

CMX Mechanical

Additional Parts and Modifications  
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Around the first of the year the Machine Shop produced about 10 types of mechanical parts for the CMX circuit boards. Based on now having worked with the 4 prototype CMX cards I now need to ask for modification of some of these parts and for some additional mechanical parts for the production CMX cards.

The following is a list of this work:

1. Trim an edge of the Front Panel
2. Trim a part of the Base Function Heat Sink
3. Flatten part of the Base Function Heat Sink
4. Make 20 Topological BGA Covers
5. Make 20 SFP Hole Covers
6. Make one more Topological Processor Heat Sink

The details of each job follow:

Trim an edge of the Front Panel  
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Please trim between 50 to 55 mils from the edge of the Front Panel that runs next to the bottom side of the circuit board. An example Front Panel has been provided to verify which edge needs to be trimmed. There are 20 Front Panels that need to have this edge trimmed. These panels have already been anodized so their front surface should be protected when they are clamped for milling.

## Trim a part of the Base Function Heat Sink

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There are 19 heat sinks that need to have the thickness of a small section reduced by about 30 mills to provide clearance around some components on the CMX cards. The area that needs to be thinned is shown in the drawing.

Please thin these heat sinks by removing material from their flat thermal contact surface. These heat sinks have not yet been anodized. An example heat sink with this area trimmed is provided.

## Flatten the Base Function Heat Sink Thermal Contact Surface

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The stock material that I provided for making these heat sinks has a serious bow shaped distortion in the heat transfer surface that contacts the electrical component that needs to be cooled. I would like to ask you to try and flatten this heat transfer surface.

Your advice on how to flatten this surface of these heat sinks is welcome. I have noticed the following:

- Some of these heat sinks have a lot more bow than others.
- About half of them have a bow of approximately 10 mills.
- I have tested various ways of trying to flatten a number of these heat sinks:

I tried to just flatten the part of the thermal contact surface that touches the electrical component that needs to be cooled. For me that did not work well.

What seems to work best is to:

Very lightly clamp the heat sink in the mill vise with the pinch force along the direction of the heat sink fins.

Flatten with a very shallow cut ( < 1 mil ) and make multiple passes at the same depth.

Once it appears flat, loosen the vise to relieve the stress in the part, re-clamp it in the vise with light pressure and without pushing it hard down into the vise. Trim across the surface to flatten it again.

- Before trying to mill it flat, I have tried to bend one of these parts, to remove the worst of the bowing, It's not clear to me that this helped at all.
- Please do not mill off any more material than necessary to flatten this area. If too much material is cut off it will interfere with other mechanical aspects of the CMX circuit boards.
- The heat sink aluminum is very soft and weak. Perhaps I should have tried to harden it before the machine work was done to make these parts.

There are 19 heat sinks that need to have this thermal contact area flattened. These heat sinks have not yet been anodized.

Please Make 20 of the Topological BGA Covers

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This is a rectangular part made of black 1/8" thick Delrin plastic. I have included a drawing of this part. The exact size of this part is not critical. Only the correct relative position of the 4 drill holes is important. This part is a protective cover over the Topological BGA pad array. I have supplied the stock material to make these BGA Covers.

Please Make 20 of the SFP Hole Covers

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This is a rectangular part made of 1/16" thick Garolite cotton fiber plastic. This part is just a rectangular piece 1.500" by 0.650". The exact size of this part is not critical. With careful work I think that these parts can just be sheared to size. Rough edges do not matter. This part is a just protective cover that I will paint black and glue over SFP holes on some of the CMX cards. I have supplied the stock material to make these SFP Hole Covers.

Make one more Topological Processor Heat Sink

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Please make one more Topological Processor Heat Sink. You folks had originally nicely made one extra of these parts but now my bosses have asked for 2 additional cards to have the Topological Processor FPGA installed so I need 2 more of these heat sinks than planned; the spare that you originally made and the one additional part that I'm asking for now. I have supplied the stock material to make this one additional Topological Processor Heat Sink. As far as I know at this time - this is the last of these heat sinks that I will ask for.