

IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 60603-2 Connectors

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Abstract: The basic dimensions of a range of modular subracks conforming to IEC 60297-3 (1984-01) and IEC 60297-4 (1995-03) for mounting in equipment according to IEC 60297-1 (1986-09) and ANSI/EIA 310-D-1992, together with the basic dimensions of a compatible range of plug-in units, printed boards, and backplanes, are covered. The dimensions and tolerances necessary to ensure mechanical function compatibility are provided. This standard offers total system integration guidelines with attendant advantages, such as reduction in design and development time, manufacturing cost savings, and distinct marketing advantages.

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

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Introduction

(This introduction is not a part of IEEE Std 1101.1-1998, IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 60603-2 Connectors.)

With the introduction of international (IEC) microcomputer architectures based on the “Euroboard form factor,” the IEEE Computer Society Technical Committee on Microprocessors and Microcomputers found it appropriate to form a separate IEEE standard to expand upon the IEC 60297 series of standards, Dimensions of mechanical structures of the 482.6 mm (19 in) series. (See Clause 3 of this standard.)

This standard provides design engineers with the dimensions and tolerances necessary to ensure mechanical function compatibility. This standard also provides environmental specifications as an addendum to IEC 60297-3 (1984-01).

This mechanical standard offers total system integration guidelines. It offers advantages such as reduction in design and development time, manufacturing cost savings, and distinct marketing advantages.

This standard covers standardized dimensions of a range of modular subracks and a compatible range of plug-in units, printed boards, backplanes, and connectors.

This standard was revised from IEEE Std 1101.1-1991.

At the time that the revision was completed, the P1101.1 Working Group had the following membership:

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IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 60603-2 Connectors

1. Scope

1.1 Basic dimensions of subracks

This standard covers the basic dimensions of a range of modular subracks conforming to IEC 60297-3 (1984-01) and IEC 60297-4 (1995-03) for mounting in equipment according to IEC 60297-1 (1986-09) and ANSI/EIA 310-D-1992, together with the basic dimensions of a compatible range of plug-in units, printed boards, and backplanes.

1.2 Dimensions of plug-in units

This standard will give the dimensions of associated plug-in units and connector-mounting details together with applicable detail dimensions of the subrack.

1.3 Environmental requirements of subracks

This standard will state environmental requirements of subracks and their associated plug-in units.

2. Purpose

The purpose of this standard is the specification of dimensions that will ensure the mechanical interchangeability and environmental requirements of subracks and of plug-in units.

3. References

The following publications shall be used in conjunctions with this standard. When they are superseded by an approved revision, the revision shall apply.

ANSI/EIA 310-D-1992: Racks, Panels, and Associated Equipment.¹

¹ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (www.ansi.org/).

CFR (Code of Federal Regulations), Title 47: Telecommunications, Part 15J, published by Office of the Federal Register (FCC Rules and Regulations are contained within this document).²

IEC 60068-2-1 (1990-05), Environmental testing—Part 2: Tests. Tests A: Cold.³

IEC 60068-2-2 (1974-01), Environmental testing—Part 2: Tests. Test B: Dry Heat.

IEC 60068-2-6 (1995-03), Environmental testing—Part 2: Tests. Test Fc: Vibration (sinusoidal).

IEC 60068-2-11 (1981-01), Environmental testing—Part 2: Tests. Test Ka: Salt mist.

IEC 60068-2-27 (1987-06), Environmental testing—Part 2: Tests. Test Ea and guidance: Shock.

IEC 60097 (1991-05), Grid systems for printed circuits.

IEC 60249-2-1 (1985-01), Base materials for printed circuits. Part 2: Specifications. Specification No. 1: Phenolic cellulose paper copper-clad laminated sheet, high electrical quality.

IEC 60249-2-2 (1985-01), Base materials for printed circuits. Part 2: Specifications. Specification No. 2: Phenolic cellulose paper copper-clad laminated sheet, economic quality.

IEC 60249-2-3 (1987-04), Base materials for printed circuits. Part 2: Specifications. Specification No. 3: Epoxide cellulose paper copper-clad laminated sheet of defined flammability (vertical burning test).

IEC 60249-2-4 (1987-06), Base materials for printed circuits. Part 2: Specifications. Specification No. 4: Epoxide woven glass fabric copper-clad laminated sheet, general purpose grade.

IEC 60249-2-5 (1987-06), Base materials for printed circuits. Part 2: Specifications. Specification No. 5: Epoxide woven glass fabric copper-clad laminated sheet of defined flammability (vertical burning test).

IEC 60297-1 (1986-09), Dimensions of mechanical structures of the 482.6 mm (19 in) series. Part 1: Panels and racks.

IEC 60297-3 (1984-01), Dimensions of mechanical structures of the 482.6 mm (19 in) series. Part 3: Sub-racks and associated plug-in units.

IEC 60297-4 (1995-03), Mechanical structures of 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 60603-2 (1995-09), 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 60651 (1979-01), Sound level meters.

IEC 60707 (1981-01), Methods of test for the determination of the flammability of solid electrical insulating materials when exposed to an igniting source.

IEC 61010-1 (1990-09), Safety requirements for electrical equipment for measurement, control, and laboratory use—Part 1: General requirements.⁴

²CFR publications are available from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, USA.

³IEC publications are available from the Sales Department of the International Electrotechnical Commission, Case Postale 131, 3, rue de Varembe, CH-1211, Genève 20, Switzerland/Suisse (www.iec.ch/). IEC publications are also available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (www.ansi.org/).

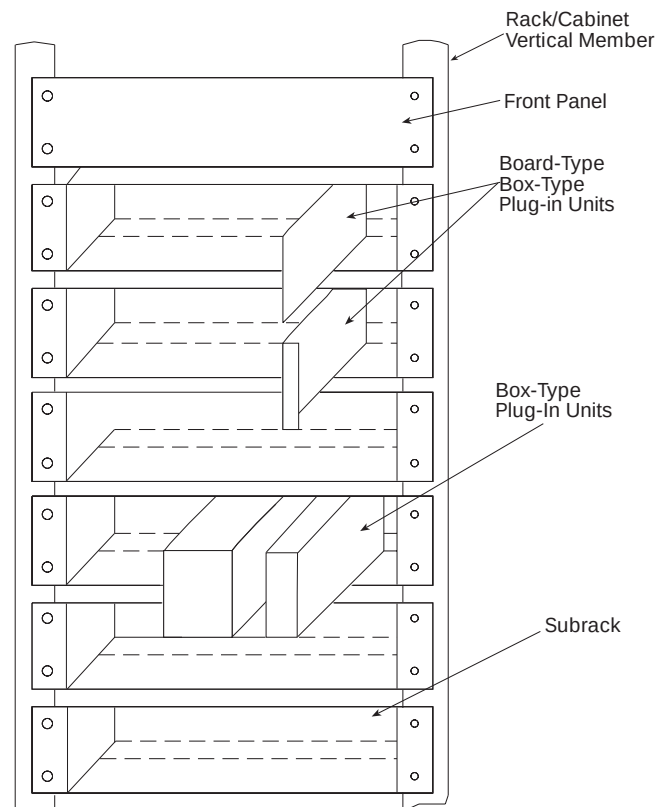
⁴IEC 61010-1 (1990-09) replaces withdrawn standard IEC 60348 (1978).

IEEE Std 1101.10-1996, IEEE Standard for Additional Mechanical Specifications for Microcomputers Using the IEEE 1101.1-1991 Equipment Practice.⁵

IEEE 1101.11-1998, IEEE Standard for Mechanical Rear Plug-in Units Specifications for Microcomputers Using the IEEE 1101.1 and the IEEE 1101.10 Equipment Practice.

4. General arrangement

Subracks may be mounted one above another or in combination with suitable instruments and panels in equipment complying with the rack and panel dimensions given in IEC 60297-1 (1986-09) and ANSI/EIA 310-D-1992. See Figure 1.



NOTES

1—Generally, subracks are equipped with printed board or rack-and-panel-type connectors at the rear side, and have guides for locating or supporting, or both, printed boards or plug-in units.

2—In principle, the connector is mounted on the right side of the printed board as viewed from the front of the subrack.

3—Table 5 defines the dimensions required for mechanical interchangeability of plug-in units.

4—The drawings in this standard are not intended to indicate details of design. All dimensions are given in millimeters (with inches in parentheses).

5—All drawings in this standard are shown in the first angle projection according to ISO 1101: 1983 [B3].

6—Terminology is as per IEC 60917-1 (1998-09) [B2] and IEC 60050 [B1].

Figure 1—General arrangement

⁵IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA (www.standards.ieee.org/).

5. Euroboard matrix

See Figure 2.

All references to board heights in this document are in units of, and increments of, 3U (133.35 mm, or 5.25 in). A board commonly called single height can be housed in a 3U-high subrack or box-type plug-in unit and may have a single connector [see IEC 60603-2 (1995-09)] on its rear edge.

- A 3U-high subrack commonly houses a single-height board.
- A 6U-high subrack commonly houses a double-height board.
- A 9U-high subrack commonly houses a triple-height board.

NOTES
1— For 6U- and 9U-high configurations, the use of fixtures to mount the connectors will be required to guarantee inter-mateability.
2— Board heights may be incremented in units of 133.35 mm (5.25 in) after the initial 100 mm (3.937 in).

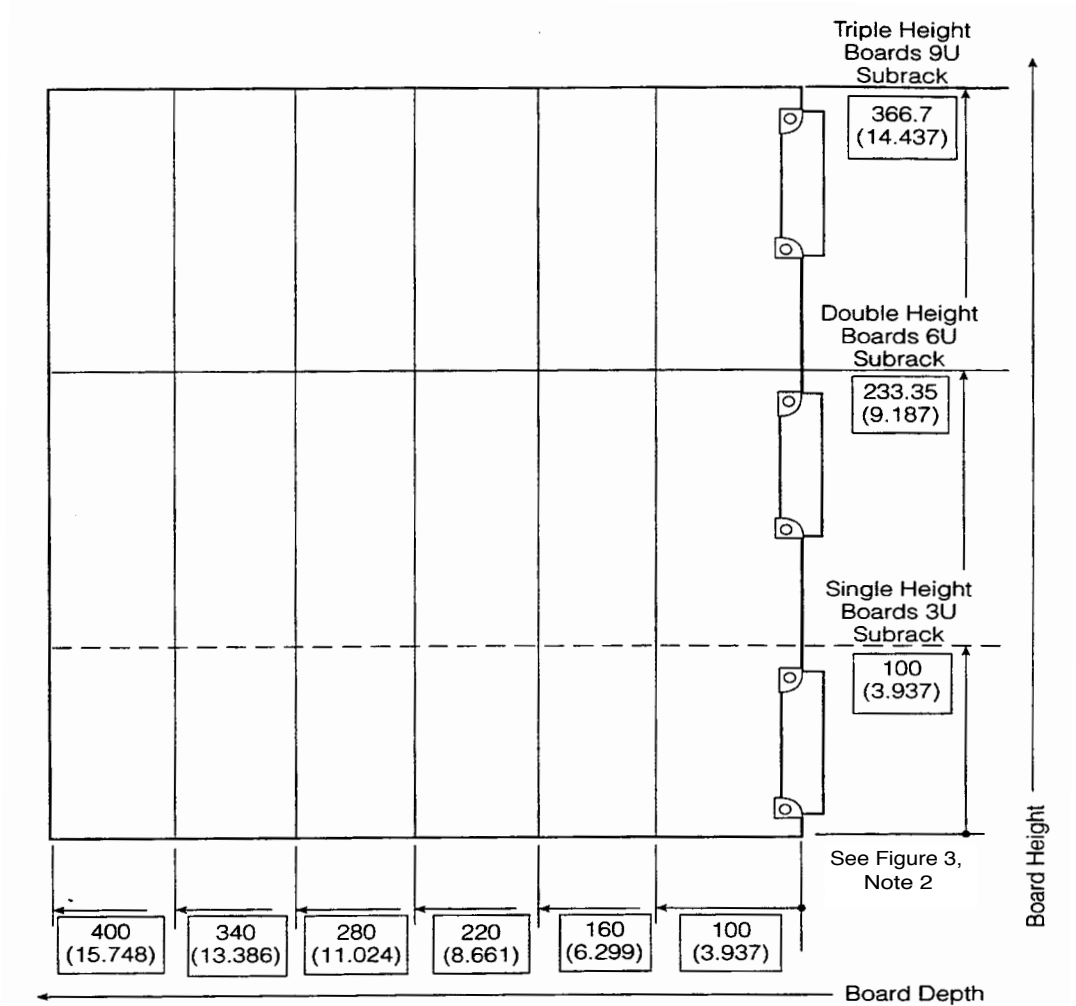


Figure 2—Euroboard matrix

6. Euroboard sizes

Table 1 and Table 2 show a selected range of Euroboard sizes from IEC 60297-3 (1984-01).

6.1 Euroboard height

Table 1—Euroboard height

Reference-U	3	6	9
Printed board height $H_b +0/-0.3$ ($+0/-0.012$) see Clause 5, Note 2	100.00 mm (3.937 in)	233.35 mm (9.187 in)	366.70 mm (14.437 in)

6.2 Euroboard depth

Table 2—Euroboard depth

Printed board depth $D_b +0/-0.3$ ($+0/-0.012$)	100 mm (3.937 in)	160 mm (6.299 in)	220 mm (8.661 in)	280 mm (11.024 in)	340 mm (13.386 in)	400 mm (15.748 in)
$D_a \pm 0.1$ (± 0.004)	93.67 mm (3.688 in)	153.67 mm (6.050 in)	213.67 mm (8.412 in)	273.67 mm (10.774 in)	333.67 mm (13.137 in)	393.67 mm (15.499 in)

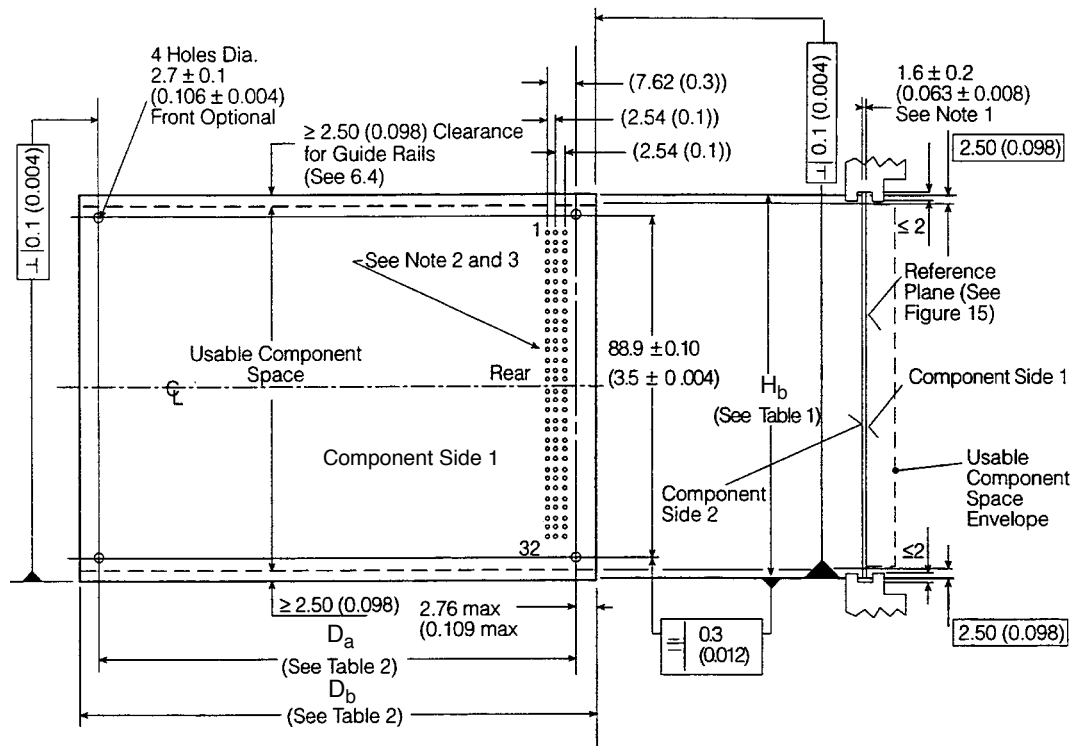
6.3 Euroboard thickness

The thickness of printed boards of plug-in units shall be 1.6 ± 0.2 mm (0.063 ± 0.008 in) in the area of the guide rails [clearance for guide rails ≥ 2.5 mm (0.098 in)]. (See Figure 3.) See the IEC 60249-2-series for other printed board thicknesses and tolerances.

6.4 Conductive elements and guide rails

Conductive elements are not to extend beyond the usable component space on the outer planes. Printed circuits and components shall be placed on the board in accordance with their electrical features.

NOTE—The clearance area for guide rails may be used to provide conductivity between the subrack and the boards in order to reduce EMI/RFI emissions, provide electrostatic discharge (ESD) contact, or to provide heat sinking capability for the board.



NOTES

- 1—For board thickness, see 6.3.
- 2—This connector pattern refers to Type C connectors as specified in IEC 60603-2 (1995-09), which does not indicate tolerance. Recommended IEEE 1101.1 tolerance is +0.05 mm (+0.002 in).
- 3—See IEC 60097 (1991-05).

Figure 3—Single-height boards, component side 1 view

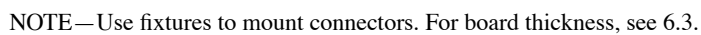


Figure 4—Double-height board, component side 1 view

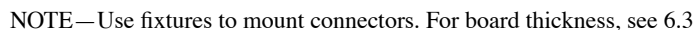


Figure 5—Triple-height board, component side 1 view

7. Position of plug-in unit mounted connectors, board-type and box-type

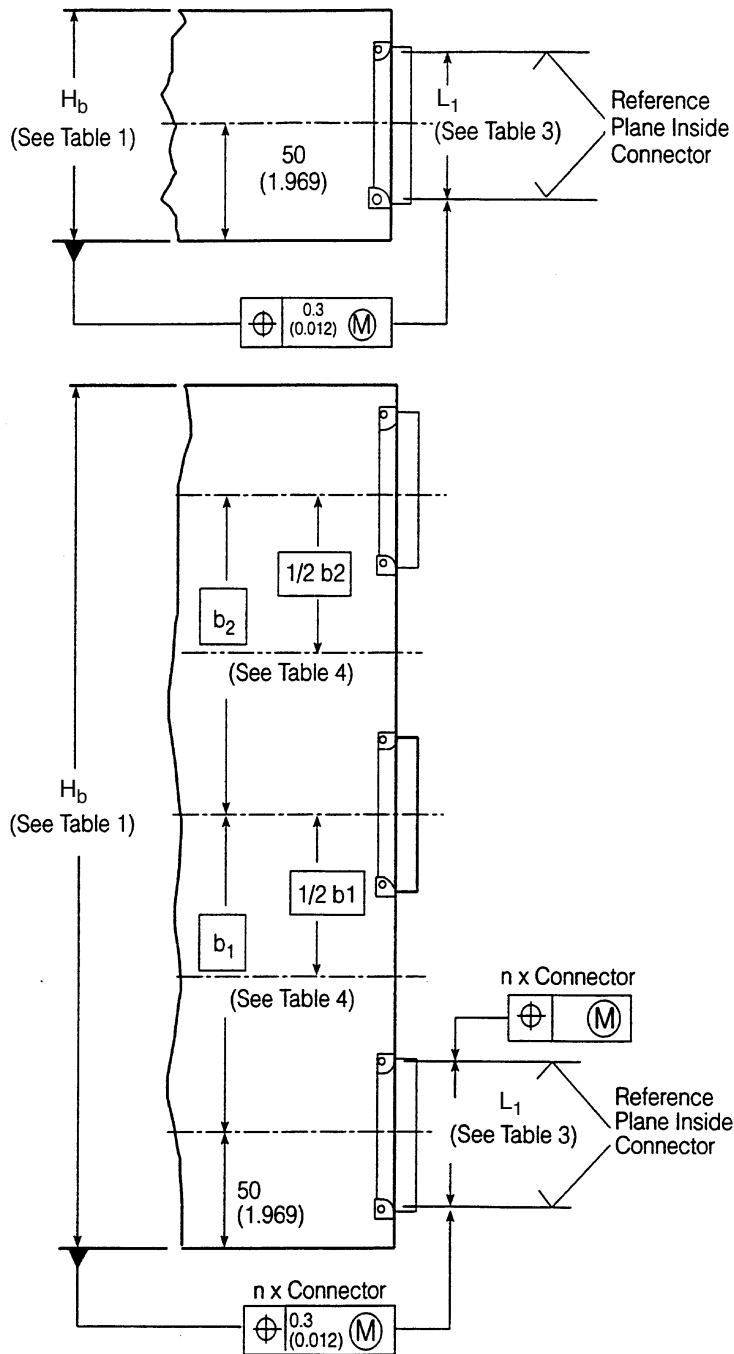
Table 3—Position of plug-in mounted connectors, board/box-type

Connector type [see IEC 60603-2 (1995-09)]	L_1	L_2
B + C (see Figure 6)	$85.2 + 0.2 - 0$ (3.354 + 0.008/-0)	—
Q + R (see Figure 7)	—	$85.2 - 0.2/+0$ (3.354 - 0.008/+0)

Table 4—Position of plug-in mounted unit connectors

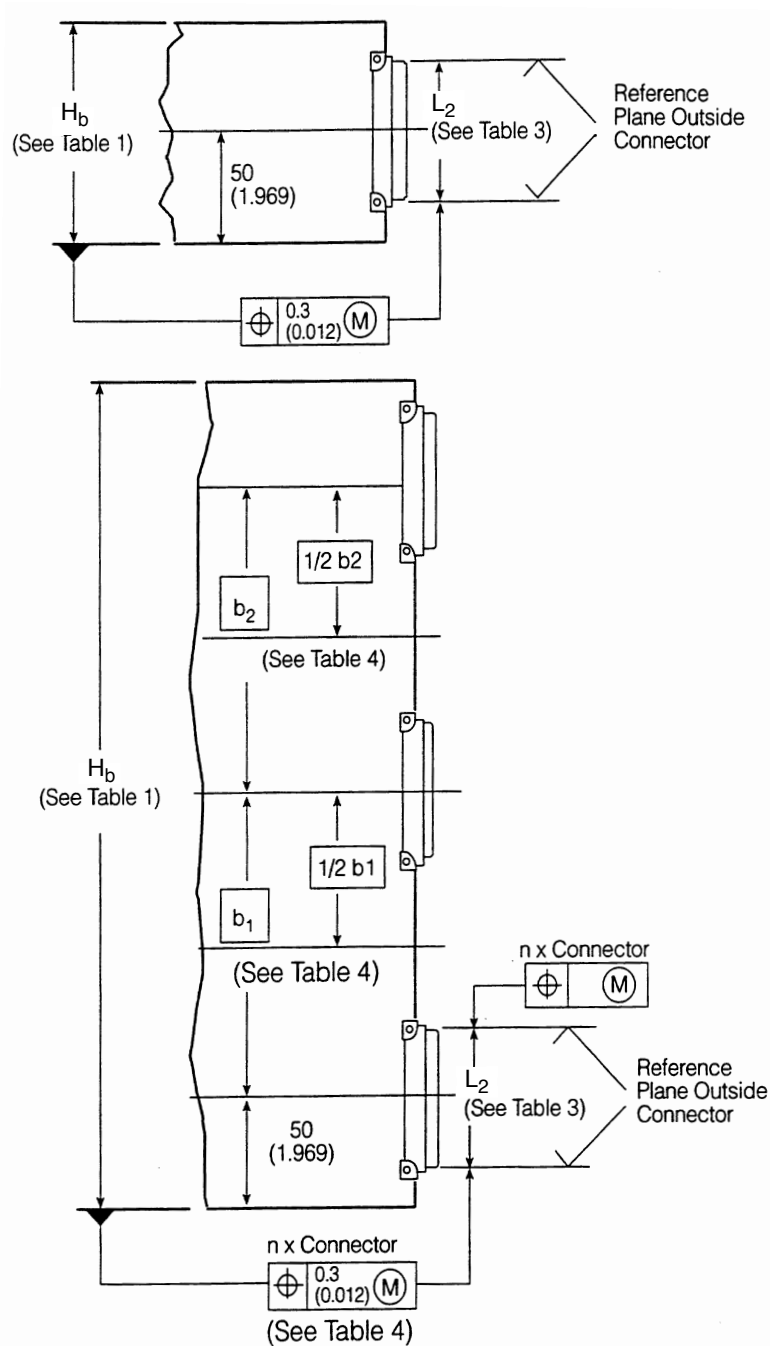
Reference-U ^a	3	6	9
b_1	—	133.35 mm (5.25 in)	133.35 mm (5.25 in)
b_2	—	—	133.35 mm (5.25 in)

^aSubracks are dimensioned in height of U, 1U = 44.45 mm (1.75 in). See IEC 60297-1 (1986-09) and ANSI/EIA 310-D-1992.



NOTE—Fixtures are required when mounting connectors on double- and triple-height boards.

Figure 6—Position of connectors on plug-in units



NOTE—Fixtures are required when mounting connectors on double- and triple-height boards.

Figure 7—Position of inverse connectors on plug-in units