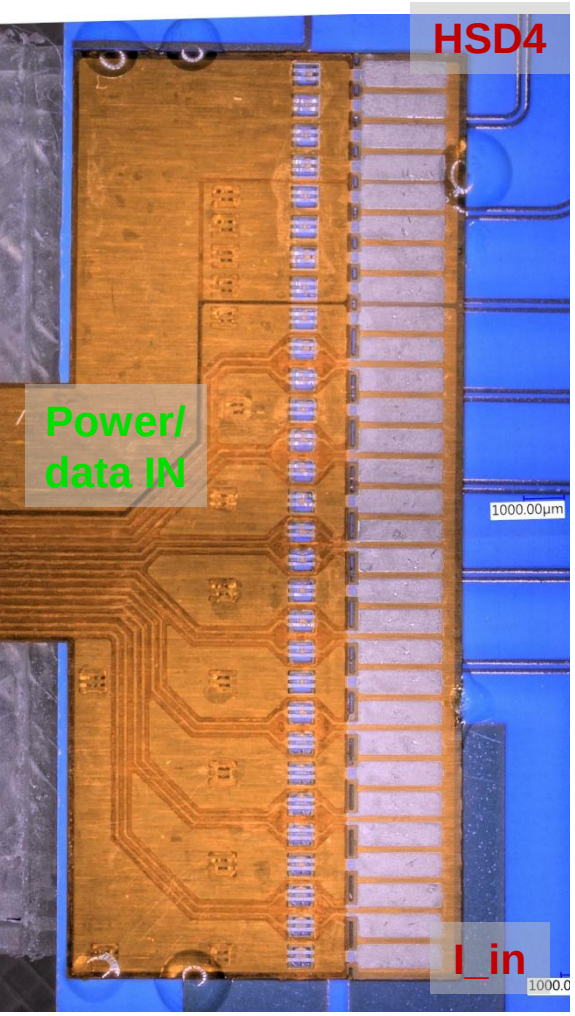
spTAB testing and preparation

James Glover, Eve Tse

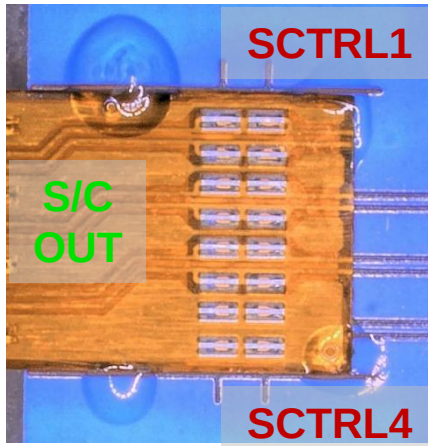
OB module: ad-hoc meeting

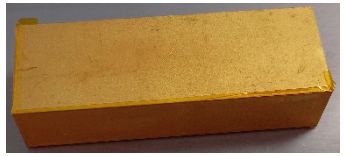
Mon, 3rd Febuary 2025

Prototype to PCB mounting (1)

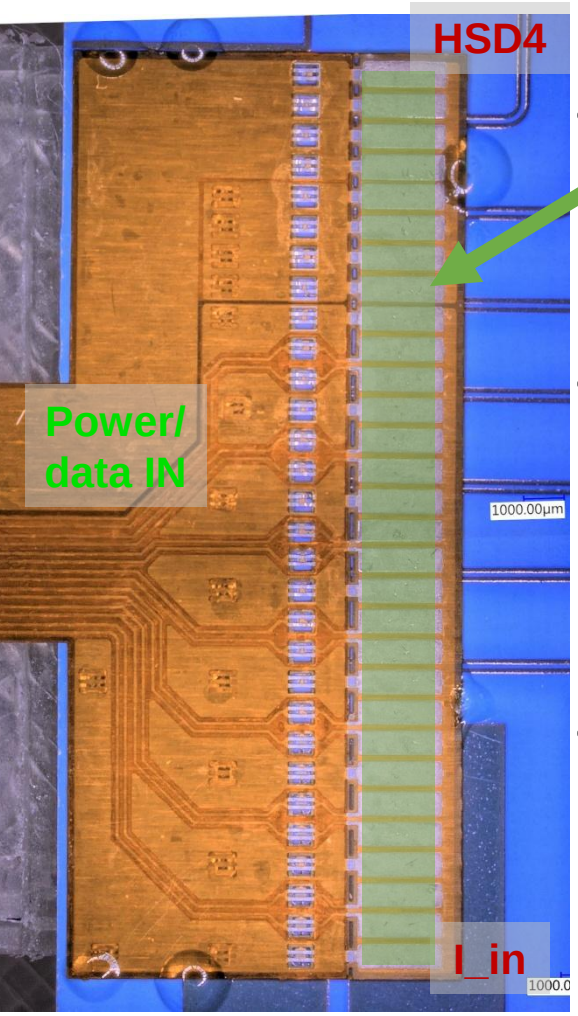


- Following on from the bond trial reported last month.
- Mounting and alignment of FPC to PCB
- Considered adhesives to help hold FPC to PCB.
  - Opted against glue under the FPC, to minimise height offset and prevent glue squeezing out to bond areas.
  - Opted for a UV-cure glue (have familiarity from ATLAS), can be placed on FPC edge and cured dot-by-dot.
  - Used a Kapton coated weight to hold FPC while applying glue.

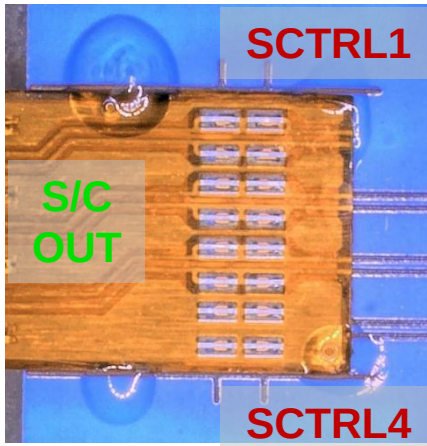


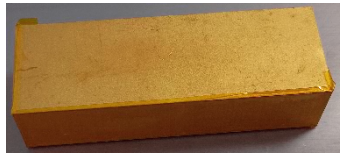


Prototype to PCB mounting (2)



- Additional solder/probe pads on the Power/data IN side of the FPC made holding FPC with the weight straightforward.
- Applied the glues dots on the left before removing weight, additional dots prevent FPC from lifting at the edge (cotton swab used to ensure FPC was flat during curing).
- There was limited locations for the weight on the S/C OUT side of the FPC.
  - Found it harder to keep this side flat.





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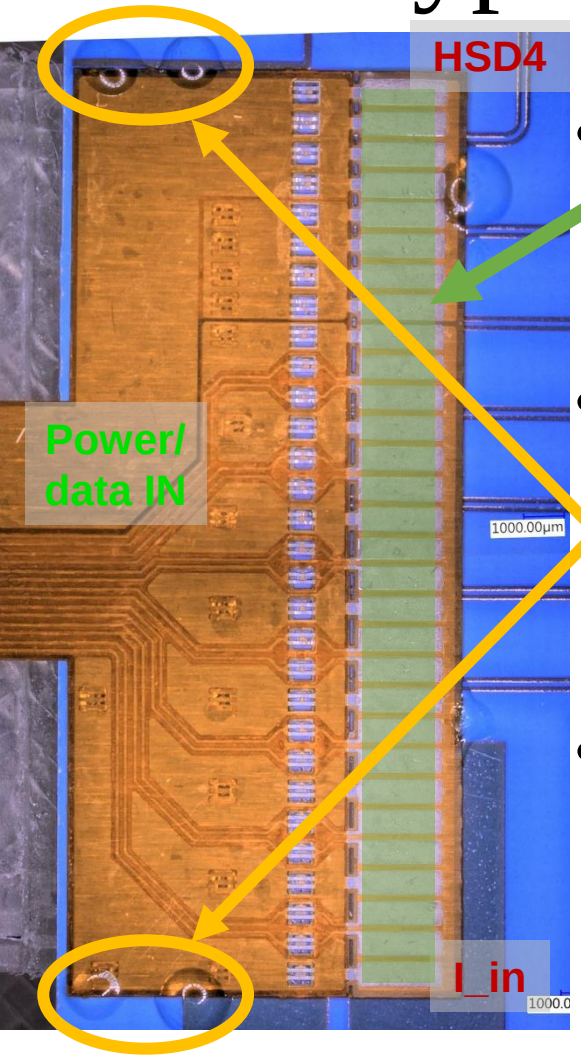

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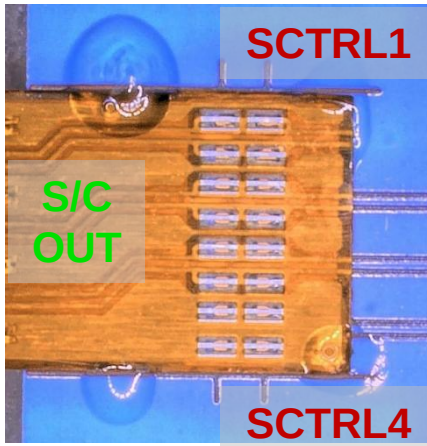

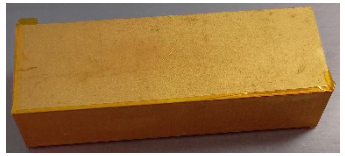

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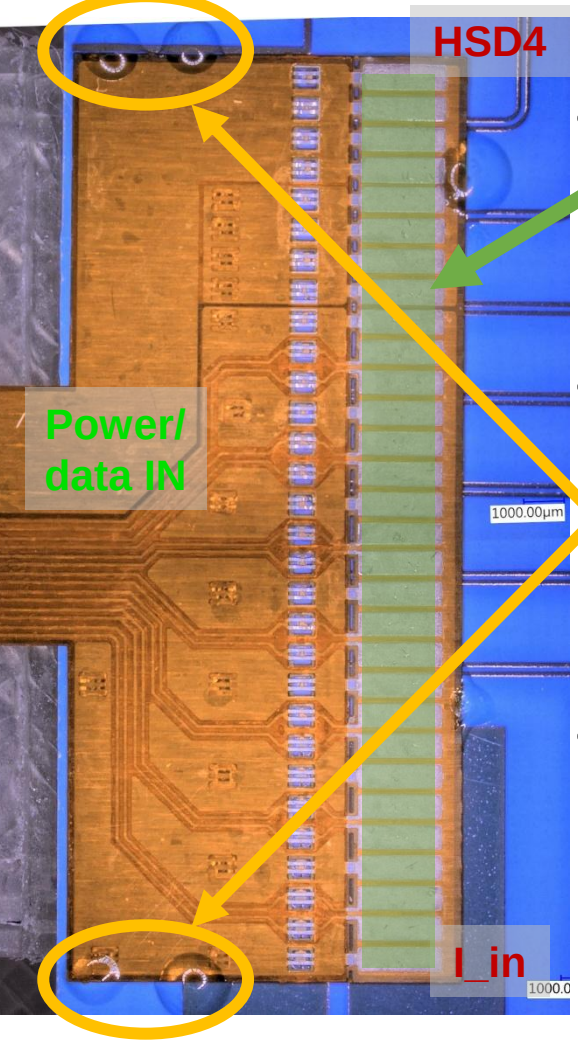

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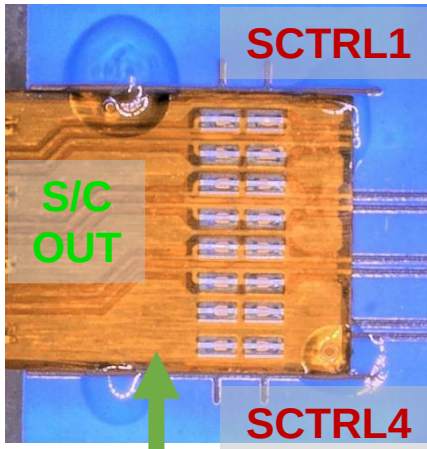

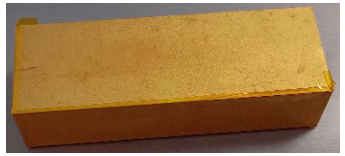

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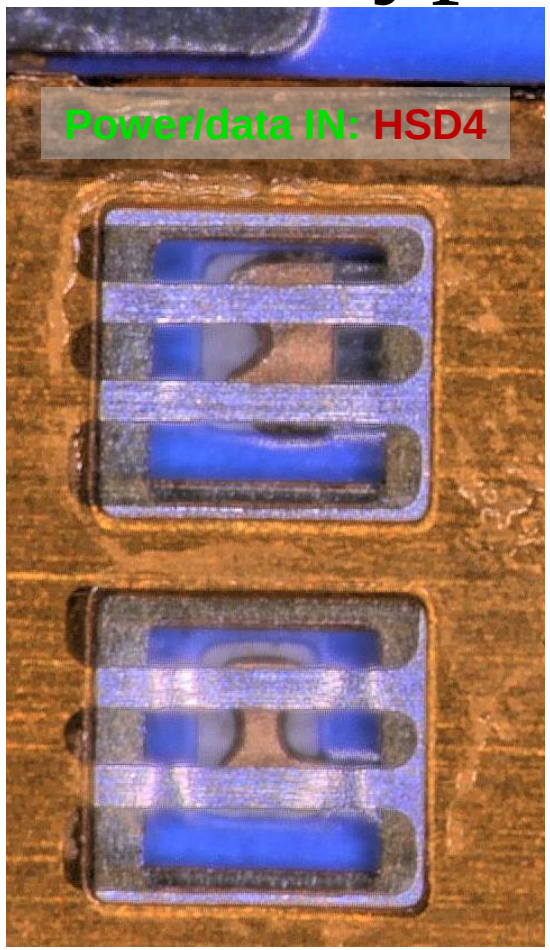
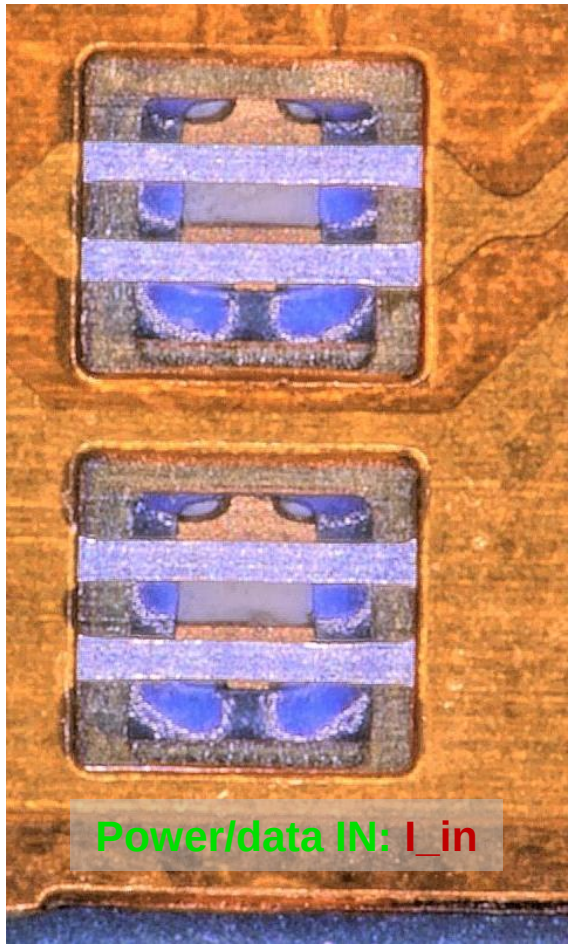
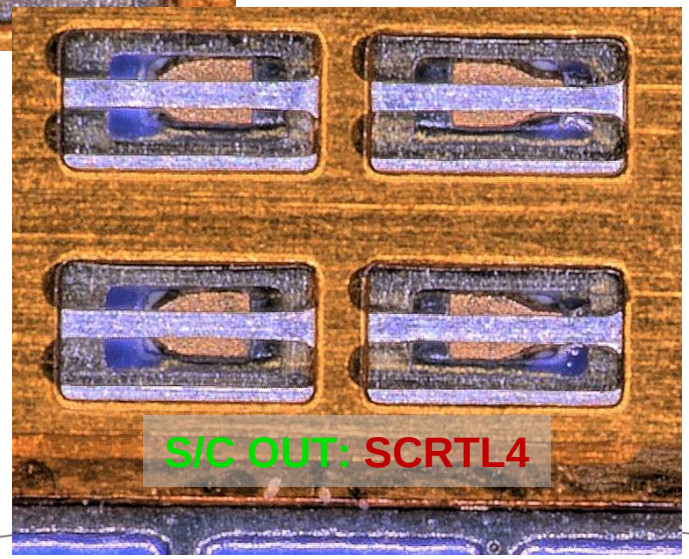
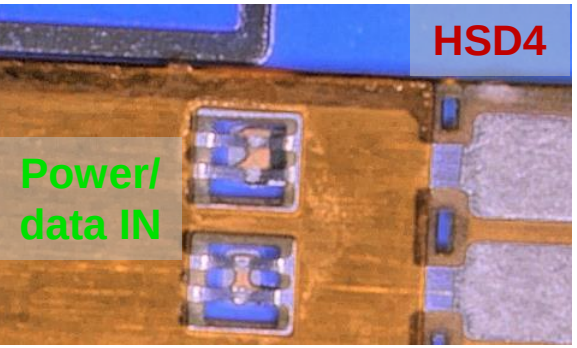
Prototype to PCB alignment

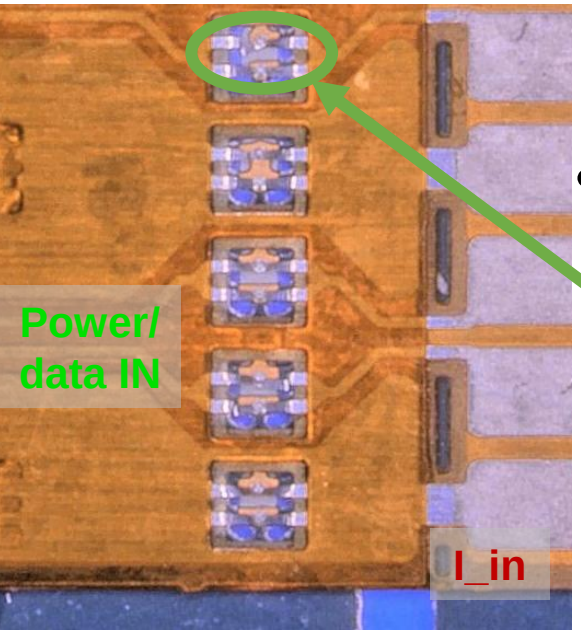






Prototype to PCB bonding

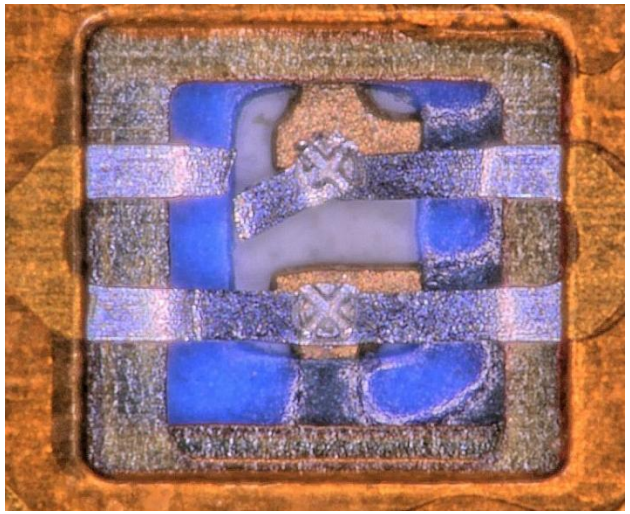


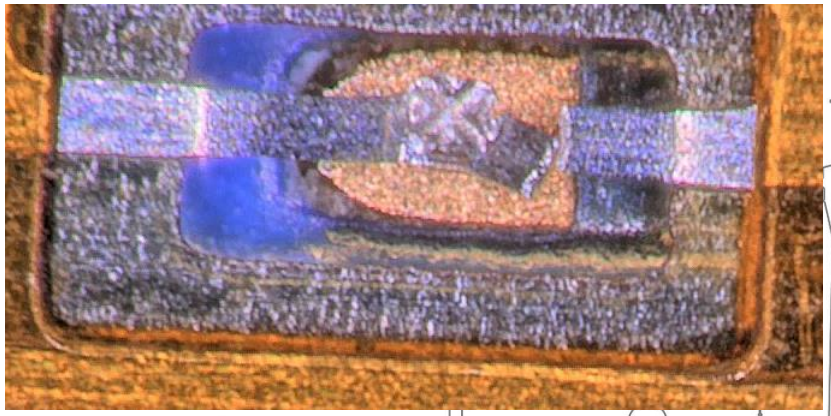


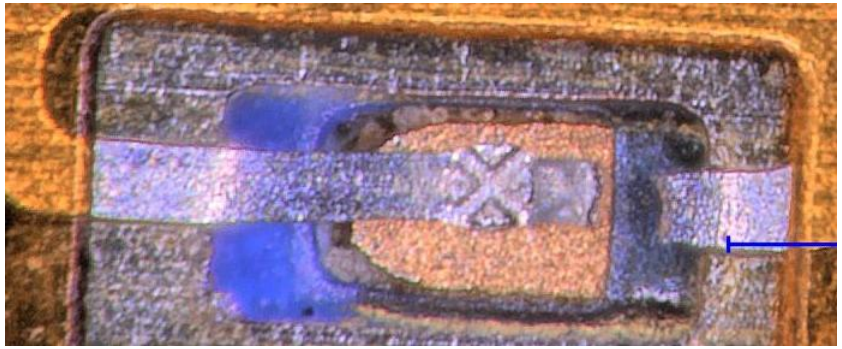
- Kept to the bond settings found to work well from testing.
- Vertical offset between FPC and PCB seemed much smaller than with the (unglued) test structure.
- Observing bonds being done appeared to go very smoothly.
  - A couple of foils had noticeable snapped at either end of FPC, seemed minimal.

Visual inspection (1)

- A detailed visual inspection of the bonds (higher magnification, better lighting and observation angle control) has shown far greater damage to the FPC tracks – esp. S/C OUT side.
- A full damage report is ongoing.
  - Images taken but need to be properly catalogued.
- Continuity checks from input to output SMA (2.92 mm) connectors to be done.

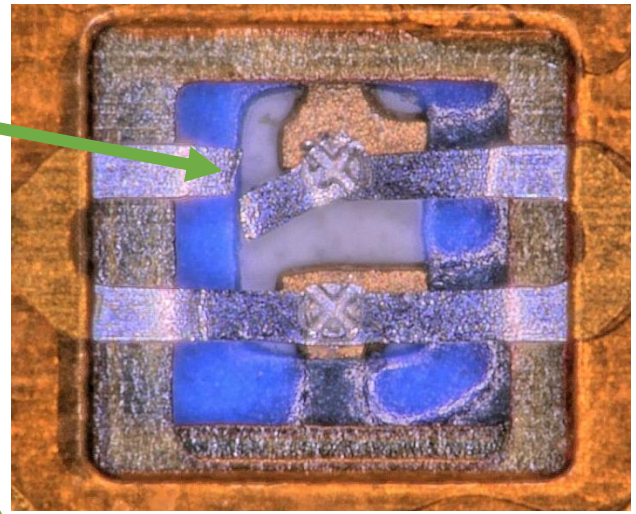


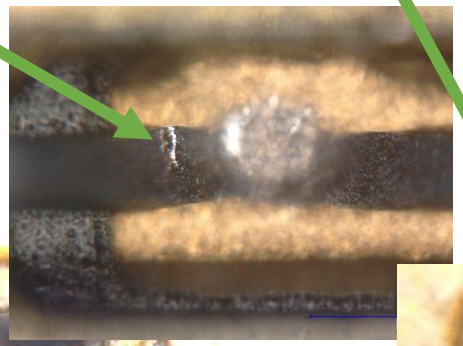


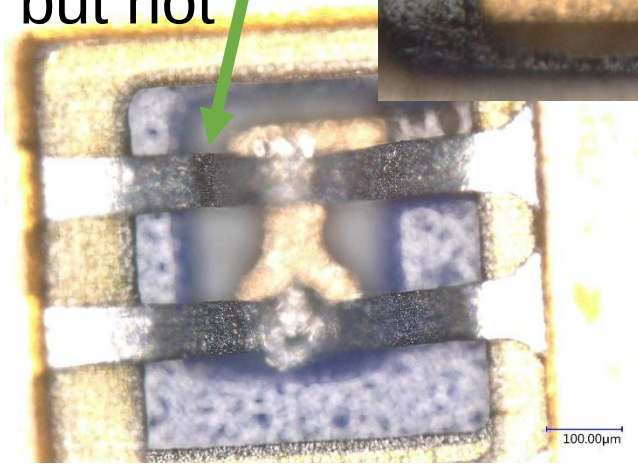


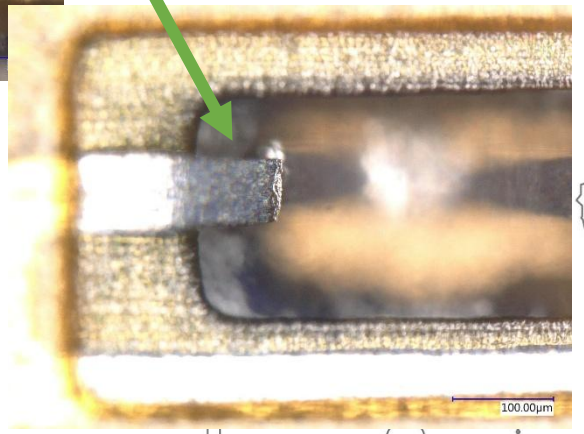
Visual inspection (2)

- Most breaks appears at the edge of the PCB's solder mask (how thick in this layer?).
- Some irregular kinks in the foil are observed.
- More than 50% of the S/C OUT side show damage.
  - May still have continuity, but not ideal for HS data Tx.
  - Due to trouble keeping FPC flat at this end?
  - Maybe only 25% on the Power/data IN side.



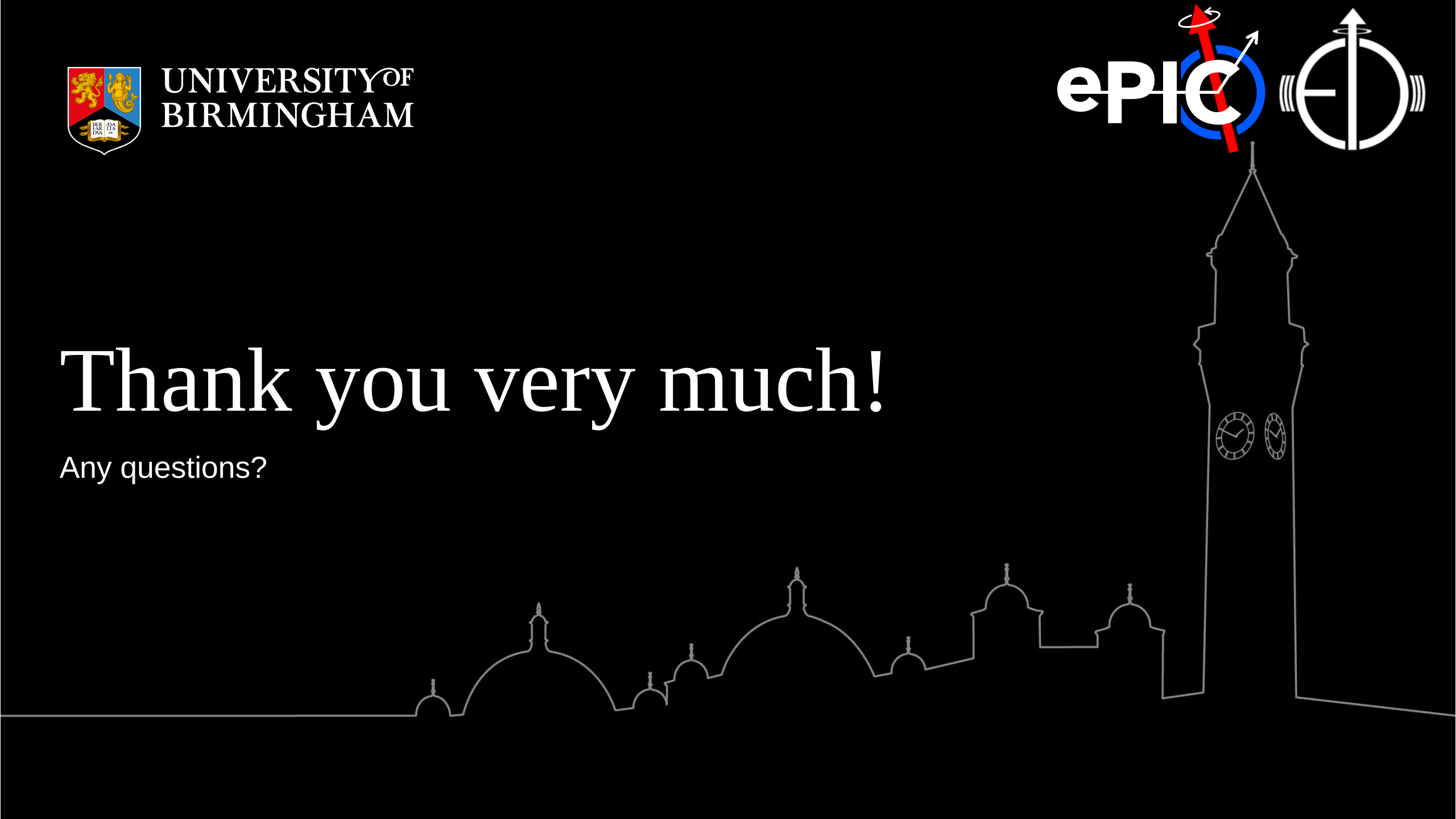






Summary

- Bonding of FPC tracks to PCB pads seems to have good welds.
- Height difference between FPC tracks and PCB pads seems to be at a limit.
  - Keeping FPC flat to PCB surface is must!
    - Additional space on FPC (Kapton extensions) to hold down during gluing.
  - Minimising surface steps within the bond window might help.
    - Can we increase the window in the solder mask?
- Cataloguing of the FPC track damage is ongoing.
- If continuity extends along the full structure (SMA to SMA), data transmission tests can be performed.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Thank you very much!
Any questions?

Additional (support) slides