

Rev. 19-Nov-2013

This notes describes the Stiffener Bars and Brackets for the CMX circuit boards. There are 5 different mechanical parts in this group:

Upper Stiffener Bar  
Lower Stiffener Bar  
Rear Stiffener Bar

Upper Bracket (aka Upper Stub)  
Lower Bracket (aka Lower Stub)

The stiffener bars and brackets mount onto the CMX circuit board and keep it flat while it is being inserted into or removed from an electronics crate. This set of mechanical parts also transmits the insertion force from the front panel latches to the backplane connector area.

Drawings of these 5 parts are available on the web in the directory:

<http://www.pa.msu.edu/hep/atlas/l1calo/cmz/hardware/>

[drawings/stiffening\\_bars/](#)

In this web directory:

The drawings: CMX\_stiffening\_system\_1.png through  
CMX\_stiffening\_system\_6.png  
show the general layout of the board stiffening system

The drawings: CMX\_upper\_stiffener\_bar\_1.png through  
CMX\_upper\_stiffener\_bar\_5.png  
show the details of the Upper Stiffener Bar

The drawings: CMX\_lower\_stiffener\_bar\_1.png through  
CMX\_lower\_stiffener\_bar\_6.png  
show the details of the Lower Stiffener Bar

Note: the Upper and Lower Stiffener Bars are the same except for the details at their "far end". Except for machining the "far end" a common part could be made.

The drawings: CMX\_rear\_stiffener\_bar\_1.png through  
CMX\_rear\_stiffener\_bar\_4.png  
show the details of the Rear Stiffener Bar. The file CMX\_rear\_stiffener\_bar\_2.pdf is a pdf file with the new correct hole locations.

The drawings: CMX\_upper\_bracket\_1.png through  
CMX\_upper\_bracket\_7.png  
show the details of the Upper Bracket aka the Upper Stub

The drawings: CMX\_lower\_bracket\_1.png through  
CMX\_lower\_bracket\_7.png  
show the details of the Lower Bracket aka the Lower Stub

Note: the Upper and Lower Brackets are basically mirror images of each other.

Quantity required of the various stiffener parts:

Upper Stiffener Bar qty = 25  
Lower Stiffener Bar qty = 25  
Rear Stiffener Bar qty = 25

Upper Bracket (aka Upper Stub) qty = 25  
Lower Bracket (aka Lower Stub) qty = 25

I will provide all of the material for making these 5 stiffener parts. All of the stiffener bars and brackets are made from 1/2" by 1/4" aluminum bar stock 6061 T6511 aluminum in 6 foot lengths McMaster Carr Part No. 8975K13

Additional points:

- Most tap drill holes are through holes and thus do not require blind taps. There are 2 exceptions:

The 4-40 tap into the far end of the Upper Stiffener Bar can have a tap drill hole whose point goes only about 0.260" deep. This lead hole should be blind tapped as far as practical with a normal tap.

The M2.5 tapped hole coming from the front panel into the Upper and Lower Brackets can have a drill hole whose point goes only about 0.380" deep. This lead hole should be blind tapped only as far as practical with a normal tap.

- All tap drill holes can be through holes.
- All of the 4-40 taps into the stiffener bars only need to provide 0.3'' of good threads. We do not need these bars taped the whole way through. 0.3" of good threads is plenty.
- The non-blind M2.5 taps in the brackets (aka stubs) only need to provide 0.3'' of good threads from the side indicated in the drawings. 0.3" of good threads is plenty.
- When you start work on these parts let me know and I will bring you models of all of them. These model parts are assembled on a "mechanical only" CMX circuit board so you can see how they fit together. You are welcome to take the mechanical only board apart. Note that the Rear Stiffener Bar in this model does not have all of its board mounting screws in the new correct locations.
- The account number for this work is: RC 101366
- When you are ready to start work on these panels please let me know. I can stop by and explain the drawings.

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Thank you for making these 5 parts,    Dan

