Rphi concept with hybrid at center and no gluing on the detector

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A concept of the rphi module with placement of hybrid at center, which hybrid is not glued on the detector but is contacted to the cooling section at the edge, will solve the concerns associated with the "hybrid at end" design.

Concerns on the hybrid-at-end design

(1) Number of contact points - Over-contraining

- Level-flatness of multi points
- Stress-concentration at the connection of the baseboard strip and the detector
- Material in supports

(2) Overlapping of detector and hybrid nearby

- Constraint the critical cooling strip nearby hybrid
- Local heating by hybrid heat?
- Vulnerability of hybrid (especially wire-bonds) in assembling

(3) "End-tapping" of the readout electronics

- Larger noise and <u>occupancy</u> than "Center-tapped"? (Note ccupancy is not the fractional increase)
- If real, do we trade "occupancy" with "efficiency"? My response is NO. Remeber why we are talking about "partial depletion" operation of the detector.

A concept:

Hybrid at center and no gluing on the detector

(see drawings)

(1) Good things:

- Eliminating the concern (1) by one support arm
- Eliminating the concern (2) (in Z direction)
- Minimizing the noise (and the dispersion) by "Center-tapping"

(2) Concerns:

- Slightly more mass for splitting the double-side hybrid into two single-sided..., but
  - The heat load is half and heat spreader thickness can be halved?; limitation in thickness for ceramic hybrid?
  - Less number of supports
- Requires detailed engineering, thermal and distortion FEA,...