

OPEN POSSIBILITIES.

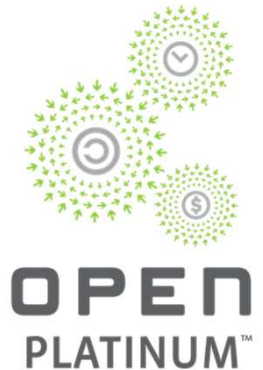
OAM Design Challenges and Recommendations

[SERVER]

OAM Design Challenges and Recommendations

[Ahmed Abou-Alfotouh, Principal Power Architect, Intel]
[Alan Wu, Power Delivery Architect, Intel]

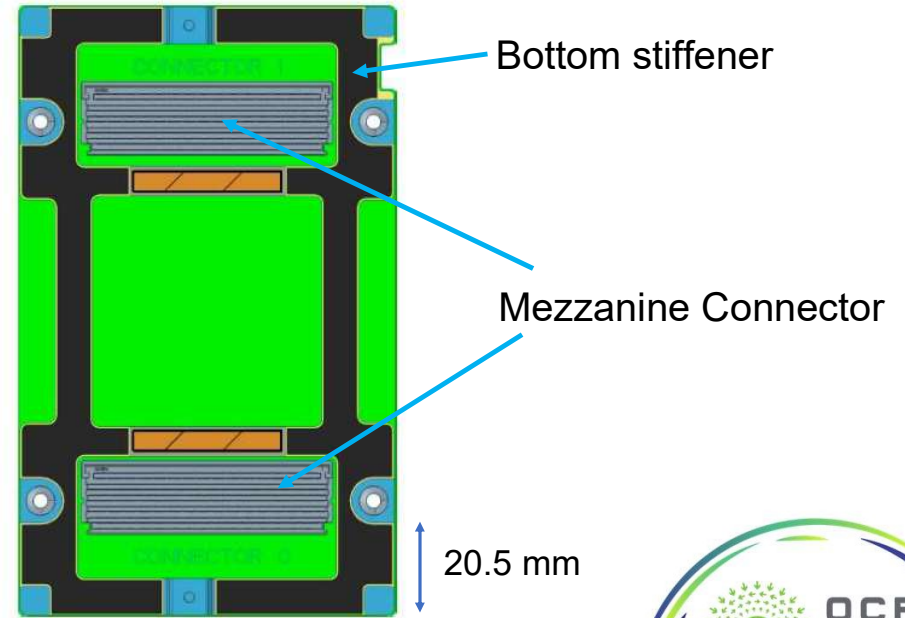
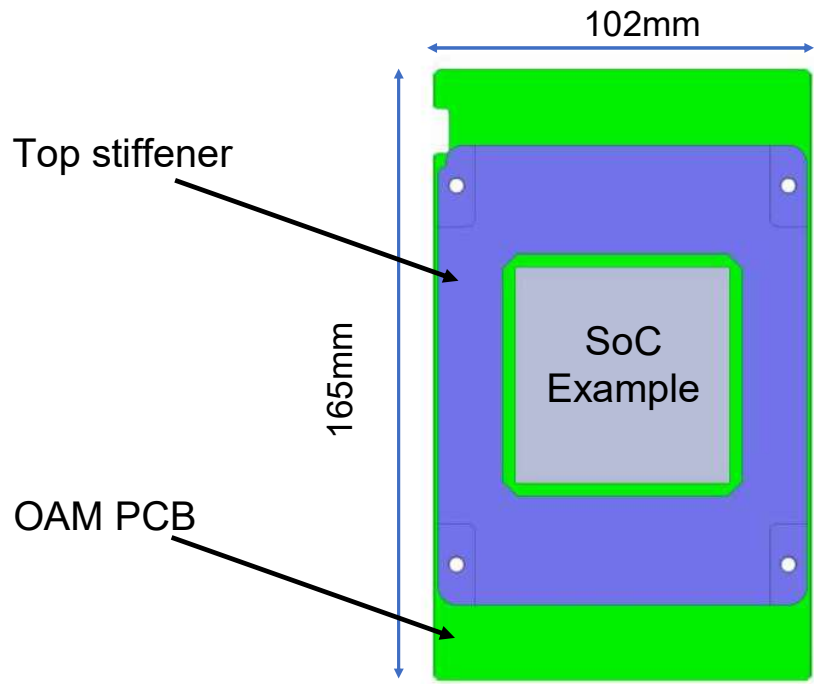
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OAM = OCP Accelerator Module



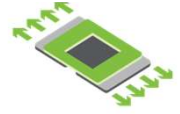
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INFRASTRUCTURE



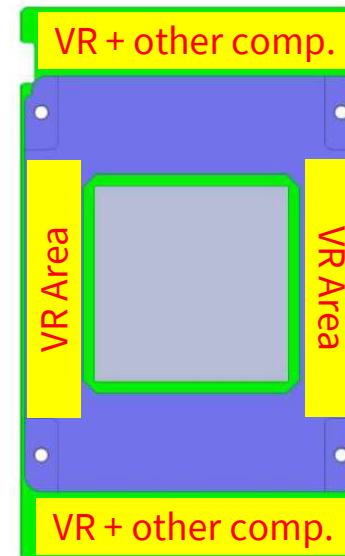
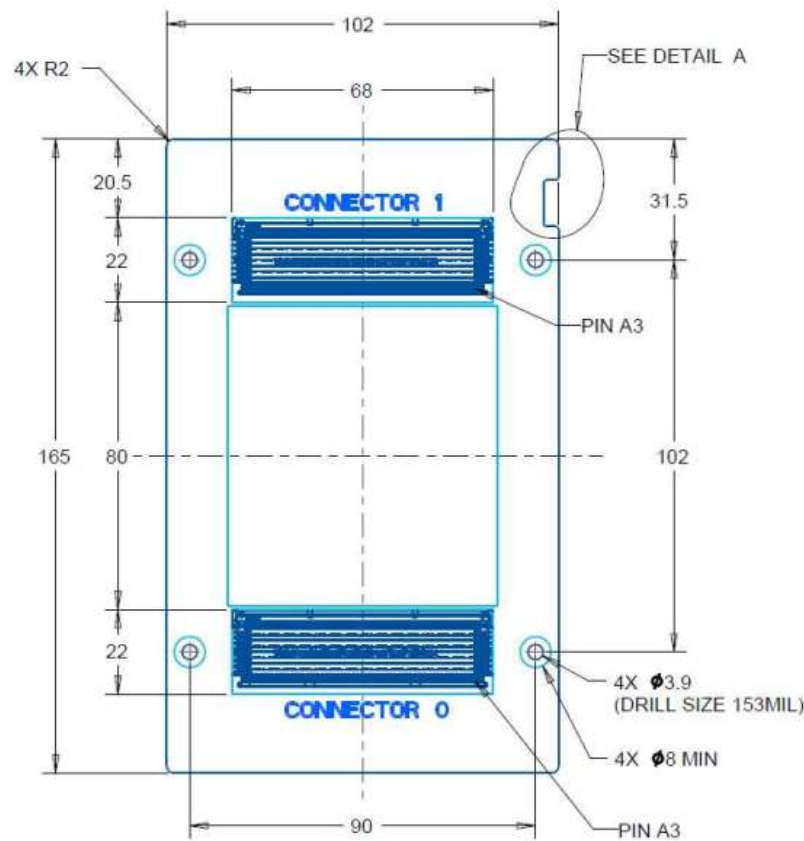
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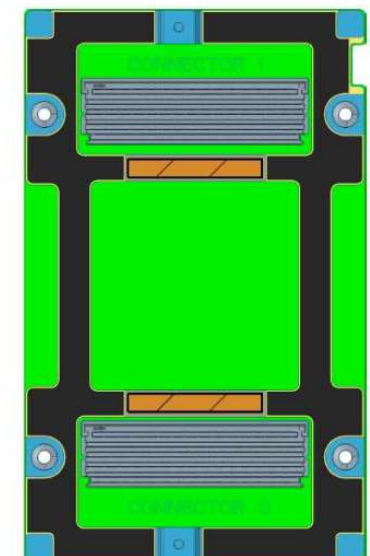
OAM = OCP Accelerator Module



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Top View

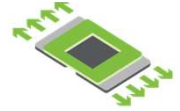


Bottom View

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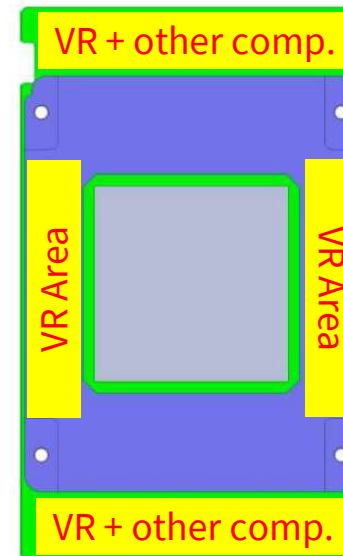


OAM Design challenges

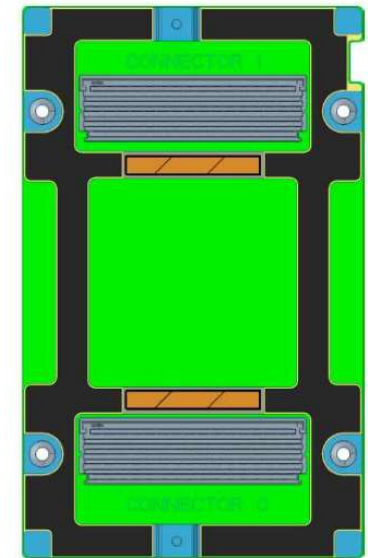


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- ❑ KOZ limits the space for VR components
- ❑ Thermal limits the operation temperature
- ❑ HSIO Vs. Power route-ability challenges
- ❑ SoC Many power rails to route
- ❑ Wide Input voltage range (40V – 59.5V)



Top View

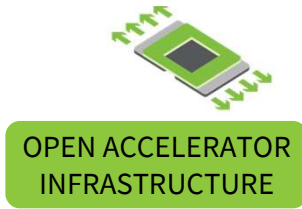


Bottom View

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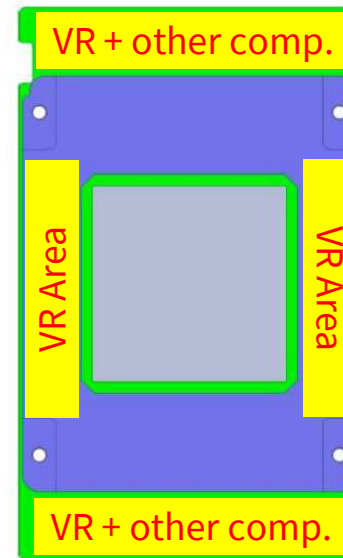


OAM Design challenges

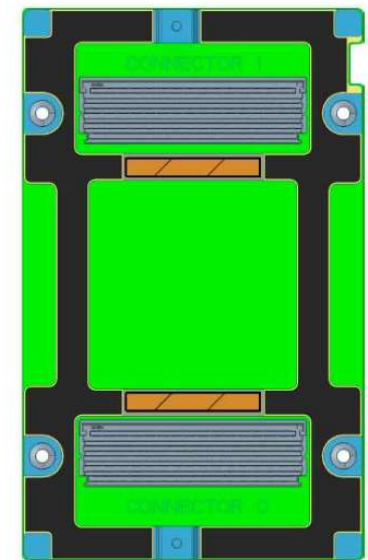


❑ VR Technology and Architecture are not up to the challenge yet:

- Buck topology: time to replace
- Current density doesn't meet SoC progress
- Challenges to achieve high switching frequency
- Magnetic is bulky
- Thermal resistance is not low enough
- CPU leverage (MB vs. OAM)



Top View

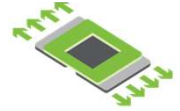


Bottom View

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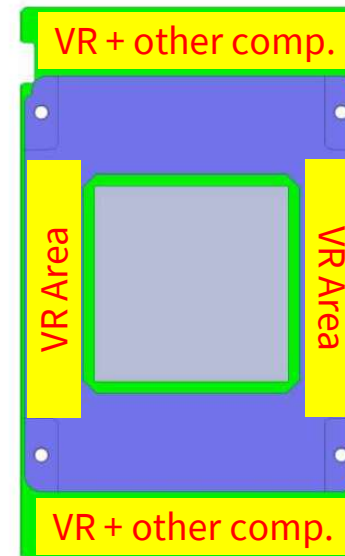
Design recommendations



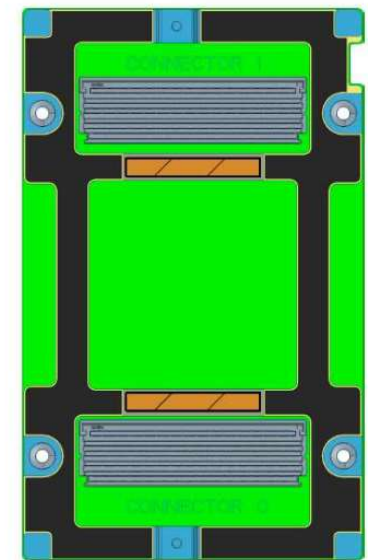
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1. To Power Semiconductor Vendors

- a. Time for new Topologies
- b. Scalable modular approach + New Magnetic design approach
- c. Higher current density
- d. New Semiconductor material
- e. Magnetic or Electrical coupling
- f. Direct conversion from 54V
- g. Lower thermal resistance



Top View

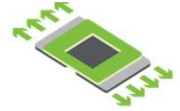


Bottom View

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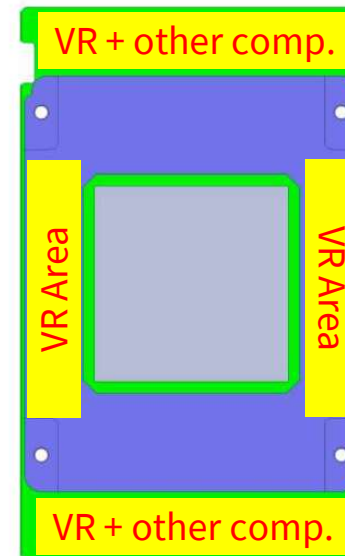
Design recommendations



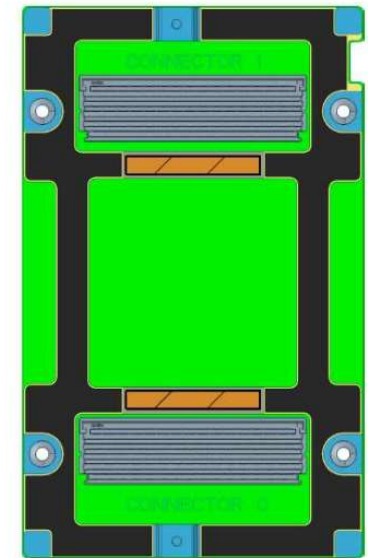
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2. To DC facility designers

- a. Narrower input voltage range (e.g. 54V \pm 10%)
- b. Lower inlet temperature (e.g. 25C)



Top View



Bottom View

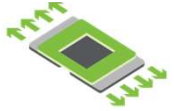
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Summary

- OAM FF has very limited space for VR components
- KOZ, thermal, and Vin adding to the difficulties
- VR Technology is not progressing fast enough
- Power community needs to innovate at all levels (Material, architecture, module, magnetic,...)
- DC facilities must advance in cooling systems

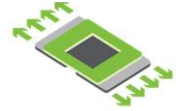
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Call to Action



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Get involved in the project:

OCP Server Project: <https://www.opencompute.org/projects/server>

OAI Subgroup: <https://www.opencompute.org/wiki/server/OAI>

OAI Mailing List: <https://oc-all.goup.io/g/OCP-OAI>

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Thank you!