OBSAI System Reference

Appendix C

HARD-METRIC 2MM, 6-ROW DAUGHTERBOARD RECEPTABLE

REQUIREMENT SPECIFICATION

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### HISTORY

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<th>Author</th>
<th>Change Note No./Notes</th>
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<tr>
<td>5.9.2003</td>
<td>0.0.1</td>
<td>Ari Oravainen</td>
<td>First release</td>
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CHANGE HISTORY:
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1. INTRODUCTION

- Specification for Hard metric 2mm female right angle receptacle, 144 pins. With or without guide and coding block.
2. GENERAL DESCRIPTION

- Type: Data
- Connection method: Pin in hole reflow (PCB thickness min 1.7mm, max. 2.145mm) or pressfit (PCB thickness 1.4 – 2.4 mm)
- Shape: Right angle female.
- Number of poles: 6x24

Figure 1. 2mm right angle female, 144pin version with guide and coding block
3. ELECTRICAL SPECIFICATION

- Operational temperature range: -45…+85 °C.
- Signalling rate: DC Gbps (defined later on)
- Max. Voltage (U): < 60 VDC.
- Creepage distance: > 0.6 mm.
- Clearance distance: > 0.6 mm.
- Max. Current (I): 0.6 A at max. +35°C temperature rise.
- Contact resistance (Ohm): Row a < 0.015 Ω on mated pair.
  Row f < 0.035 Ω on mated pair.
- Insulation resistance: > 1000 M Ω
- Voltage proof: 750V (RMS)
4. MECHANICAL SPECIFICATION

- All mechanical dimensions are described in specification drawing (chapter 8. Appendices / Specification drawings)

- Allowed misalignment*: $< \pm 0.1 \text{ mm without guidance (still t.b.d.)}$
  $\leq 1.35 \text{ mm with guidance}$

- Contact range / wipe: According to IEC 1076-4-101

Basic material and plating of the

- Body PIHR connector housing material must be suitable for lead free reflow process. On pressfit connectors no high temperature material is required.
  Connector plastics shall be UL listed with V0

- Contact Phosphor Bronze.

- Pressfit pin plating: Tin lead (0.5…3µm) over nickel (min. 2.0 µm) and press-in zone acc. to IEC 60352-5 (01/02) .. ROHS compatible pins are required in the future.

- Weight (g): $< 30 \text{g 144 pin.}$

- Durability: $\geq 250 \text{ mating cycles (IEC 61076-4-101, performance level 2).}$

- Solderability PIHR connector must be suitable for lead free reflow process.
  PIH connector must have min 0.5mm stand off to PCB surface.

*) Pictures for allowed misalignment to be added for 2nd release
5. ENVIRONMENTAL REQUIREMENT

Following values are list of conditions where connector will be used. Connector manufacturer does not have to test connector according these conditions. However this information must be taken into account in connector design.

These requirements come from system requirements and will be replaced by a connector test specification in a second release of this document.

5.1 Environment specification for operation

Climatic conditions:

- Temperature range  -45…+85°C.
- Relative humidity range  5…100% (ETS 300 019-1-4:1992, class 4.1).
- Absolute humidity range  0,26…29g/m³.
- Rate of temperature change  0,5°C/min.
- Air pressure range  70…106 kPa (ETS 300019-1-1:1991).

Mechanical conditions:

Sinusoidal vibration:

- Displacement  3,5mm peak between 5…9 Hz
- Acceleration  2m/s² (~0.2g)
- Frequency range  62…500 Hz
- Sweeps  5 sweep cycles for 3 direction increasing frequency (1dB/octave, logarithmic)

Shocks:
- Shock spectrum       Half Sine
- Duration            11ms
- Acceleration        100 m/s² (10 g)
- Number              3 (may be extended for ~10 shocks)
- Direction           6 axis (+X, +Y, +Z, -X, -Y, -Z)(total 6 x 3)

Bump shocks:
- Acceleration amplitude 400 m/s² (40 g)
- Pulse duration        6 ms/ pulse
- Number               500 bumps in each of 6 directions.

Random:
- ASD (14)             0,96 m²/s³ or – 3 dB/oct
- Direction            3 (X, Y, Z)
- Frequency            5 – 20 – 800 Hz.
- Duration             3 * 10 min

Earthquake:
- Earthquake (zone 4 tests) GR-63-CORE

5.2 Environment specification for transportation

Climatic and mechanical conditions for units, modules and components:

ETS 300 019-1-2: 1994 (testing methods) class 2.3.
ETS 300 019-1-2: 1992 (requirements) class 2.3.
6. CODING

Three types of coding are in use.

6.1 Coding 1

![Figure 2. Female connector with guidance and coding 1](image1)

6.2 Coding 2

![Figure 3. Female connector with guidance and coding 2](image2)
6.3 Coding 3

Figure 4. Female connector with guidance and coding 3
7. **PCB LAYOUT**

Figure 5. Board layout for 144 pin female Press-fit connector with guidance
Figure 6. Board layout for 144 pin female Press-fit connector without guidance
Figure 7. Lay out drawing for 144 pin female PIHR connector with guidance.
Figure 8. Board layout for 144 pin female PIHR connector without guidance
8. SPECIFICATION DRAWINGS

Following figures 9, 10, 11 and 12 will be checked and corrections if any will be made to the second release of this document.

8.1 Female PIHR connector

![Diagram of female PIHR connector]

**Figure 9. Female PIHR connector without guidance**

1) Dimension for alternative connector design
2) Forces for locking-pin (if used)
   - Insertion force: max 8N
   - Retention force: min 0.5N.

Remark: A locking mechanism is necessary to hold the connector in its position for reflow soldering. Whether this mechanism is a plastic peg as shown or something else is not important.

<table>
<thead>
<tr>
<th>Connector Type</th>
<th>B</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td>144 pin</td>
<td>48 -0.2</td>
<td>23x2 = 46</td>
</tr>
</tbody>
</table>
8.2 Female PIHR connector with guidance

Figure 10. Female PIHR connector with guidance

1) Dimension for alternative connector design
2) Forces for locking-pin (if used)
   insertion force: max 8N
   retention force: min 0.5N

<table>
<thead>
<tr>
<th>Connector Type</th>
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<th>B</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td>144 pin with guidance</td>
<td>55 -0.2</td>
<td>48 -0.2</td>
<td>23×2 = 46</td>
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</tbody>
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8.3 Female Pressfit connector

![Diagram of Female Press-fit connector]

**Figure 11. Female Press-fit connector without guidance**

1) Dimension for alternative connector design
3) Press-fit section acc. to IEC 352-5

<table>
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8.4 Female Pressfit connector with guidance

![Diagram of female press-fit connector with guidance](image)

**Figure 12. Female press-fit connector with guidance.**

1) Dimension for alternative connector design
3) Press-fit section acc. to IEC 352-5

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9. REFERENCE DOCUMENTS

- MIL- STD- 883, method 2003,3
- ETS 300 019-1-4:1992, class 4.1
- ETS 300019-1-1:1991
- ETS 300 019-1-2
- IEC 512-3, 5b
- ISO 9001
- Earthquake (zone 4 tests) GR-63-CORE
- IEC 61076-4-101
- IEC 60352-5 (01/02)