

IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 603-2 Connectors

Sponsor

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of the
IEEE Computer Society**

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Abstract: The basic dimensions of a range of modular subracks conforming to IEC 297-3 (1984) for mounting in equipment according to IEC 297-1 (1986) and ANSI/EIA 310-C (1977), together with the basic dimensions of compatible range of plug-in units, printed board, 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: dimensions, mechanical interchangeability, plug-in units, subracks

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Foreword

(This foreword is not a part of IEEE Std 1101.1-1991, IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 603-2 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 297 series of standards, “Dimensions of mechanical structures of the 482.6 mm (19 in) series” (see [8] and [9] in Section 3. of this document).

This standard provides design engineers with the dimensions and tolerances necessary to ensure mechanical function compatibility. This standard provides environmental specifications as an addendum to IEC 297-3 (1984), Dimensions of mechanical structures of the 482.6 series, Part 3.: Subracks and associated plug-in units.

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

This document was revised from ANSI/IEEE Std 1101-1987.

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CLAUSE	PAGE
1. Scope	1
1.1 Basic Dimensions of Subracks.....	1
1.2 Dimensions of Plug-in Units.....	1
1.3 Environmental Requirements of Subracks.....	1
2. Object	1
3. References.....	2
4. General Arrangement.....	3
5. Euroboard Matrix	4
6. Euroboard Sizes	4
6.1 Euroboard Height.....	4
6.2 Euroboard Depth	4
6.3 Euroboard Thickness.....	4
6.4 Conductive Elements and Guide Rails.....	5
7. Position of Plug-in Unit Mounted Connectors (Board-Type and Box-Type).....	9
8. Plug-in Unit Description	12
9. Plug-in Unit Dimensions.....	12
9.1 Board-Type Plug-in Units	12
9.2 Box-Type Plug-in Units	12
10. Backplane Design and Mounting Positions	13
10.1 Rigidity.....	13
10.2 Dimensions.....	13
11. Subracks	34
12. Environmental Specifications	42
12.1 Introduction.....	42
12.2 Climatic Tests	42
12.3 Mechanical Load.....	42
12.4 Vibration	44
12.5 Shock.....	44
12.6 Safety Tests.....	44
13. Bibliography.....	46

IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 603-2 Connectors

1. Scope

1.1 Basic Dimensions of Subracks

This standard covers the basic dimensions of a range of modular subracks conforming to IEC 297-3 (1984) [11],¹ for mounting in equipment according to IEC 297-1 (1986) [10] and ANSI/EIA 310-C (1977) [1], together with the basic dimensions of compatible range of plug-in units, printed board, 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. Object

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.

¹The numbers in brackets correspond to those of the references in Section 3.

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:

- [1] ANSI/EIA 310-C (1977) (R1983), Racks, Panels, and Associated Equipment.²
- [2] 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).³
- [3] IEC 68-2-1 (1990), Environmental Testing, Part 2: Tests—Tests A: Cold.⁴
- [4] IEC 68-2-2 (1974), Environmental Testing, Part 2: Tests—Tests B: Dry Heat.
- [5] IEC 68-2-6 (1982), Environmental Testing, Part 2: Tests—Test Fc and Guidance: Vibration (sinusoidal).
- [6] IEC 68-2-11 (1981), Environmental Testing, Part 2: Tests—Test Ka: Salt mist.
- [7] IEC 68-2-27 (1987), Environmental Testing, Part 2: Tests—Test Ea and Guidance: Shock.
- [8] IEC 97 (1973), Grid system for printed circuits.
- [9] IEC 249-2-1/2/3/4/5, Base materials for printed circuits, Part 2: Specifications.
 - 1 (1985): Specification No. 1: Phenolic cellulose paper copper-clad laminated sheet, high electrical quality.
 - 2 (1985): Specification No. 2: Phenolic cellulose paper copper-clad laminated sheet, economic quality.
 - 3 (1987): Specification No. 3: Epoxide cellulose paper copper-clad laminated sheet, of defined flammability (vertical burning test).
 - 4 (1987): Specification No. 4: Epoxide woven glass fabric copper-clad laminated sheet, general purpose grade.
 - 5 (1987): Specification No. 5: Epoxide woven glass fabric copper-clad laminated sheet, of defined flammability (vertical burning test).
- [10] IEC 297-1 (1986), Dimensions of mechanical structures of the 482.6 mm (19 in) series, Part 1: Panels and racks.
- [11] IEC 297-3 (1984), Dimensions of mechanical structures of the 482.6 mm (19 in) series. Part 3: Subracks and associated plug-in units.
- [12] IEC 348 (1978), Safety requirements for electronic measuring apparatus.
- [13] IEC 603-2 (1988), Two-part connectors for printed boards, for basic grid of 2.54 mm (0.1 in), with common mounting features.
- [14] IEC 651 (1979), Sound level meters.
- [15] IEC 707 (1981), Methods of test for the determination of the flammability of solid electrical insulation materials when exposed to an igniting source.

²ANSI/EIA publications are available from the Sales Department, American National Standards Institute, 1430 Broadway, New York, NY 10013, or from Global Engineering, 1990 M St., NW, Suite 400, Washington, DC 20036, USA.

³This document is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, USA.

⁴IEC 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.

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 297-1 (1986) [10] and ANSI/EIA 310-C (1977) [1]. See Fig 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 specification are not intended to indicate details of design. All dimensions are given in millimeters (with inches in brackets).
- 5 — All drawings in this specification are shown in the first angle projection according to ISO 1101:1983 [B3]. Boxed dimensions are for reference only.
- 6 — Terminology is as per IEC 916 (1988) [B2] and IEC 50 [B1].

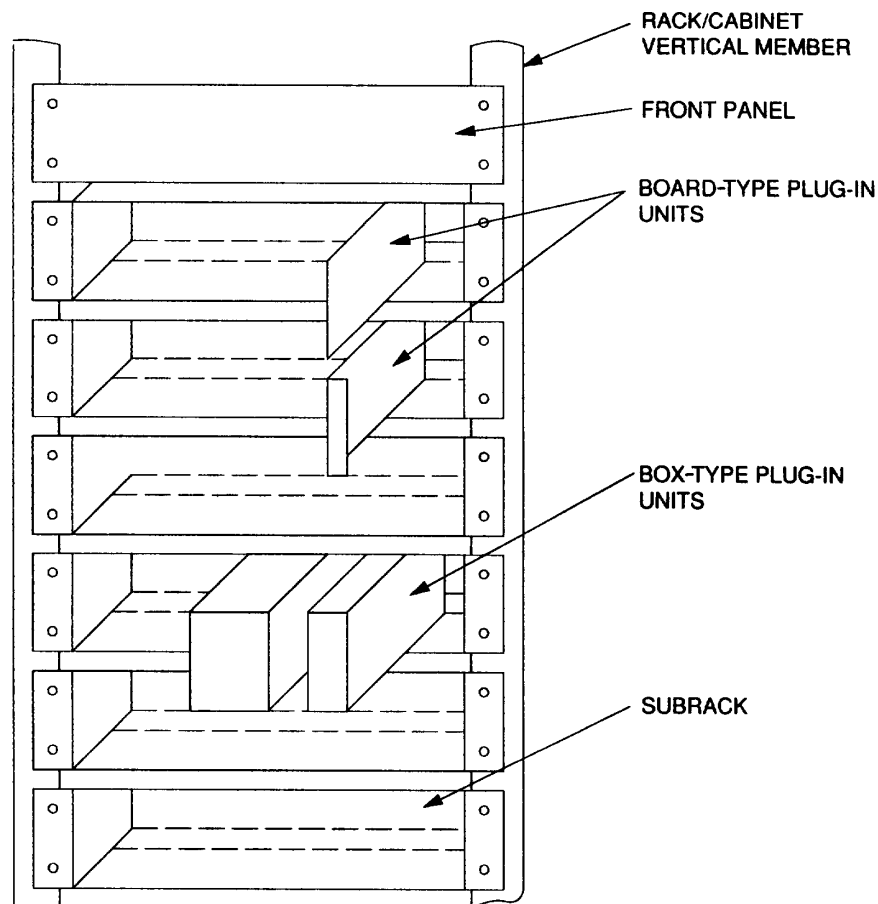


Figure 1— General Arrangement

5. Euroboard Matrix

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 603-2 (1988) [13]) 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 intermateability.
- 2 — Board heights may be incremented in units of 133.35 mm (5.25 in) after the initial 100 mm (3.937 in).

6. Euroboard Sizes

Table 1 and Table 2 show a selected range of Euroboard sizes from IEC 297-3 (1984) [11].

6.1 Euroboard Height

Table 1— Euroboard Height

U	3U	6U	9U
$H_b +0/-0.3$ (+0/-0.012)	100.0 (3.937)	233.35 (9.187)	366.7 (14.437)

6.2 Euroboard Depth

Table 2— Euroboard Depth

$D_b +0/-0.3$ (+0/-0.012)	100 (3.937)	160 (6.299)	220 (8.661)	280 (11.024)	340 (13.386)	400 (15.748)
$D_a \pm 0.1$ (± 0.004)	93.67 (3.688)	153.67 (6.05)	213.67 (8.412)	273.67 (10.774)	333.67 (13.137)	393.67 (15.499)

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 guides. See IEC 249-2-1/2/3/4/5 [9] for PB thicknesses and tolerances.

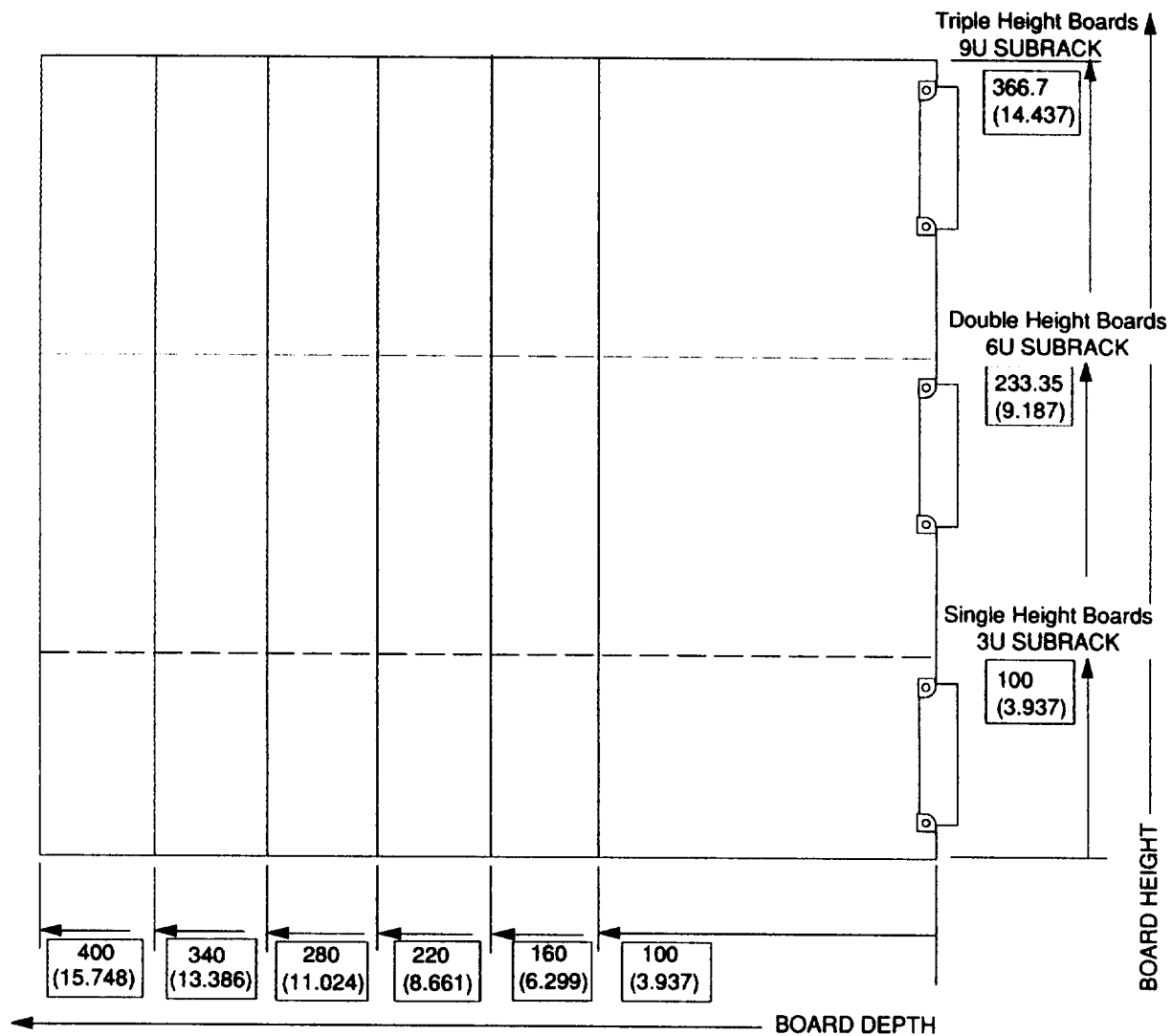
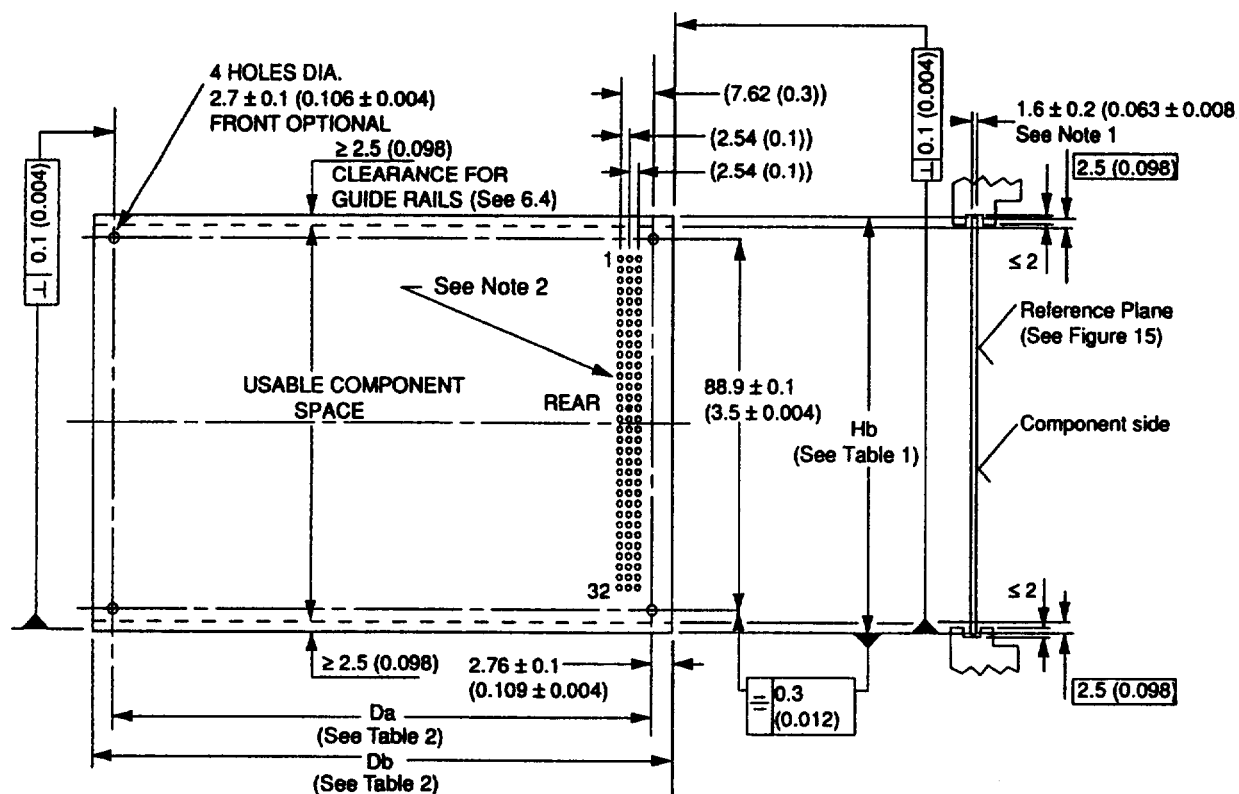


Figure 2— Euroboard Matrix

6.4 Conductive Elements and Guide Rails

Conductive elements are not to extend beyond the usable component space on the outer planes. If metallic guide rails are used, component clearance may have to be increased. Printed circuits and components must be placed on the board in accordance with their electrical features.

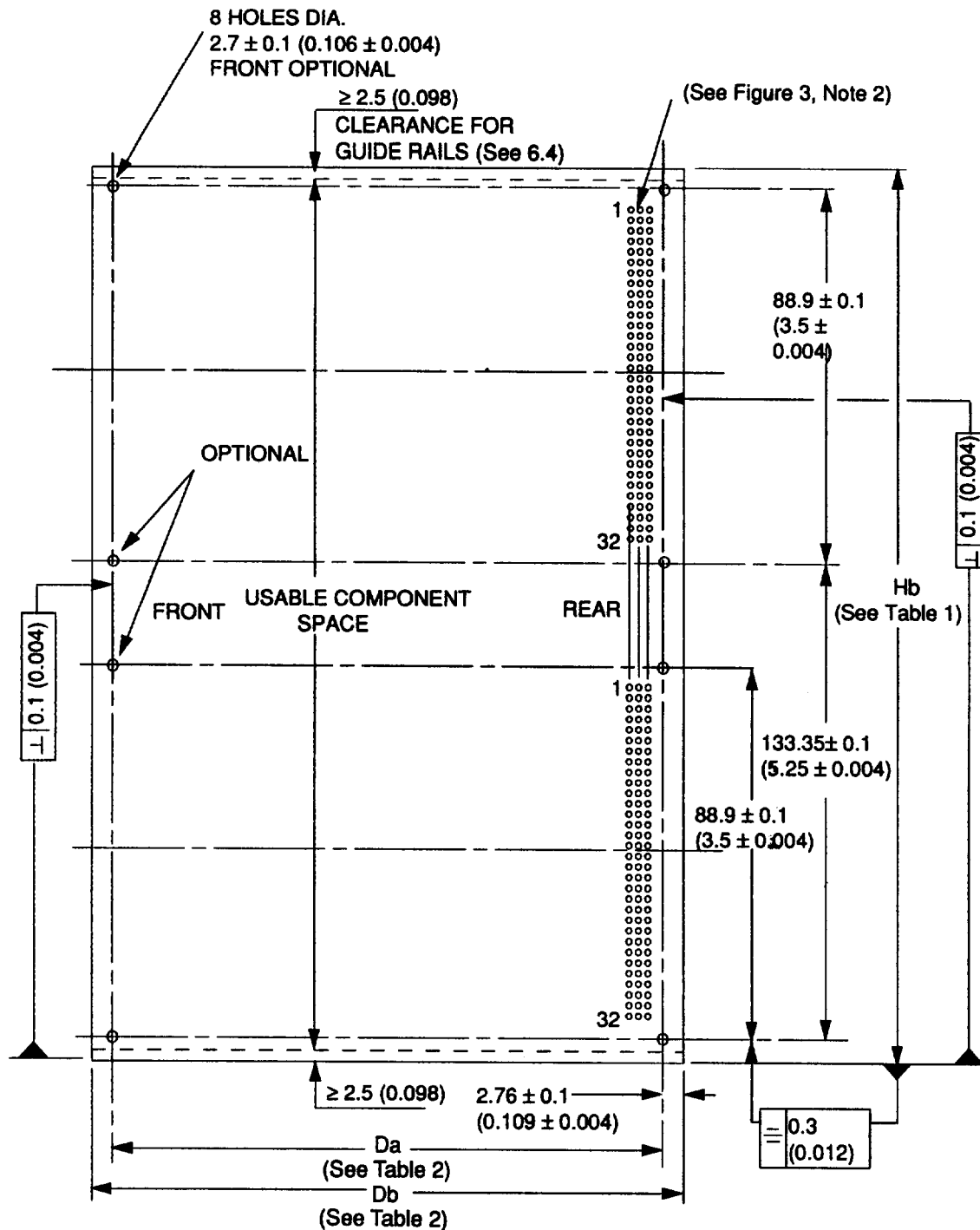
NOTE — The clearance area for guide rails may be used to provide conductivity between the subrack and the boards in order to reduce EMI/RFI emissions, or to provide heat sinking capability to board, or both.



NOTES:

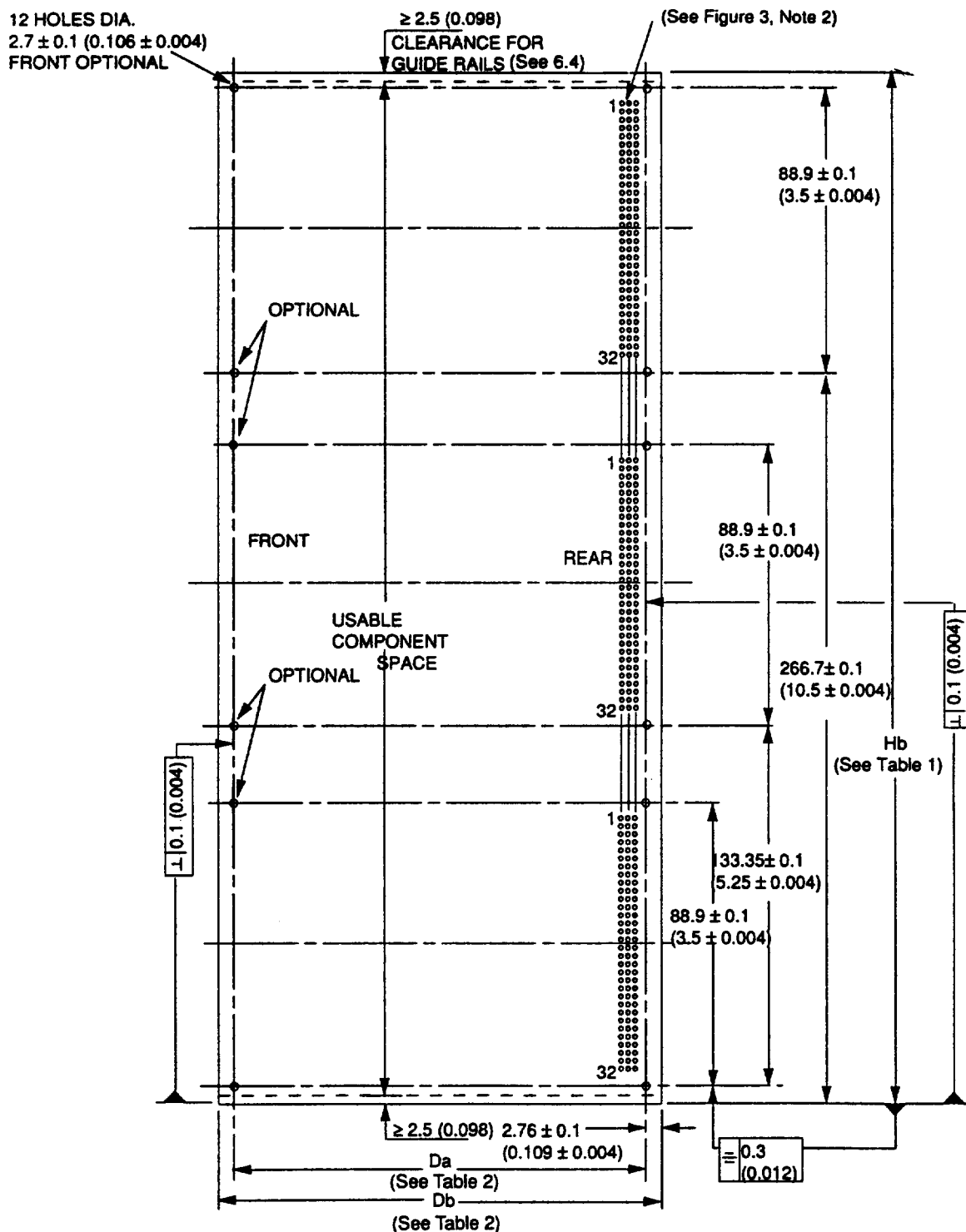
- (1) For board thickness, see 6.3.
(2) This connector pattern refers to Type C connectors as specified in IEC 603-2 (1988) [13], but does not indicate tolerance. Recommended tolerance is ± 0.05 mm (0.002 in).
See IEC 97 (1973) [8].

Figure 3— Single-Height Boards, Component Side View



NOTE: Use fixtures to mount connectors. For board thickness, see 6.3.

Figure 4— Double-Height Board, Component Side View



NOTE: Use fixtures to mount connectors. For board thickness, see 6.3.

Figure 5— Triple-Height Board, Component Side View

7. Position of Plug-in Unit Mounted Connectors (Board-Type and Box-Type)

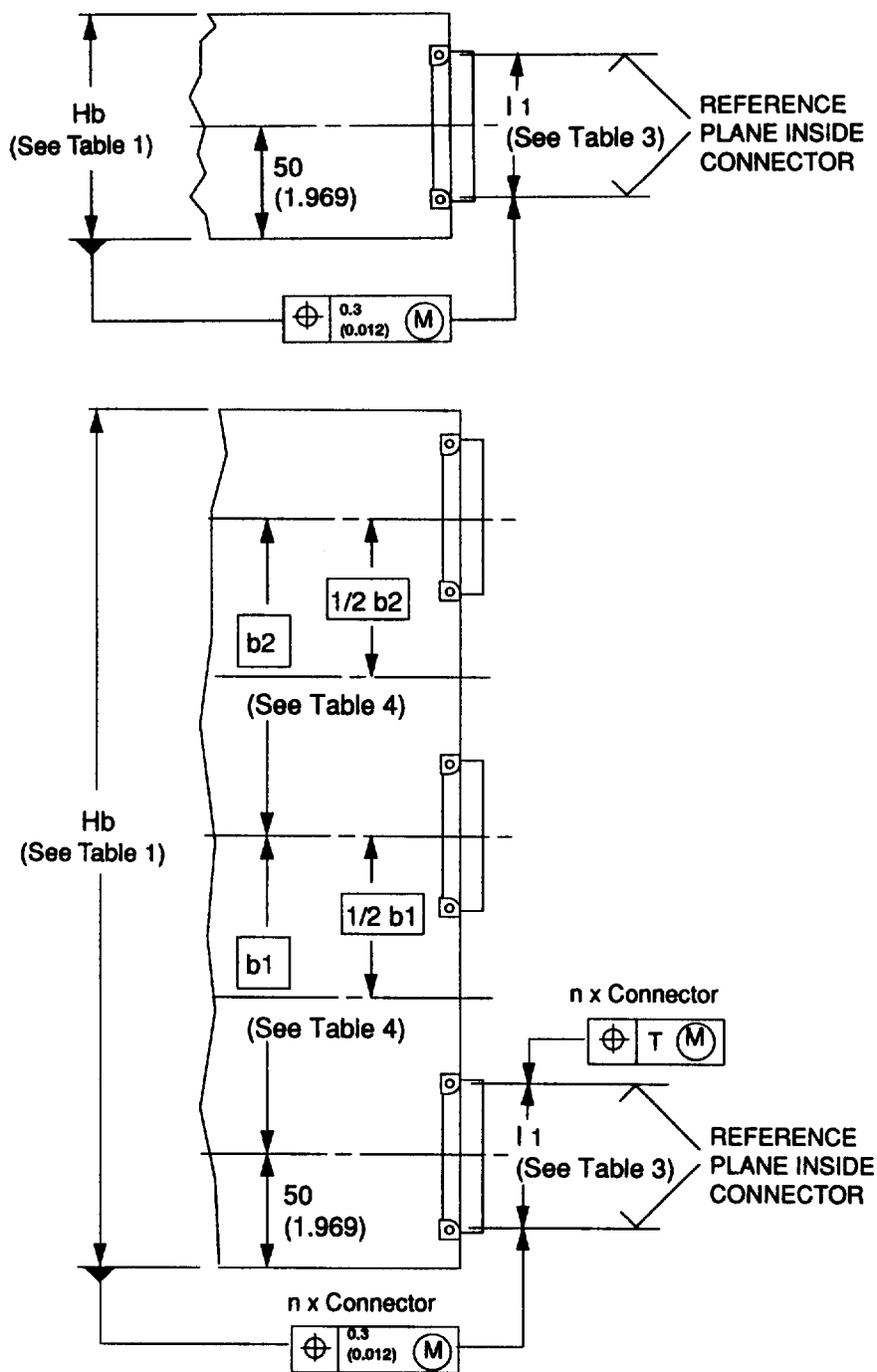
Table 3— Position of Plug-in Unit Mounted Connectors, Board/Box-Type

Connector Type (see IEC 603-2 (1988) [13])	l_1	l_2
B + C (see Fig 6)	85.2 +0.2-0 (3.354 +0.008/-0)	
Q + R (see Fig 7)		85.2 -0.2/+0 (3.354 -0.008/+0)

Table 4— Position of Plug-in Unit Mounted Connectors

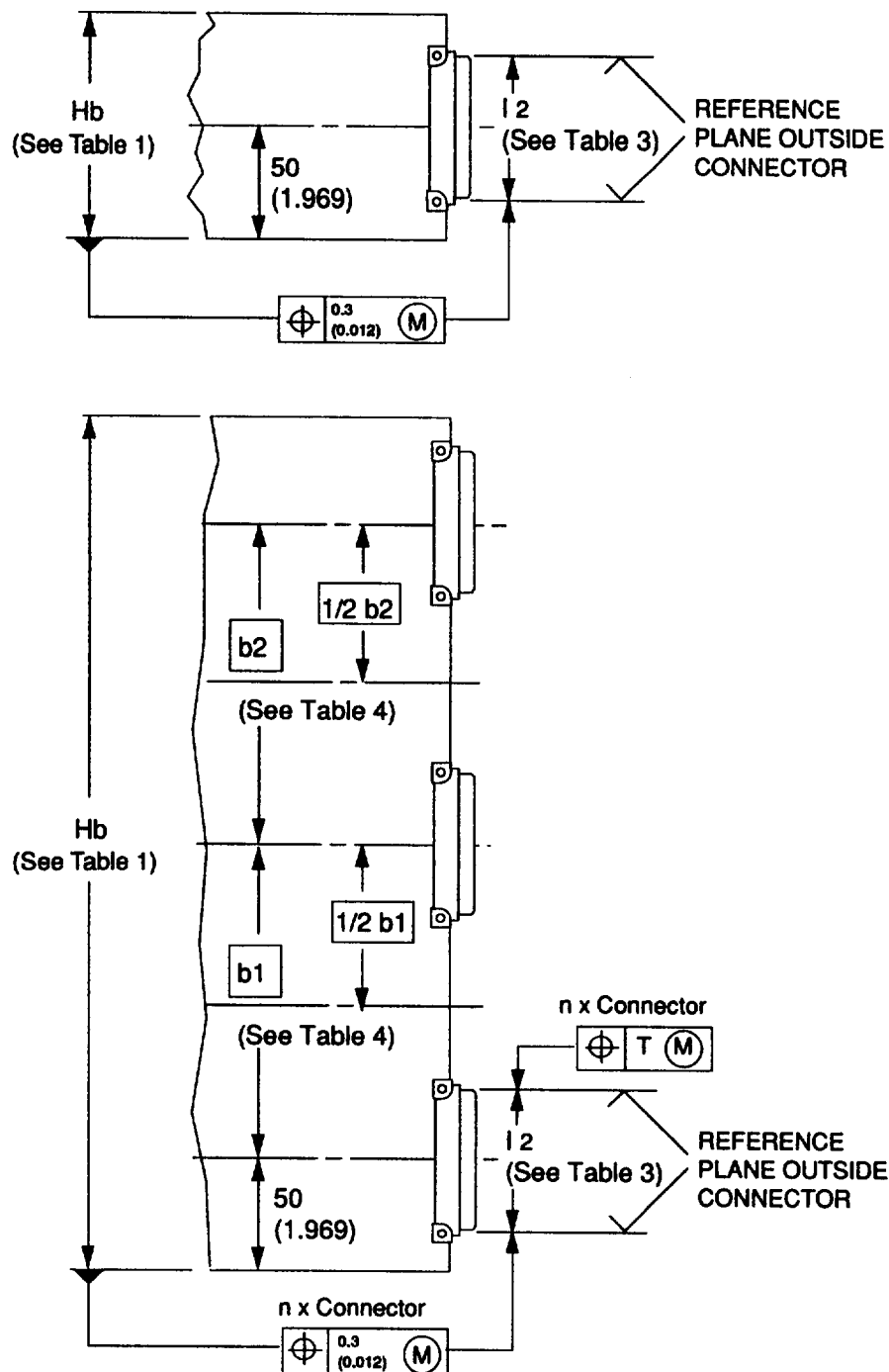
$n \times U^*$	3U	6U	9U
b_1		133.35(5.25)	133.35(5.25)
b_2			133.35 (5.25)

*Subracks are dimensioned in heights of U, 1U = 44.45 mm (1.75 in). See IEC 297-1 (1986) [10] and ANSI/EIA 310-C (1977) [1].



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