COM-HPC™

Carrier Board Mating and Stiffener Reference Guide

Revision 5.0: May 2024

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Change History

Revision #	Reason	Author	Date
1.0	Initial Draft	Burrell Best	09/14/2021
2.0	Formatting, update screw & locking nut callout in Figure 1	MarCom/Dylan Lang	05/04/2022
3.0	Update Figure 7	Matt Burns/MarCom	03/02/2023
4.0	Update Figures 2a, 2b, 2c, 3a, 3b, 3c, 5 & 7; Add Figure 8	Emmanuel Davis/ MarCom	08/28/2023
5.0	Update Figures 7 and 8	Matt Burns/MarCom	05/06/2024

Carrier Board Design Mechanical Considerations

Optional Precision Jack Screw Standoffs

Precision jack screw standoffs (JSOM) help unmating in high-normal-force, multi-connector applications. They work like traditional stand-offs but contain an internal machined hex screw that can be turned in a counterclockwise direction to lift the Module Card from the Carrier Board. JSOMs mitigate damage to the connector pins, components, boards, and solder joints.

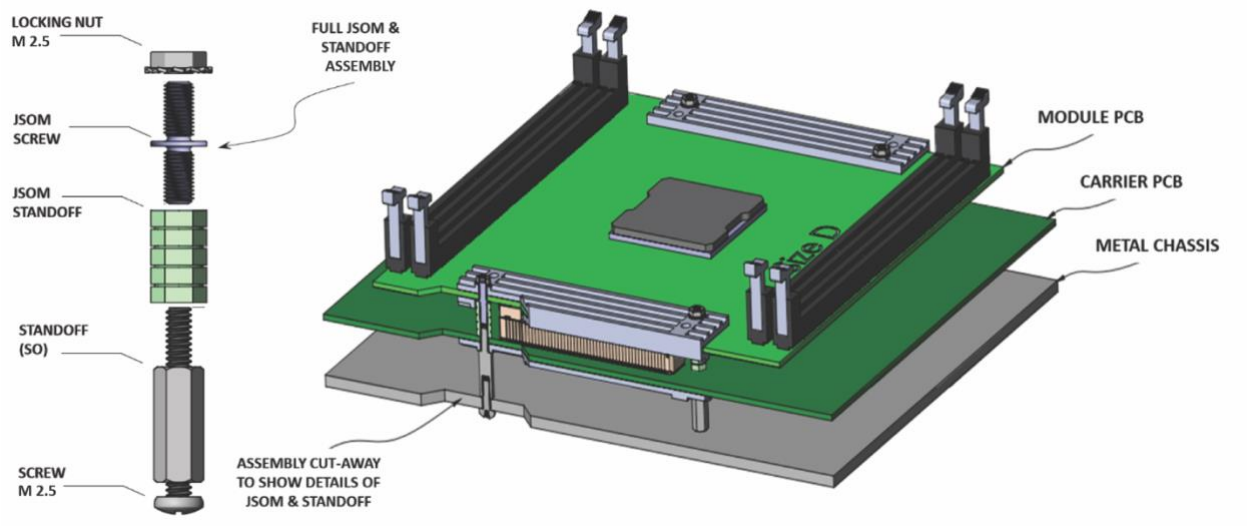
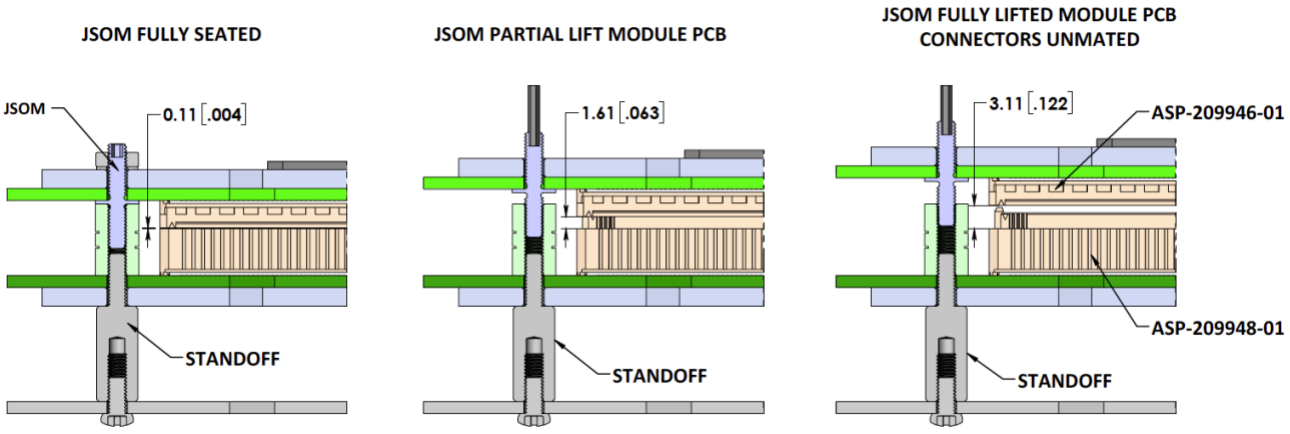


Figure 1. JSOM (Jack Screw Standoff - Micro) Diagram and Application Cutaway

Preparation for Module Card and Carrier Board Mating

Before mating the Module Card to the Carrier Board, use a 1.5mm hex driver to turn the JSOM screw clockwise until the screw is fully seated in the JSOM standoff as shown in Figure 2.a.

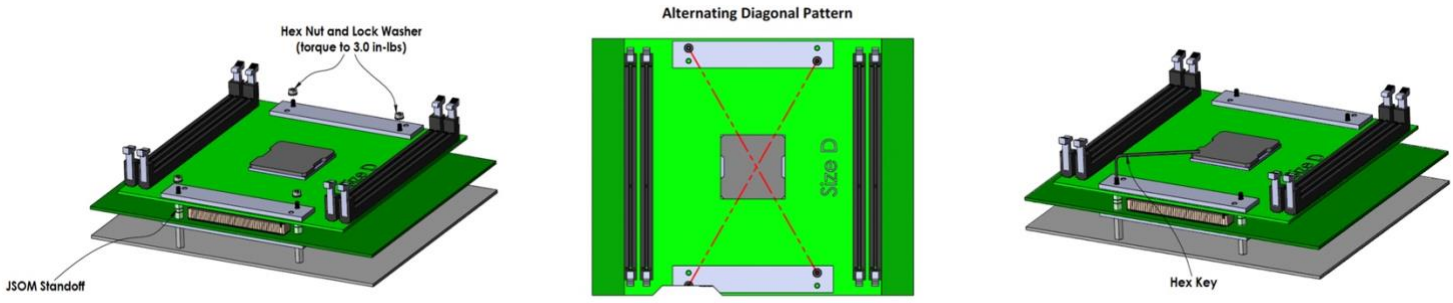
Figure 2. Three unmating views using a JSOM



(a) (b) (c)

Mating the Module Card to the Carrier Board

Once all four JSOM screws are fully seated, apply even downward pressure over the J1 and J2 connector regions to mate the Module Card to the Carrier Board. Use the JSOM screws to align the Module Card to the Carrier Board before mating. Once the Module Card is fully mated secure the Module Card to the Carrier Board with four hex nuts and lock washers as shown in Figure 3.a. Use a torque wrench to tighten the hex nuts to ***3.0 (+/- 0.5) in-lbs***. Tighten the nuts in an alternating diagonal pattern shown in Figure 3.b. For detailed mating recommendations, refer to section 7.5.5 of the COM-HPC® Module Base Specification, Revision 1.0.



(a) (b) (c)

Figure 3. (a) Hex nut torque, (b) diagonal unmate pattern, (c) hex screw turning ratio

Unmating the Module Card from the Carrier Board

To unmate the boards remove the locking nuts and washers. Using the diagonal pattern shown in Figure 3.b insert the 1.5mm hex key shown in Figure 3.c into the JSOM screw labeled 1 and turn counterclockwise a ¼ turn. Repeat this procedure for all JSOM screws labeled 2, 3, and 4 until the connectors unmate. The Module Card can then be removed from the Carrier Board.

Carrier Board Mechanical Stiffener

Mechanical FEM simulations were conducted to understand the amount of deflection and temporary stress that can occur in the Carrier Board as it is being mated with a Module Card. The simulations assumed that the Carrier Board was fabricated using standard FR4 material and fixed to some type of chassis using metal stand-offs attached to the mounting holes adjacent to both the J1 and J2 connectors. Two Carrier board thicknesses (1.6 mm and 2.4 mm) were simulated. As shown in Figure 4, a downward force was applied evenly over the length of the connector, and the amount of deflection was measured. The results confirmed that Carrier Boards ***should*** be supported using some type of stiffening mechanism.

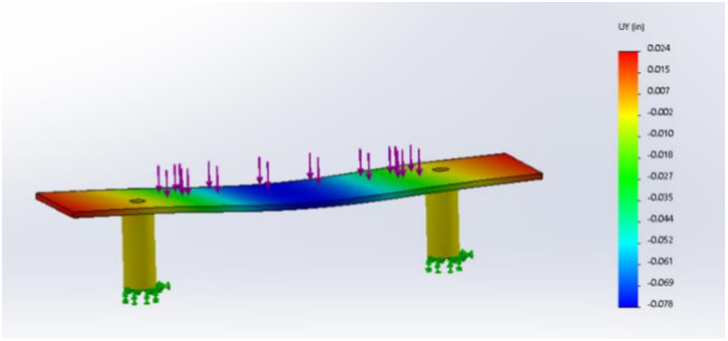


Figure 4. FEM simulation results without a stiffener

Simple Carrier Board Stiffener

A simple stiffener design is shown in Figure 5 with the corresponding keep-out region in Figure 6. When designing a Carrier Board stiffener there are some key points to consider.

- The stiffener should provide uniform support directly underneath the Carrier Board connector and span the entire length of the connector region. This should be done for both the J1 and J2 connectors.
- The stiffener should be securely anchored to the chassis through mechanical mounting hardware or attached to the bottom side of the Carrier Board using an adhesive.
- Stiffener thickness should be as thick as the application allows.
- Care must be taken when using conductive materials such as steel or alloys.
- A stiffener will require a keep-out region where peripheral components cannot be placed.

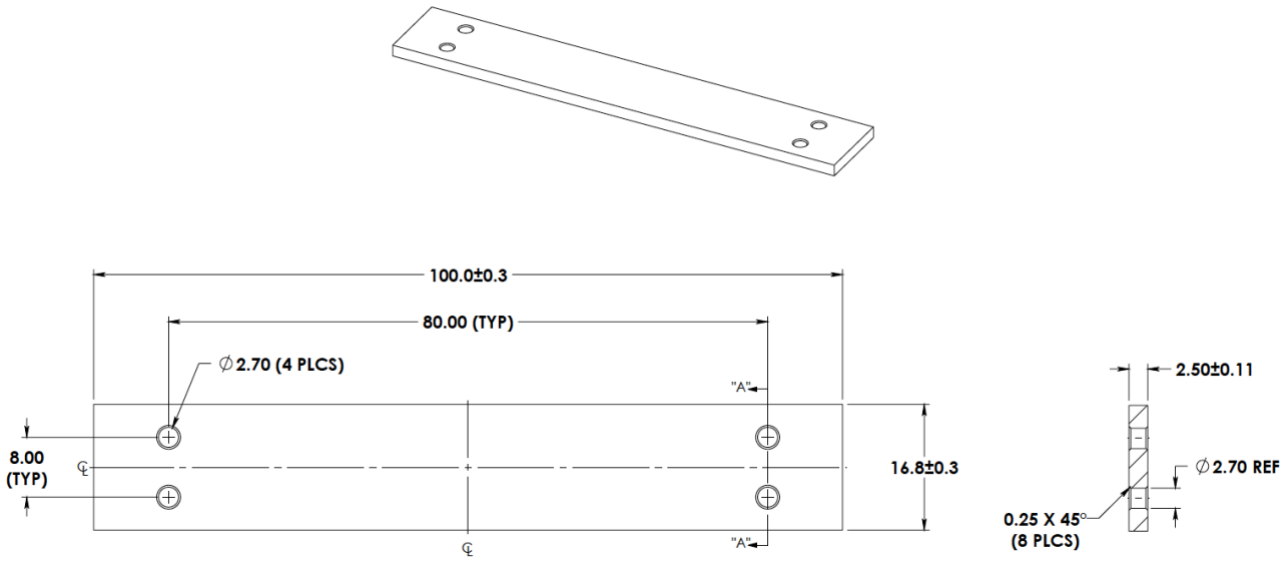


Figure 5. Carrier Board stiffener

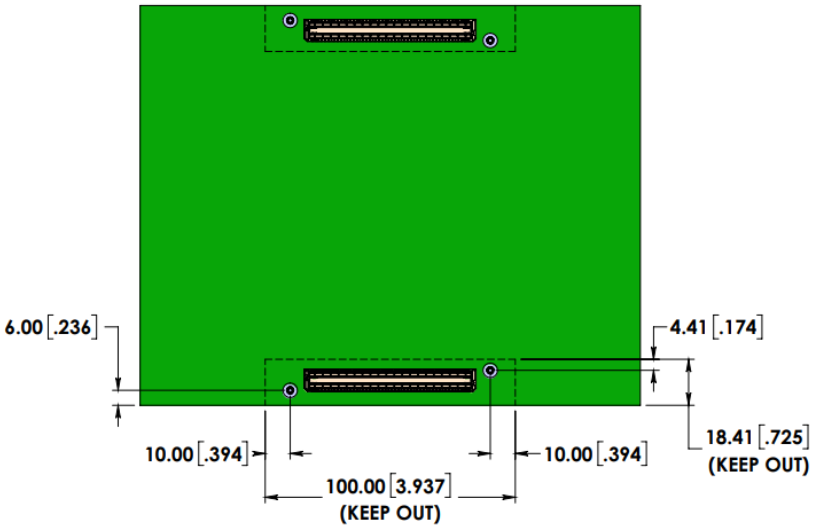


Figure 6. Carrier Board stiffener keep-out region

Appendix

COM-HPC Application Specific Part Number (ASP) Reference Guide

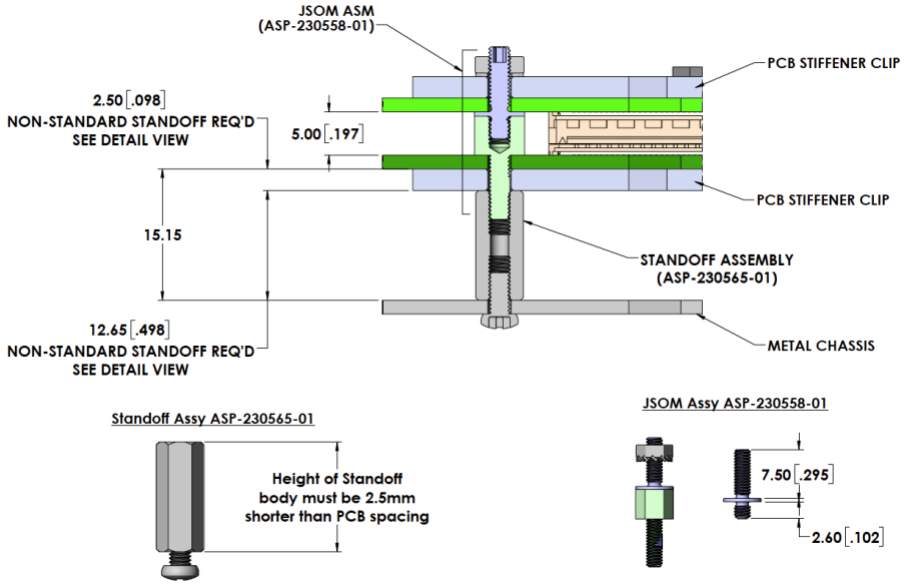


Figure 7. Component Part number reference diagram – Cross Section through 5 mm JSOM Standoff

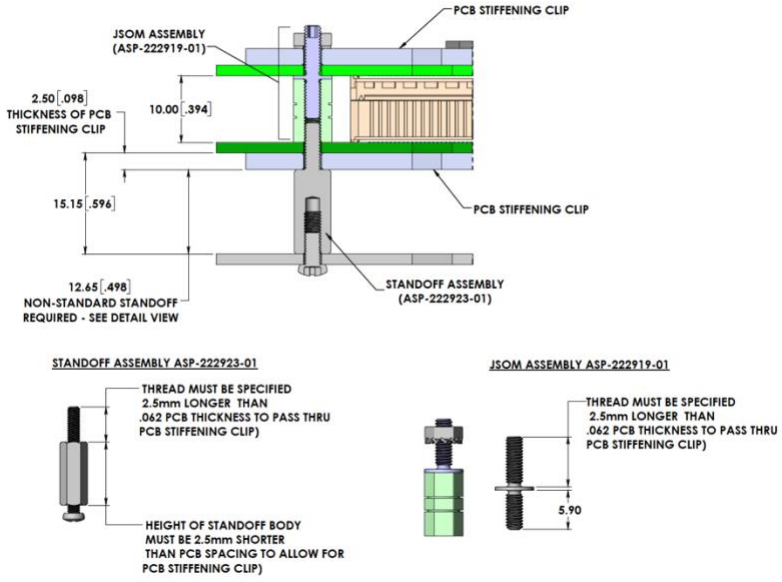


Figure 8. Component Part number reference diagram – Cross Section through 10 mm JSOM Standoff