# Design Considerations for a small height R/O pcb

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# Small height r/o pcb

## Parameters

Input Channels:

- 256 sensor channels per slice
- 8 (16) channel F/E asic → 32 (16) differential inputs

  → not posing any challenge

Mechanics:

- gap between Tungsten plates 0.5 1.0 2.0
  allowed overall thickness 4.0 4.5 5.5
  (from rather 'old' design by F.X. Nuiry)
- for comparison:

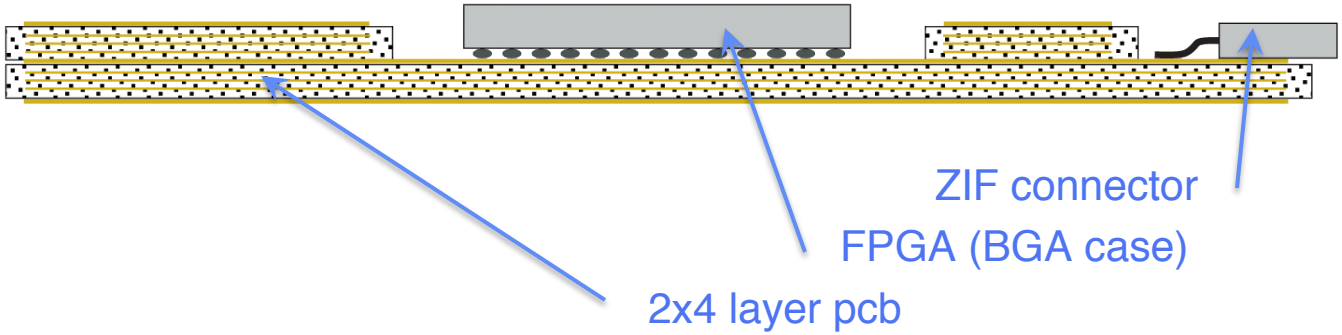
| | |
|---|---|
| standard pcb | 3.2 |
| FPGA package (XILINX) | 2.6 |
| connector (USB mini) | 4.0 |

→ staggered pcb required!

# Small height r/o pcb

## Staggered pcb

- proven technology at high-end companies




- XILINX Artix-7 FPGA:
  - 285 (400) pins – 23x23mm$^2$ (27x27 mm$^2$)
  - 2 (…3) signal layers for routing the ball grid + 2 (…4) power layers
  - PCB should have 2x4 layers minimum
- company suggestion:
  - 2 identical stacks of 4 layers, each one 0.8mm
  - 1.6mm total height – leaving 3.2mm for FPGA or connector

## Conclusion

- integrating a standard BGA case FPGA into a small height pcb is demanding but possible
- however none of the well known two-part connectors will fit