congatec Application Note

Applicable Products	All congatec XTX and ETX modules
Application Note Subject	Mechanical mounting solutions for congatec XTX or ETX modules
Document Name	AN14_ETX_XTX_Mounting_Solutions
Usage Designation	External

Application Note #14

Revision 1.3

Revision History

Revision	Date (dd.mm.yy)	Author	Changes
1.0	30.01.07	HCH	Initial release
1.1	21.08.07	HCH	Added additional standoff order numbers.
1.2	23.10.08	HCH	Deleted KVT standoffs (bore hole) because of to big outer diameter and EFCO ECM00512-L because of EOL
1.3	28.12.10	HCH	Updated document format; Corrected minor mistakes

Preface

This Application Note provides information about the mounting solutions (heatspreader - CPU module – carrier board) that are possible with congatec XTX or ETX modules.

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Intended Audience

This Application Note is intended for technically qualified personnel. It is not intended for general audiences.

Symbols

The following symbols may be used in this Application Note:

Warning

Warnings indicate conditions that, if not observed, can cause personal injury.

Caution

Cautions warn the user about how to prevent damage to hardware or loss of data.

Note

Notes call attention to important information that should be observed.

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Terminology

Some of the following terms may be used throughout this document.

Term	Description
Heatspreader (HSP)	Thermal interface between the module and the application specific thermal solution. The heatspreader should not be considered as a heatsink.
T.B.D.	To be determined

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1   Introduction

One of the essential tasks for system developers is defining the mounting and securing concept for their embedded computer module application. The system must remain service-friendly yet still be able to handle the harsh (mechanical) environmental conditions industrial applications often face. congatec has taken into consideration the different mechanical requirements and offers adequate solutions. This application note will give examples of mounting possibilities and will describe the parts that are needed to implement these solutions.

2   Heatspreader

The ETX and XTX Embedded Module Specifications defines a thermal interface that can be used to connect the module to a cooling solution. This thermal interface, called a heatspreader, acts as a thermal coupling device between the module and the cooling solution.

This application note will look at the heatspreader from the mechanical side of view. There are other documents available that cover the thermal function of the heatspreader.

The heatspreader is defined in the ETX/XTX Specification as a 2mm thick aluminum plate that is 114mm x 96 mm (the dimensions of an ETX/XTX module is 114mm x 95mm) in size. In each of the 4 corners of the heatspreader there are four 6mm high standoffs. The location of each of these standoffs correspond to the position of each of the 4 corner mounting holes found on the ETX/XTX module. The total height of the heatspreader, measured from the PCB surface of the ETX/XTX module, is 8mm. See picture 1 for heatspreader dimensions.

congatec defined additional standoffs and mounting holes for the heatspreader other than the ones defined in the ETX/XTX Specification. The additional standoffs (can be one or more) on the heatspreader should only be used for the mechanical connection between the ETX/XTX module and the heatspreader. These standoffs are necessary for a better thermal connection between the components on the ETX/XTX module and the heatspreader. They should not be used as a connection to the baseboard, the cooling system, or other parts because the position of these standoffs can differ on the different hardware revisions of a product. This is the reason why these additional standoffs are not mentioned in the congatec module User's Guides and not shown in picture 1.

The 4 additional mounting holes in the corners of the heatspreader plate (see picture 1) are always located in the same position on all congatec ETX/XTX heatspreaders. These holes are designed to be used for the mechanical connection between the heatspreader plate and the cooling solution (heatsink, fan, system chassis, heat pipes, etc...). Only these mounting holes should be used to attach the heatspreader to the cooling solution.

Note

The heatspreader is not to be considered as a heatsink. It has been designed to be used as a thermal interface between the module and the application specific thermal solution.

4–M2.5x8mm
threaded standoff
for threaded version
or
4–⌀2.7x8mm
nonthreaded
standoff for
bore hole version

114

108

94

⌀5

96

90

89

⌀2.7

A

A–A

A

8

2

Note

All measurements are in millimeters. Torque specification for heatspreader screws is 0.5 Nm.

Picture 1: Heatspreader dimensions

3   Mounting Solutions

The main mechanical mounting solutions for systems based on ETX or XTX modules have proven to be the 'top-mounting' and 'bottom-mounting' solutions. The decision as to which solution will be used is determined by the mechanical construction and the cooling solution of the customer's system. congatec offers two variants of the heatspreader, one for each mounting possibility. One version has threaded standoffs and the other has non-threaded standoffs (bore hole). The following sections describe these two common mounting possibilities and the additional components (standoffs, screws, etc...) that are necessary to implement the respective solution.

3.1   congatec Heatspreader for Top-Mounting Solution

This variant of the heatspreader was designed to be used in a system where the heatspreader screws need to be inserted the from the top side of the complete assembly. In this case the threads for securing the screws are in the carrier board's standoffs. This is the reason why the heatspreader must have non-threaded (bore hole) (HSP-B) standoffs. See Picture 2.

✏ **Note**

The torque specification for heatspreader screws is 0.5 Nm.

⚠ **Caution**

Do not use a threaded heatspreader together with threaded carrier board standoffs. The combination of the two threads may be staggered, which could lead to stripping or cross-threading of the threads in either the standoffs of the heatspreader or carrier board.

Picture 2: *Complete assembly using non-threaded (bore hole) heatspreader*

Materials Used for Top-Mounting

Qty	Description	Manufacturer	Manufacturer order number	Comment
1	Heatspreader	congatec	conga-????/HSP-B	Heatspreader standoff with Ø2.7mm bore hole (non-threaded)
4	Carrier board standoff	Everfine Industrial Corp. (www.efcotec.com)	ECM00477-L	Standoff for soldered mounting 3mm height, M2.5 thread
			ECM00247-L	Standoff for press-in mounting 3mm height, M2.5 thread
		Kerb-Konus GmbH (www.kerbkonus.de)	503 600 025.100	Standoff for press-in mounting 3mm height, M2.5 thread
4	Screw M2.5 x 12mm	various	-	Recessed raised cheese head screw with point, galvanized with metric thread M2.5 and 12mm length DIN7985 / ISO7045
4	Washer Ø2.7mm	various	-	Plain washer galvanized for M2.5 screws. DIN433 / ISO7092

3.2 congatec Heatspreader for Bottom-Mounting Solution

The second variant of the heatspreader has been designed to be used in systems where the heatspreader screws need to be inserted from the bottom side of the complete assembly. For this solution a heatspreader version with threaded standoffs (HSP-T) must be used. In this case, the standoffs used on the carrier board are not threaded. See Picture 3.

Note
The torque specification for heatspreader screws is 0.5 Nm.

Caution
Do not use a threaded heatspreader together with threaded carrier board standoffs. The combination of the two threads may be staggered, which could lead to stripping of the threads in either the standoffs of the heatspreader or carrier board.

Picture 3: *Complete assembly using threaded heatspreader*

Materials Used for Bottom-Mounting

Qty	Description	Manufacturer	Manufacturer order number	Comment
1	Heatspreader	congatec	conga-????/HSP-T	Heatspreader standoff with M2.5 thread
4	Carrier board standoff	Everfine Industrial Corp. (www.efcotec.com)	ECM00517-L	Standoff for press-in mounting 3mm height, $\varnothing 2.7$ mm bore hole
		KVT GmbH (www.kvt-koenig.de)	SMTSO-3.6-3 ET	Standoff for soldered mounting 3mm height, $\varnothing 3.6$mm bore hole
			KFE-3.6-3 ET	Standoff for press-in mounting 3mm height, $\varnothing 3.6$mm bore hole
4	Screw M2.5 x 12mm	various	-	Recessed raised cheese head screw with point, galvanized with metric thread M2.5 and 12mm length DIN7985 / ISO7045
4	Washer $\varnothing 2.7$mm	various	-	Plain washer galvanized for M2.5 screws. DIN433 / ISO7092

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