC 917 -... and the IEC 297 -... series. See 5.1.

5.1 EMC subrack

EMC subrack dimensions are as illustrated in Figure 2. The following conditions shall be observed:

- All gaskets, contacts, and contact surfaces shall be electrically conductive.
- The mating surfaces of the EMC subrack and the EMC plug-in unit front panels and/or EMC filler panels shall be conductive.
- Under worst condition performance, the mating contacts of the EMC and ESD plug-in units and subracks may be related to the application specific chosen connector performance requirements or specified in application-specific standards.
- All subrack and plug-in unit contact surfaces shall be connected to a common subrack ground.

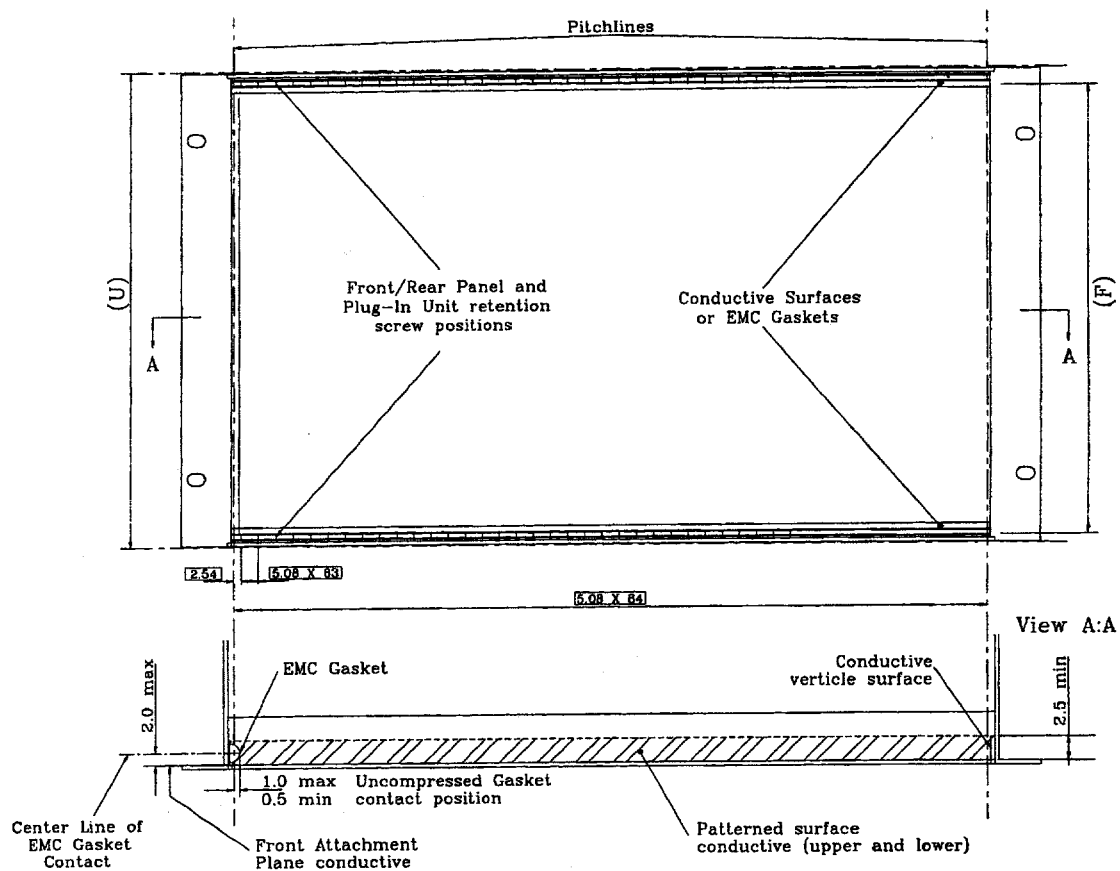


Figure 2— EMC subrack dimensions