Bonding distances in Astropix V3, V4

A follow-up from March 1st meeting:

checking on the bonding dimensions

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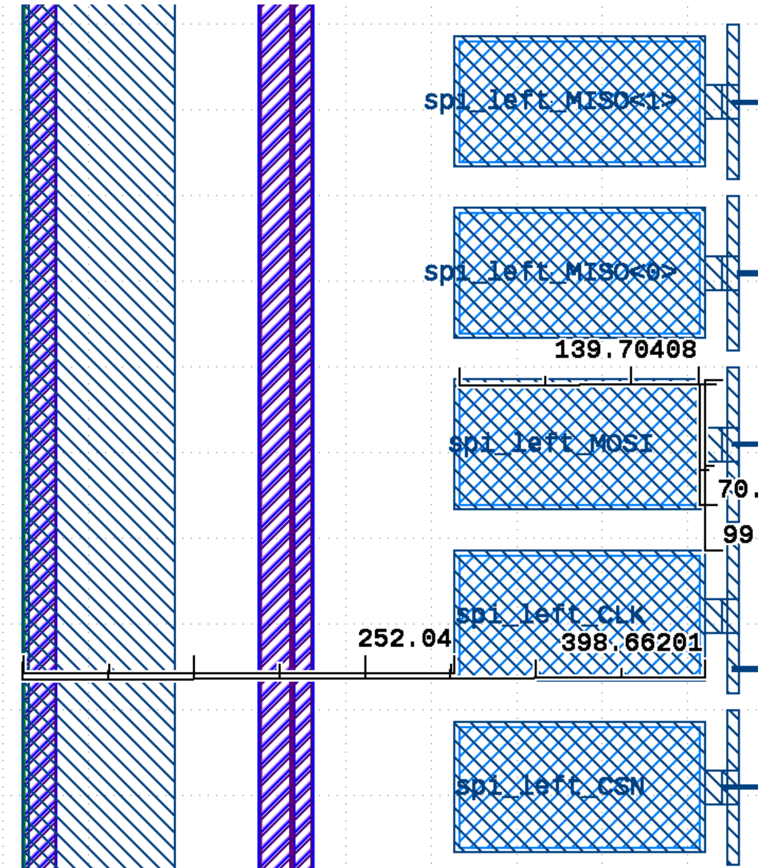
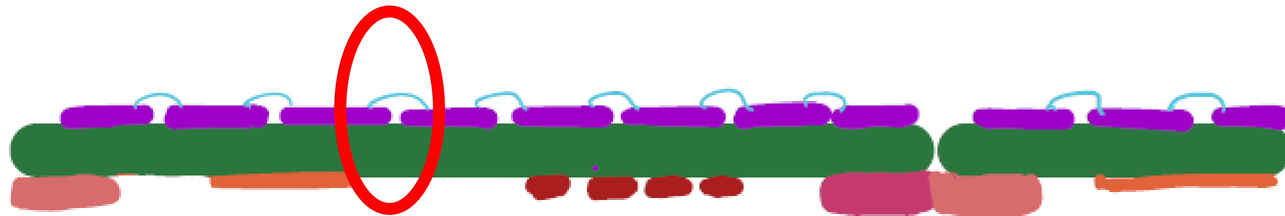
Chip-to-chip connections (SPI)

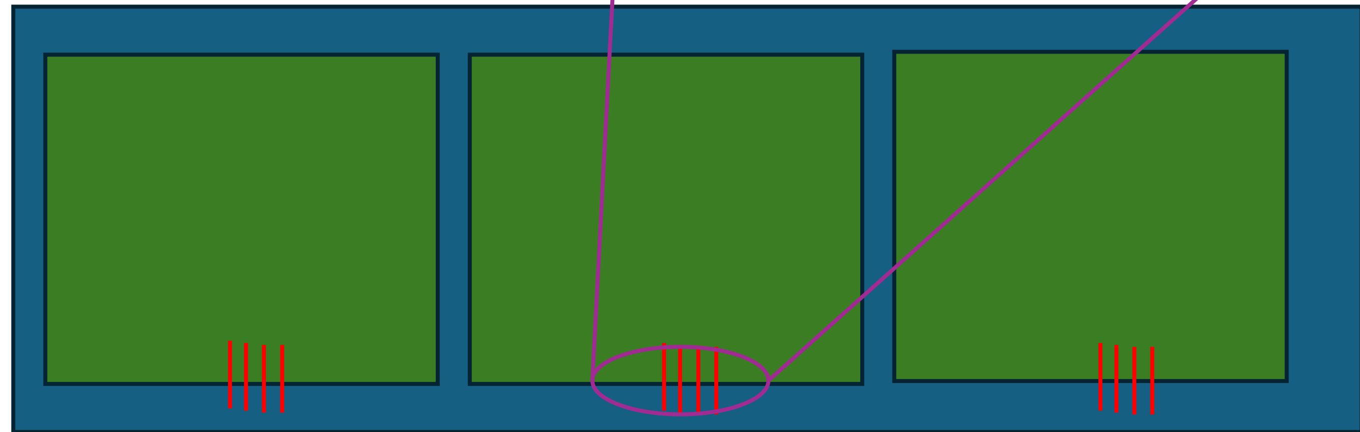
- 5 pads with pitch of 100 um for V4
  - 6 pads for V3, with additional “sample_clock_left/right”
- Pad area is 70 x 140 um^2
- Distance between the edge and pad center is 275 um
- Same dimensions for both chip edges
- ➔ The dimensions look ok for bonding:
  - 275 um + 275 um + 50 um (?) = 600 um > 500 um





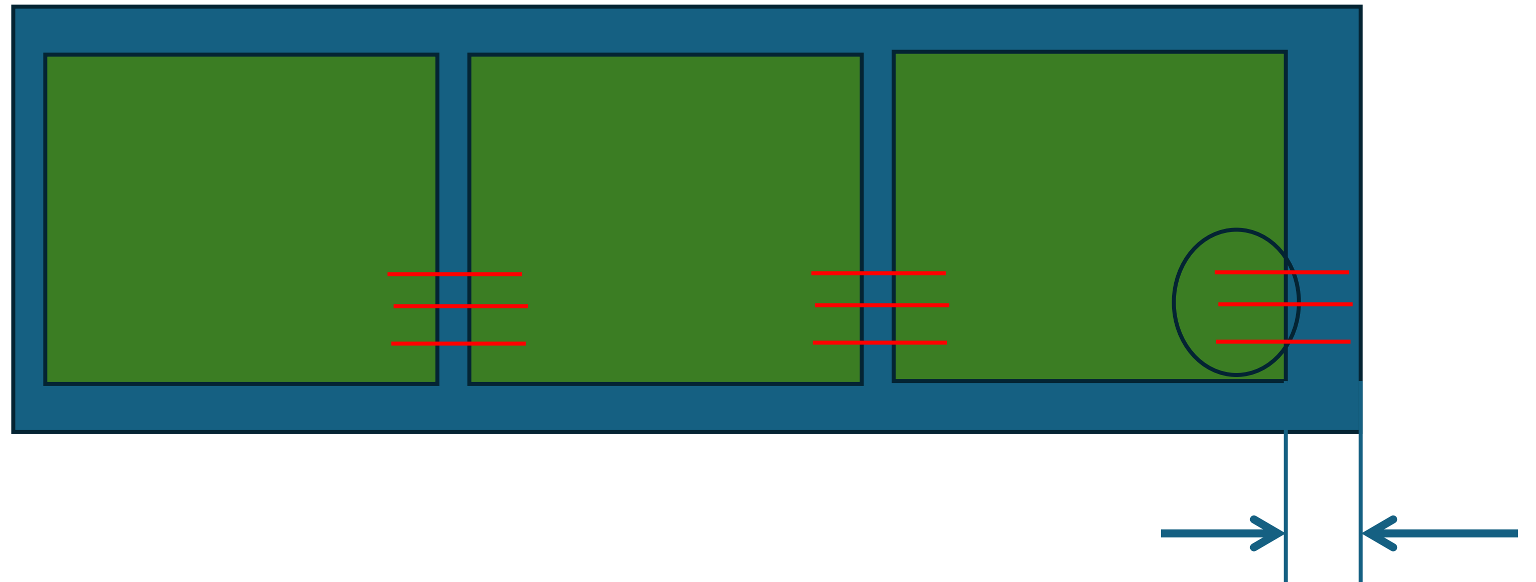
Chip-to-PCB bonding (1)

- The (numerous) bonds on another edge have the same dimensions and distance to edge.
  - Will need the PCB margin, but it's available in this direction.



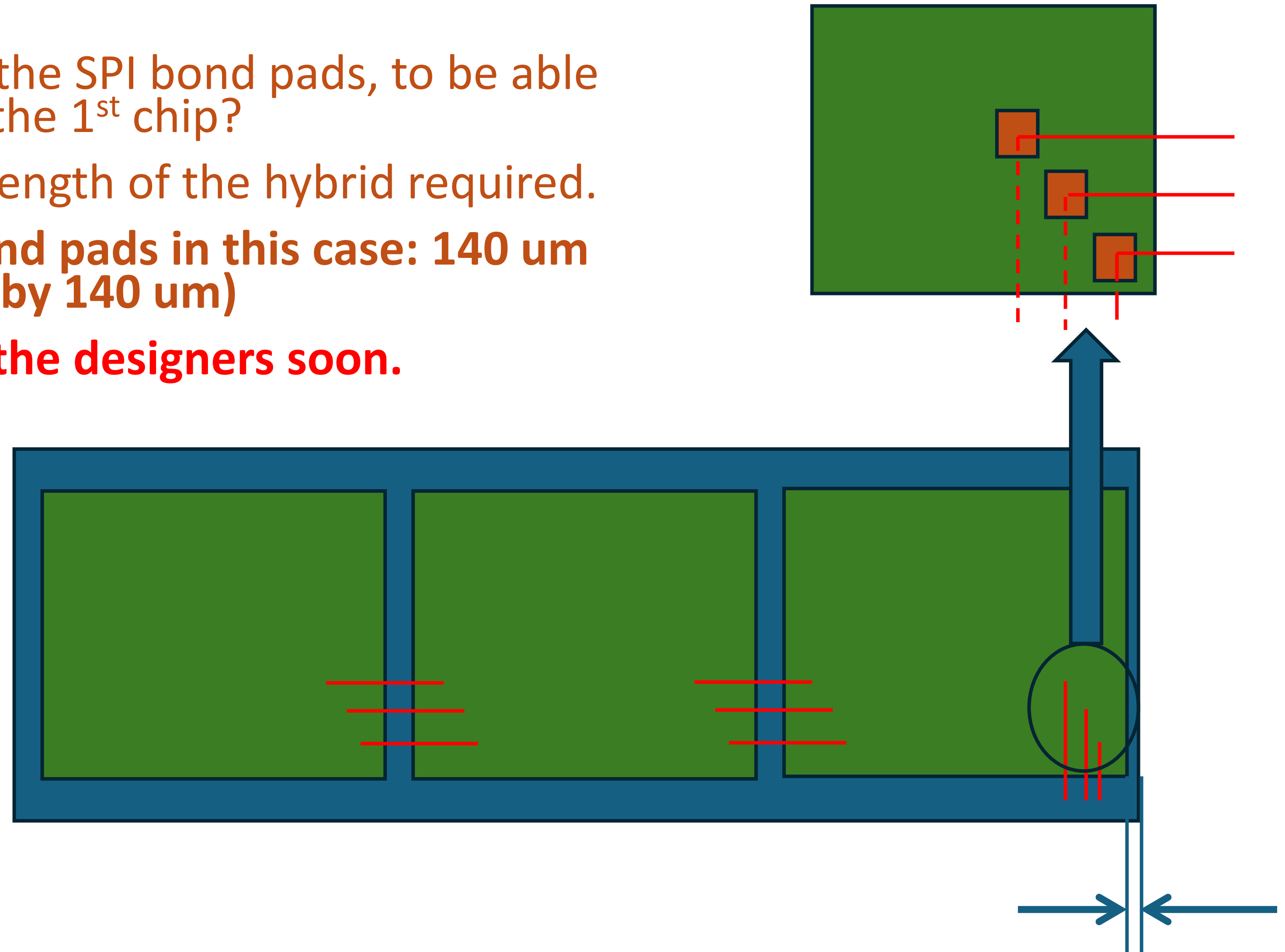
Chip-to-PCB bonding (2)

- For the existing chips (V3, V4) would have to allow the necessary distance/margin on the PCB at the end, due to the space needed for the bonds.
- Would prefer ~800 um between the chip edge and the bondpad center.



Chip-to-PCB bonding (3)

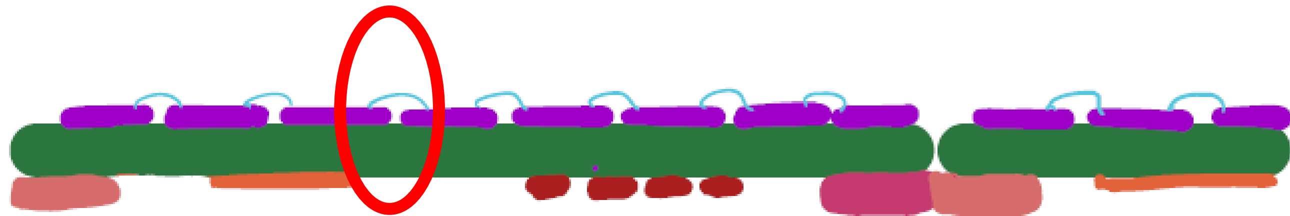
- For V5: Would like to stagger the SPI bond pads, to be able to bond to the other side for the 1st chip?
- This would allow to limit the length of the hybrid required.
- **Would want to widen the bond pads in this case: 140 um by 140 um (instead of 70 um by 140 um)**
- **If in agreement, need to ask the designers soon.**

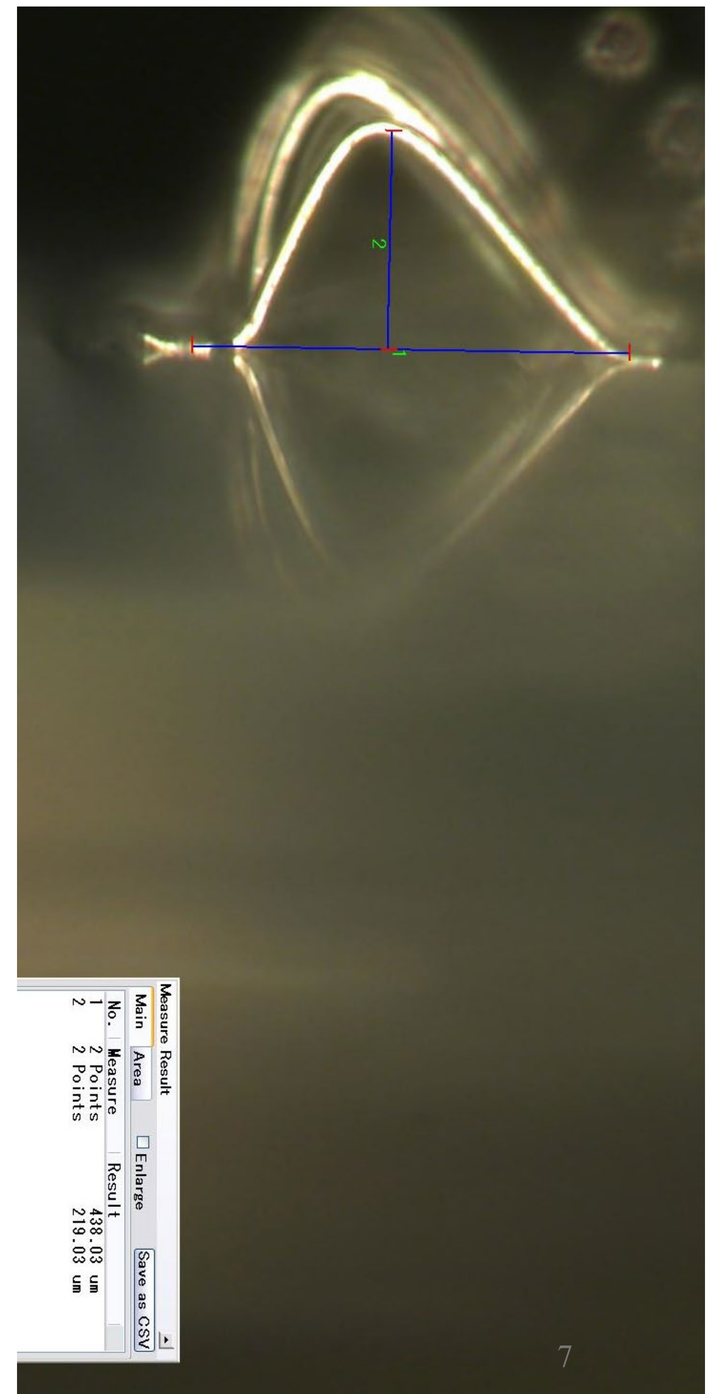


Backup

Checking on the bonding distances/constraints: chip-to-chip

- Have to have a bond height at the chip edge (which is at HV!)
- Assuming x2 safety factor and max(HV) = 400 V, would need 266 um loop height.
- ➔ > ~500 um pad pitch distance for the same height.
- Is this the case for V4/5 chips?





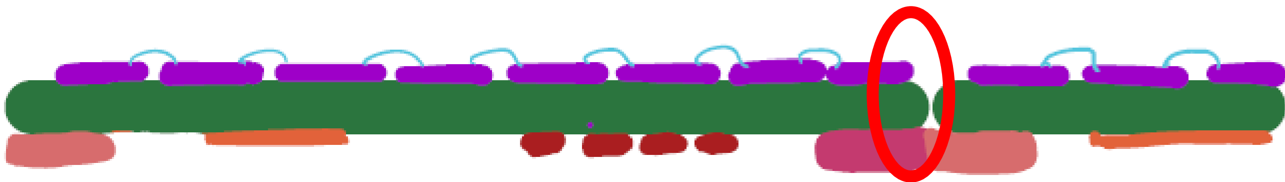
Chip-to-PCB bonding

- Still need the loop height (HV)
- Cannot get too close to the chip edge without making unreliable bond due to kinks at **both** source and destination locations.
  - Note the horizontal distance limits the max loop height to avoid “vertical” portion of the wire and a large part of the wire pressing against the bonding wedge.
- Would prefer ~1 mm. This is probably too much.

Measure Result

Main | Area | Enlarge | Save as

No.	Measure	Result
1	2 Points	440.55 um
2	2 Points	915.29 um
3	PerpLine	949.83 um
4	2 Points	38.13 um
5	2 Points	87.77 um
6	2 Points	133.45 um
7	2 Points	745.40 um



Chip-to-PCB bonding (2)

- An extreme case – got very close, but:
  - Wire against he wedge, kinks.
  - Limitations on the wire pitch (due to the wedge width)