Mellanox® QSFP+ Port Cages
Application Specification
Rev 1.0
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## Revision History

**Table 1 – Revision History**

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>July 2014</td>
<td>Initial release</td>
</tr>
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Preface

About this Application Specification

This application specification describes the limits, operating parameters and operating instructions of Mellanox® QSFP+ Port Cage Solutions.

Audience

The Mellanox® QSFP+ Port Cages Application Specification is intended for system and board designers as well as mechanical engineers that are interested to use Mellanox high quality 1x1 and 1x6 QSFP+ port cages.

Related Documentation

The documentation accompanying the QSFP+ cages includes the following reference documents and/or websites listed in Table 2.

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Description</th>
</tr>
</thead>
</table>
1 Overview

Mellanox network products are designed for various markets and applications including hubs, switches, routers and adapters. Mellanox QSFP+ cages are part and parcel of Mellanox’s 40, 56 and 100Gb/s end-to-end solutions that have been successfully deployed in thousands of applications across the globe which use millions of Mellanox QSFP+ port cages and silicon devices. The QSFP+ port cages are offered as single QSFP+ cages and as lines of six QSFP+ port cages with or without light pipes. The six-port cages enable dense port designs of switch systems.

Mellanox QSFP+ cages are the best fit for designs based on Mellanox adapter and switch silicon products, allowing the most cost effective solutions in the market when purchased with Mellanox silicon devices.

1.1 Features

- Single (1x1) press fit and through hole QSFP+ port cages
- 6 (1x6) through hole QSFP+ port cages (with and without light pipes)
- SFF-8683 compliant
- PCIe compliant 1x1 cages
- Field proven with Mellanox adapter and switch devices
- RoHS and REACH compliant
Table 3 – Mellanox QSFP+ Port Cages

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTMQ11PPN</td>
<td>QSFP+ port cage, 1x1, press fit* PCI type heat-sink</td>
</tr>
<tr>
<td>MTMQ11TPN</td>
<td>QSFP+ port cage, 1x1, through hole PCI type heat-sink</td>
</tr>
<tr>
<td>MTMQ16PPN</td>
<td>QSFP+ port cage, 1x6, press fit* with PCI type heat-sink</td>
</tr>
<tr>
<td>MTMQ16PSL</td>
<td>QSFP+ port cage, 1x6, SAN type heat-sink with square light pipes</td>
</tr>
</tbody>
</table>

*To ensure the durability of the components on the circuit board, the contact of the press fit cages must be strengthened by soldering. For guidelines, see Section 2.2.

Figure 1 – MTMQ11TPN Port Cage

Figure 2 – MTMQ16PSL Port Cage

Figure 3 – MTMQ11PPN Port Cage

Figure 4 – MTMQ16PPN Port Cage
2 Specifications and Requirements

2.1 Material

Table 4 – Material Specifications

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cage assembly frame</td>
<td>Nickel Silver Alloy</td>
</tr>
<tr>
<td>EMI springs</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Heat sinks</td>
<td>Aluminum Alloy</td>
</tr>
<tr>
<td>Heat sink clip</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Light pipes</td>
<td>Clear Polycarbonate</td>
</tr>
</tbody>
</table>

2.2 Assembly on PCB

2.2.1 PCB Design

A careful consideration of the components’ placement on the PCB can ensure long term stability and reliability of the cage assembly. For optimal performance, the PCB holes must be well planned and precisely drilled. For PCB layout recommendations, see Section 2.3.

Mellanox’s QSFP press-fit cages offer two possible PCB layout configurations - single sided and double-sided (belly-to-belly). While the single-sided layout suits the assembly of one cage on the topside of the card, the belly-to-belly configuration allows a second cage to be placed on the opposite side of the PCB, directly under the top cage.

2.2.2 Soldering Guidelines

The QSFP+ cage is a press fit component assembled to the PCB by a press tool. Additional 12 soldering points were added for enforcement. Soldering will be done using a selective soldering machine (a mini solder wave) or a solder wave.

1. Before soldering, visually inspect the solder joints to make sure they are smooth and shiny. It is recommended to perform x-ray inspection to ensure sufficient barrel fill.

2. Place the component on the board’s 12 marked soldering points as shown in Figure 5, and begin the soldering procedure. Do not solder any other points besides the 12 designated ones.
Figure 5 – Soldering Points
2.3 Recommended PCB Layout

2.3.1 MTMQ11PPN Recommended PCB Layout

*Figure 6 – MTMQ11PPN Single Sided Configuration*
Figure 7 – MTMQ11PPN Belly to Belly Configuration
2.3.2 MTMQ11TPN Recommended PCB Layout

Figure 8 – MTMQ11TPN Single Sided Configuration

---

**NOTE #5**
- P6C

**NOTE #6**
- 12x COMPENSATING SRT HOLE
- 0.100±0.005

**NOTE #5**
- P6C

**NOTE #6**
- 12x COMPENSATING SRT HOLE
- 0.100±0.005

---

GROOVE SURFACE AREA DENOTES COMPONENT AND TRACE KEEP OUT (EXCEPT GROUNDED GROUNDS)

THIS AREA DENOTES COMPONENT KEEP OUT (TRAJEC TO ALLOWED)
2.3.3 MTMQ16PPN Recommended PCB Layout

Figure 9 – MTMQ16PPN Single Sided Configuration
Figure 10 – MTMQ16PPN Belly to Belly Configuration
2.3.4 MTMQ16PSL Recommended PCB Layout

*Figure 11 – MTMQ16PSL Single Sided Configuration*
Figure 12 – MTMQ16PSL Belly to Belly Configuration
3 Cages Press Fit Tools

In order to assemble the press-fit cages on the board, it is recommended to use Mellanox Press Fit Tools.

*Table 5 – Cages Pressing Tools*

<table>
<thead>
<tr>
<th>Tool Part Number</th>
<th>Description</th>
<th>Applicable for Press-Fit Cage Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTTQ11PNN</td>
<td>Jig for QSFP 1x1, press fit port cage</td>
<td>MTMQ11PPN</td>
</tr>
<tr>
<td>MTTQ16PNN</td>
<td>Jig for QSFP 1x6 port cage, with or without light pipe</td>
<td>MTMQ16PPN, MTMQ16PSL</td>
</tr>
</tbody>
</table>

*Figure 13 – MTTQ11PNN Pressing Tool*

*Figure 14 – MTTQ16PNN Pressing Tool*
3.1 Press-fit Instructions

The following figures show the press-fit procedure using a 1x1 cage. They, nevertheless, apply to Mellanox’s 1x6 QSFP press-fit cages as well.

1. Insert the support block horizontally into the cage.

   *Figure 15 – Inserting the Support Block*

2. Place the PCB on top of the support platform.

   *Figure 16 – PCB on the Support Platform*

3. Place the cage and aim the pressfit pin to meet the PCB hole.

   *Figure 17 – Fixing the Cage on the Board*

4. Place the pressfit tool on the cage, as shown in the below figure, and press it.

   The required force for a single pin is 40N (480N for 12 pins in the 1x1 cages and 1640N for 41 pins in the 1x6 cages). Mellanox recommends using force of 480N to 1000N for the 1x1 cages and 1640N to 2500N for the 1x6 cages.
Figure 18 – Placing the Tool on the Cage

Figure 19 – Pressing the Tool
4  Label Schematics

4.1  QSFP+ Cages Product Labels

The following labels are placed on the product’s box.

*Figure 20 – MTMQ11PPN Product Label*

*Figure 21 – MTMQ11TPN Product Label*

*Figure 22 – MTMQ16PPN Product Label*

*Figure 23 – MTMQ16PSL Product Label*
4.2 Press Fit Tools Product Labels

*Figure 24 – MTTQ16PNN Product Label*

![MTTQ16PNN Product Label](image)

*Figure 25 – MTTQ11PNN Product Label*

![MTTQ11PNN Product Label](image)
5 Ordering Information

For ordering information about any of the products listed in Table 3 or Table 5, please contact sales@mellanox.com.