



08/07/2026

Mighty Tracker - Assembly Trial -

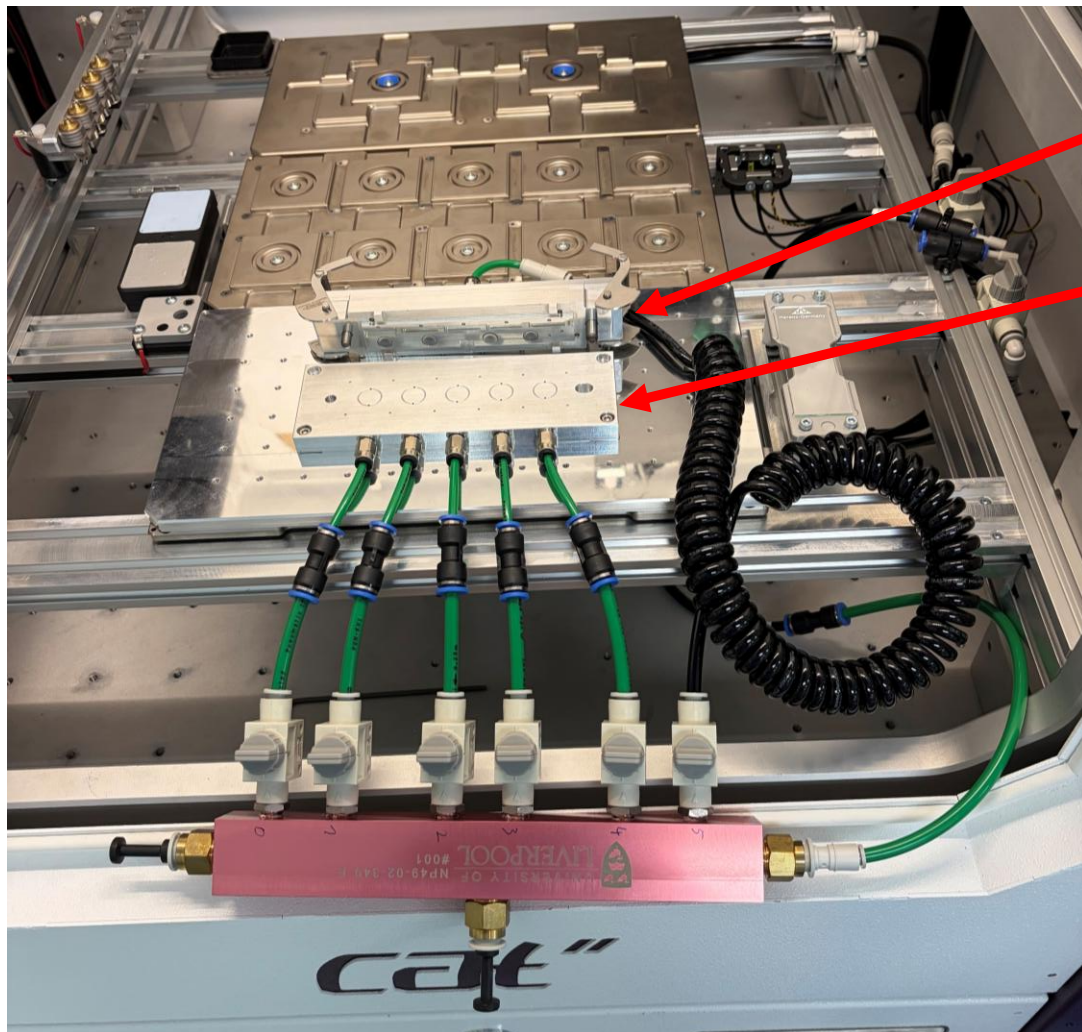
Maria Queiroga Bazetto, Sven Wonsak



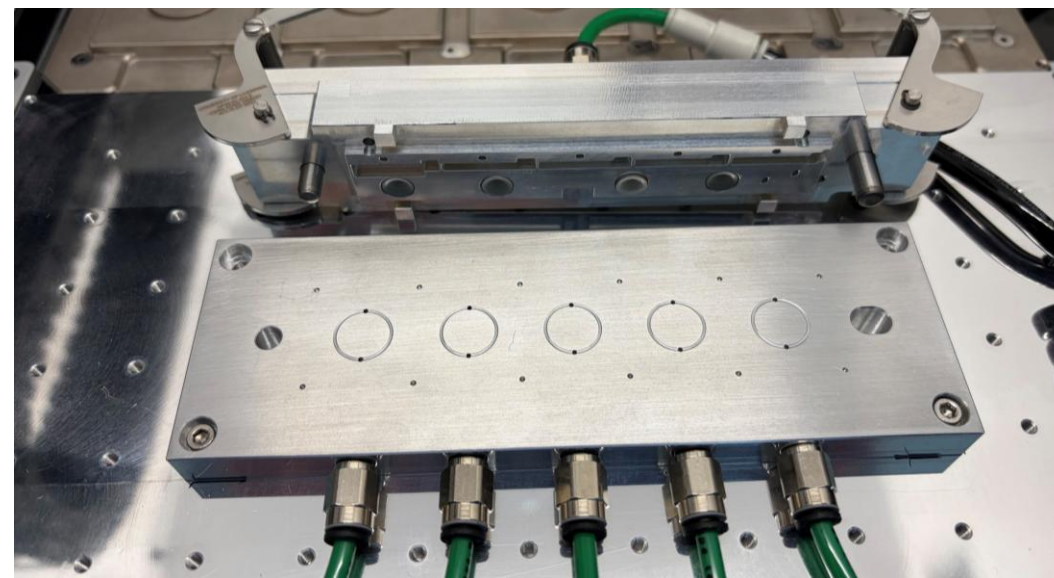


- Use dummy blank silicon chips and flex without SMDs to trial new tools with pick-and-place machine

Assembly Jig

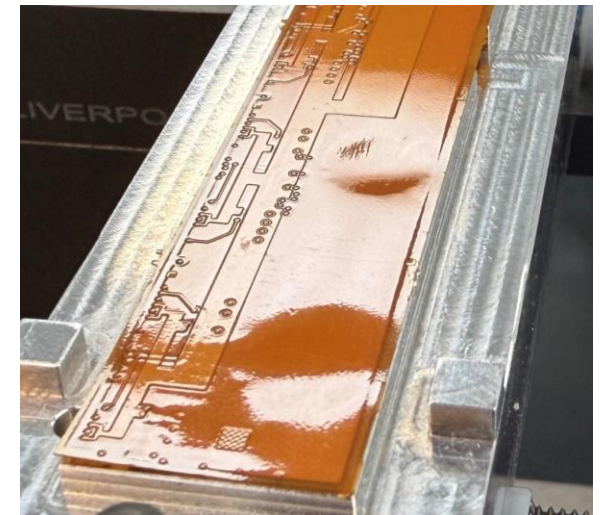
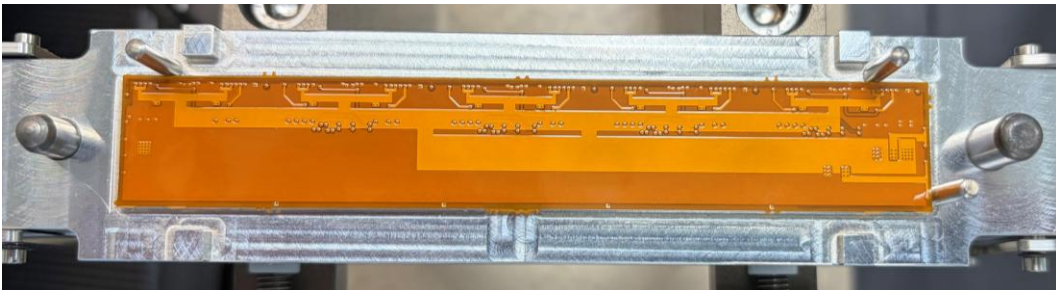
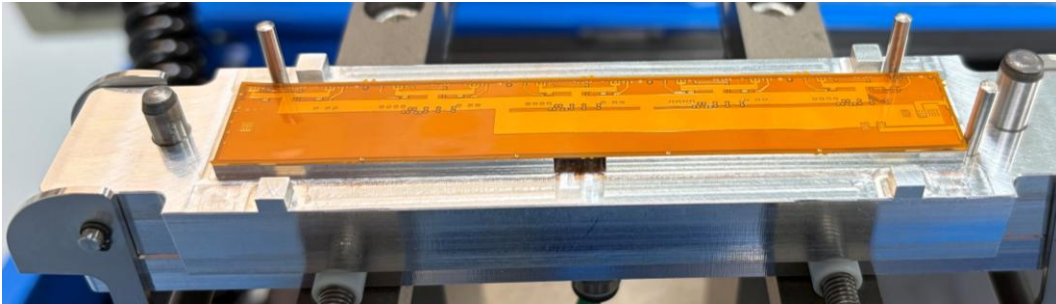
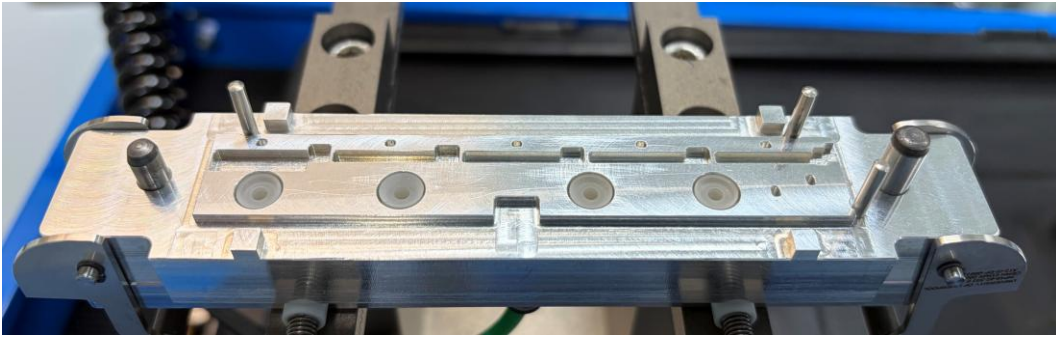


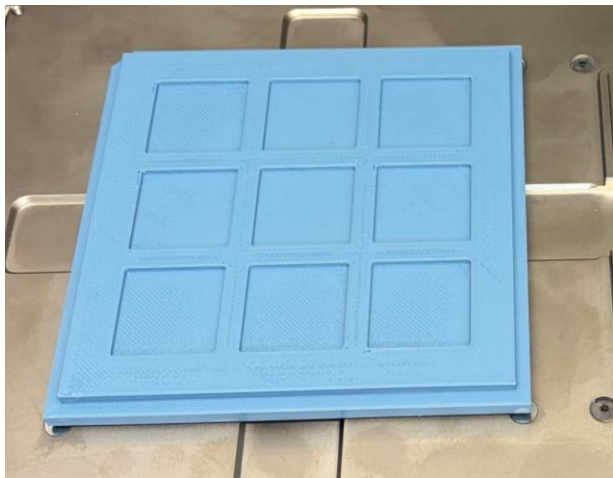
- Flex Pick-up tools with vacuum
- Assembly Jig with individual vacuum channels for each chip location
- Connected to manifold that uses machine vacuum
 - For production, better to use external vacuum source



Pick-Up Tool

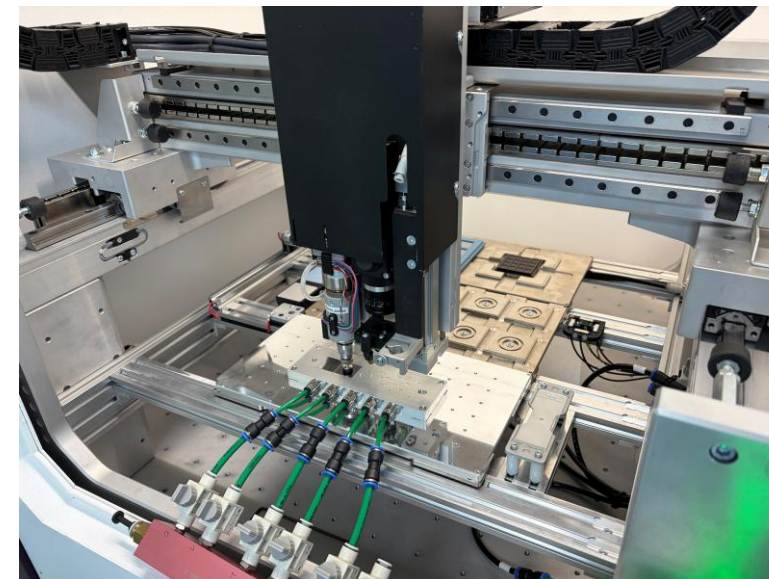
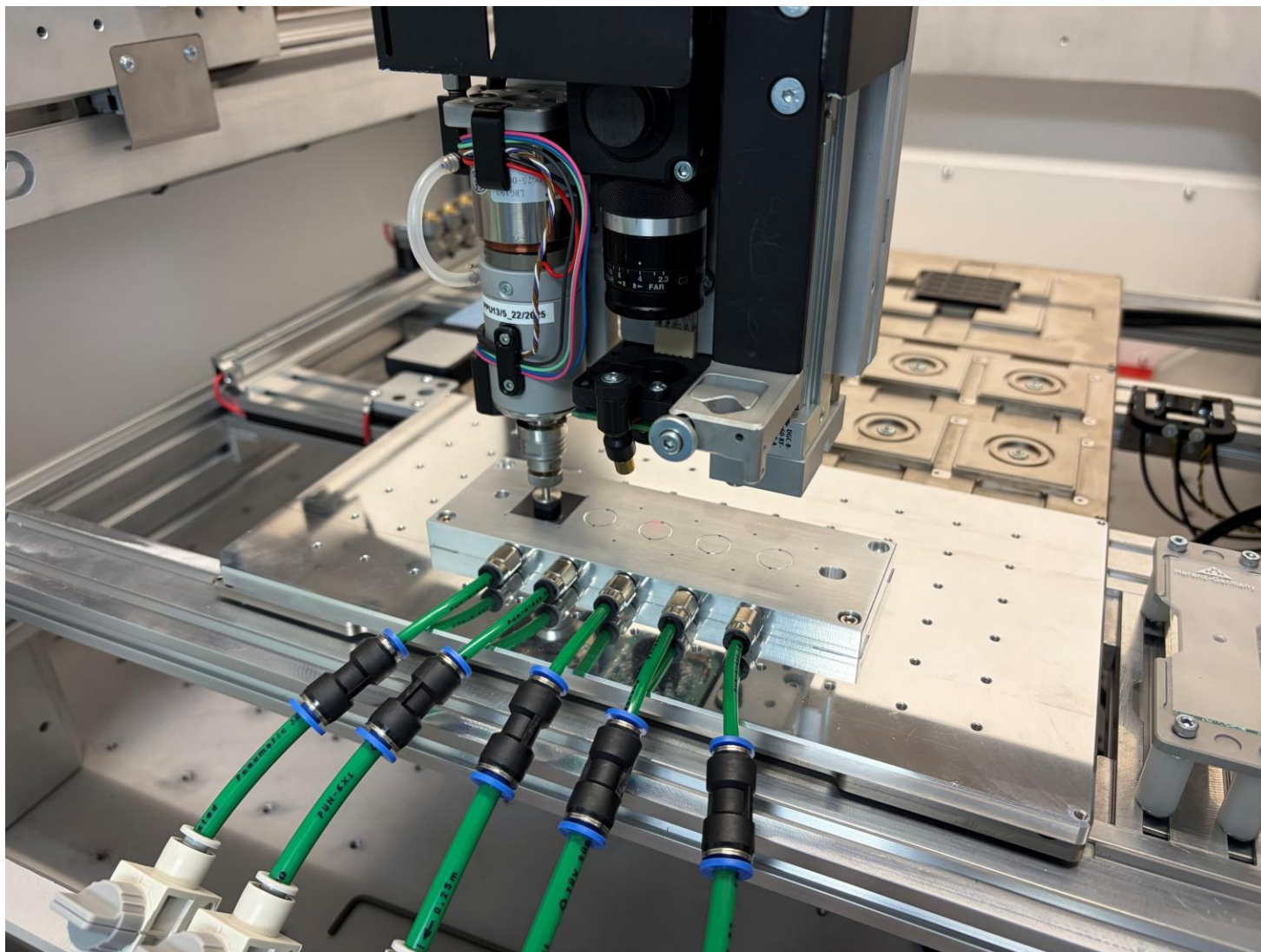
- Removable dowel pins to align flex on pick-up tool
- Vacuum suction cups to hold it in place





- 3D printed waffle pack for chip alignment/pick-up
 - Backside of filament-printed waffle pack not smooth enough for machine vacuum to hold it down
- To note: removing these dummies from the dicing tape is challenging
 - Likely UV release tape (no equipment for that)
 - Dicing quite deep into tape, it easily tears in the dicing streams

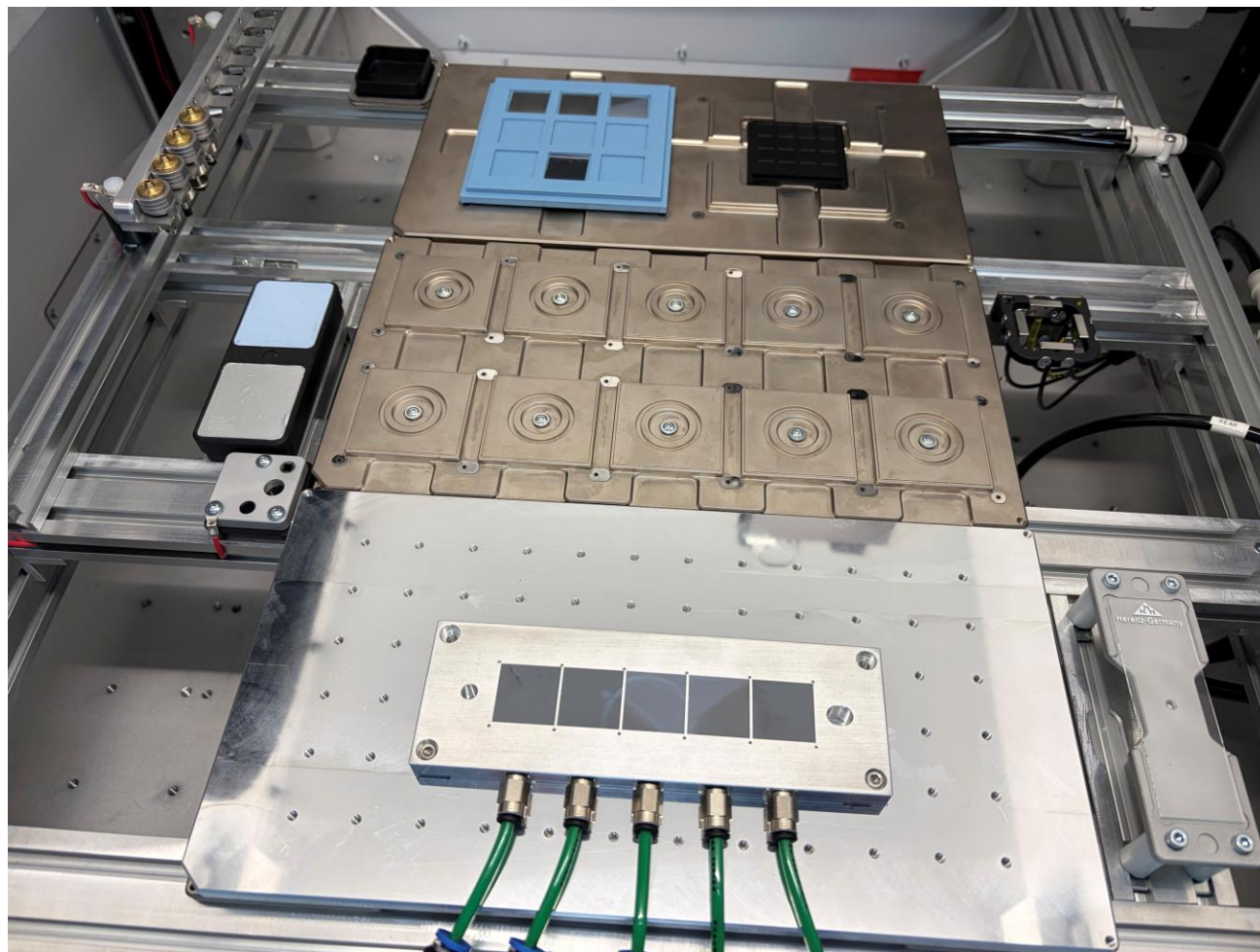
Pick-and-Place



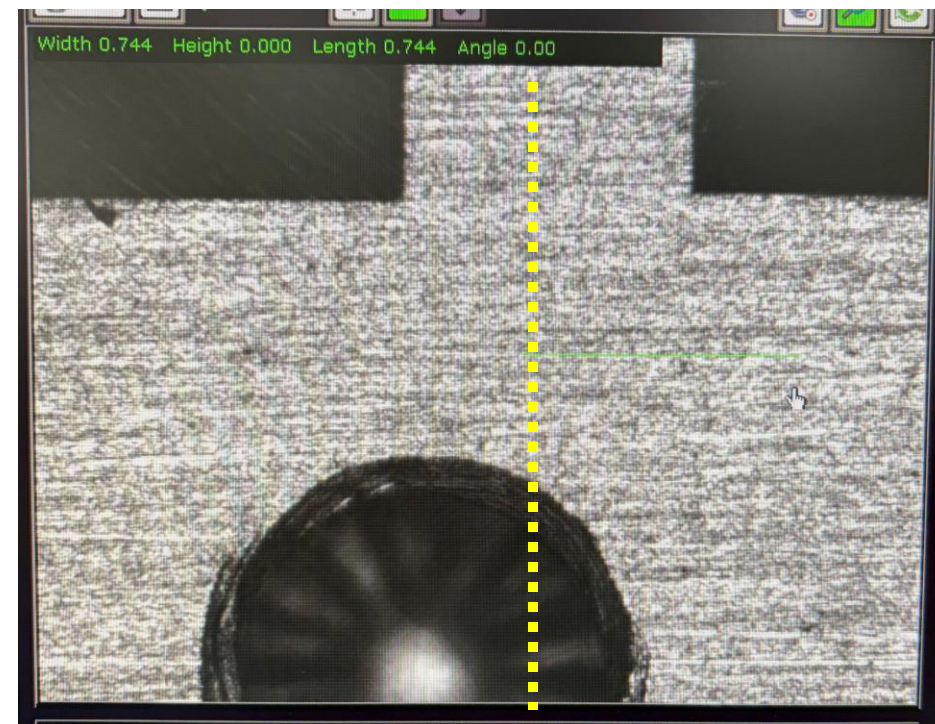
Vacuum for each position has to be switched on manually

- Programmed wait time of 5 s

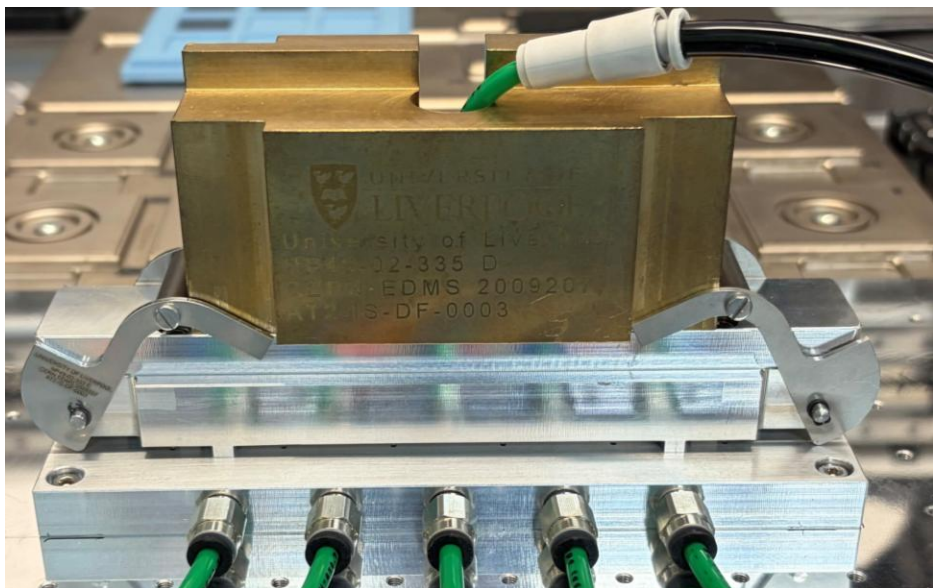
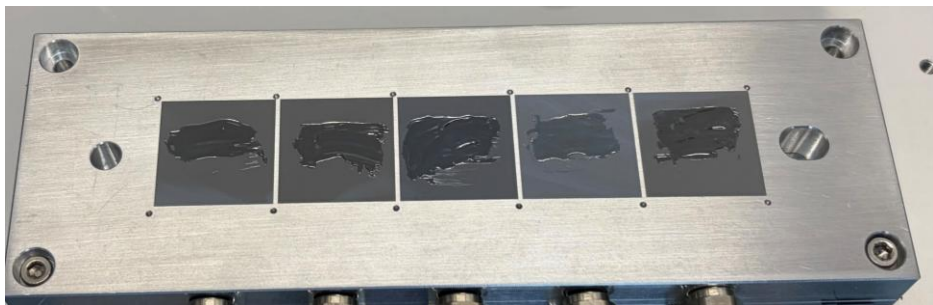
Chips after Placement



Machine skipped one chip on waffle pack because it could not find the edges (dirty from propanol, cleaning helped)



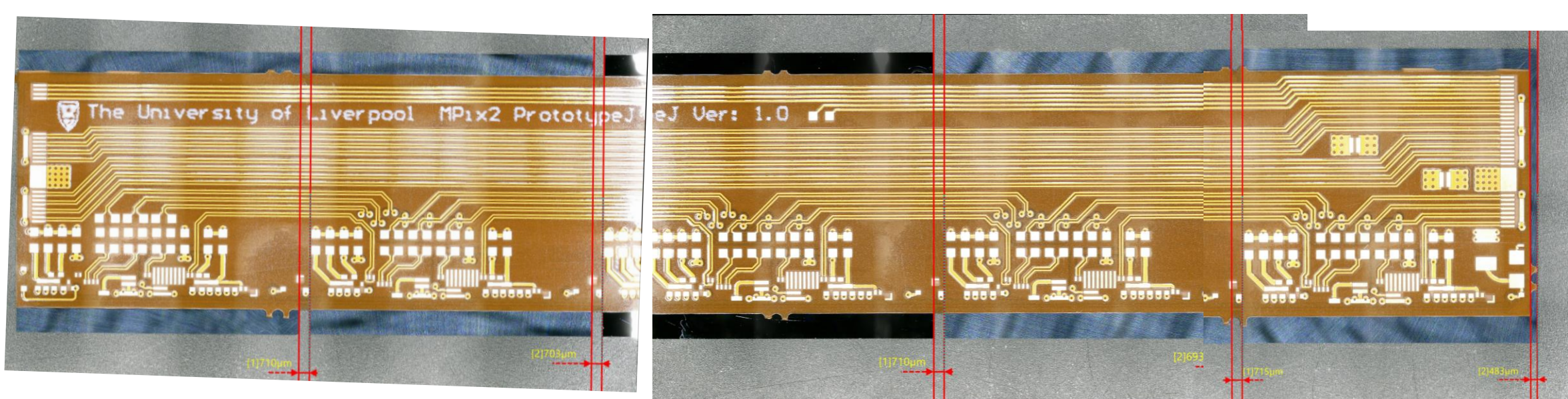
Alignment slightly wrong
- Hole should be in centre of gap



- Use Quick Araldite for a trail gluing
 - Manual deposition because curing time too fast to set up machine
- Weight on pick-up tool during curing



Shift of chips to right side visible



Gaps left to right: 710um, 703um, 710um, 715um

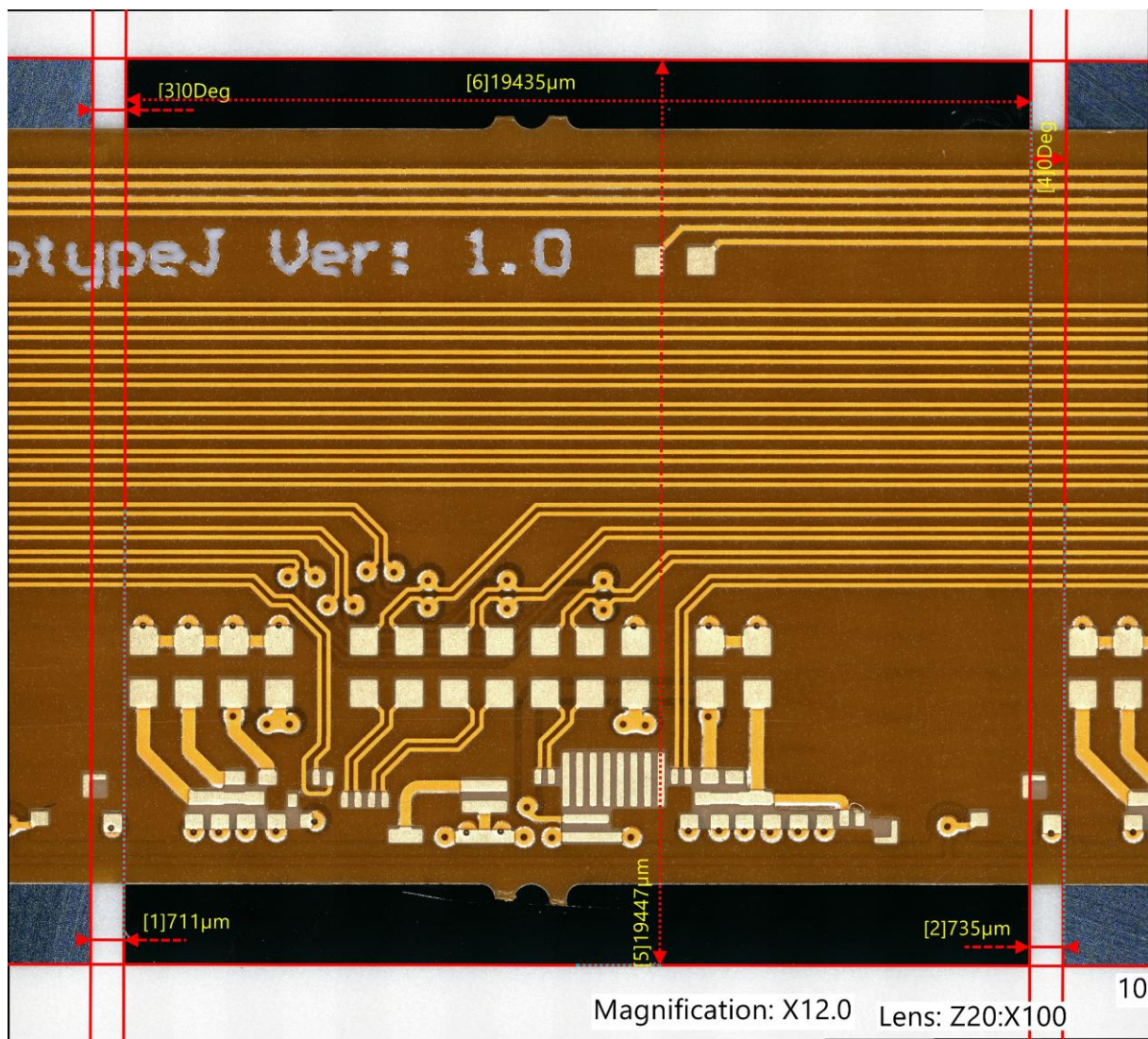
- In general very consistent

Left side: no gap between flex and chip; right side a gap of 483um -> misalignment

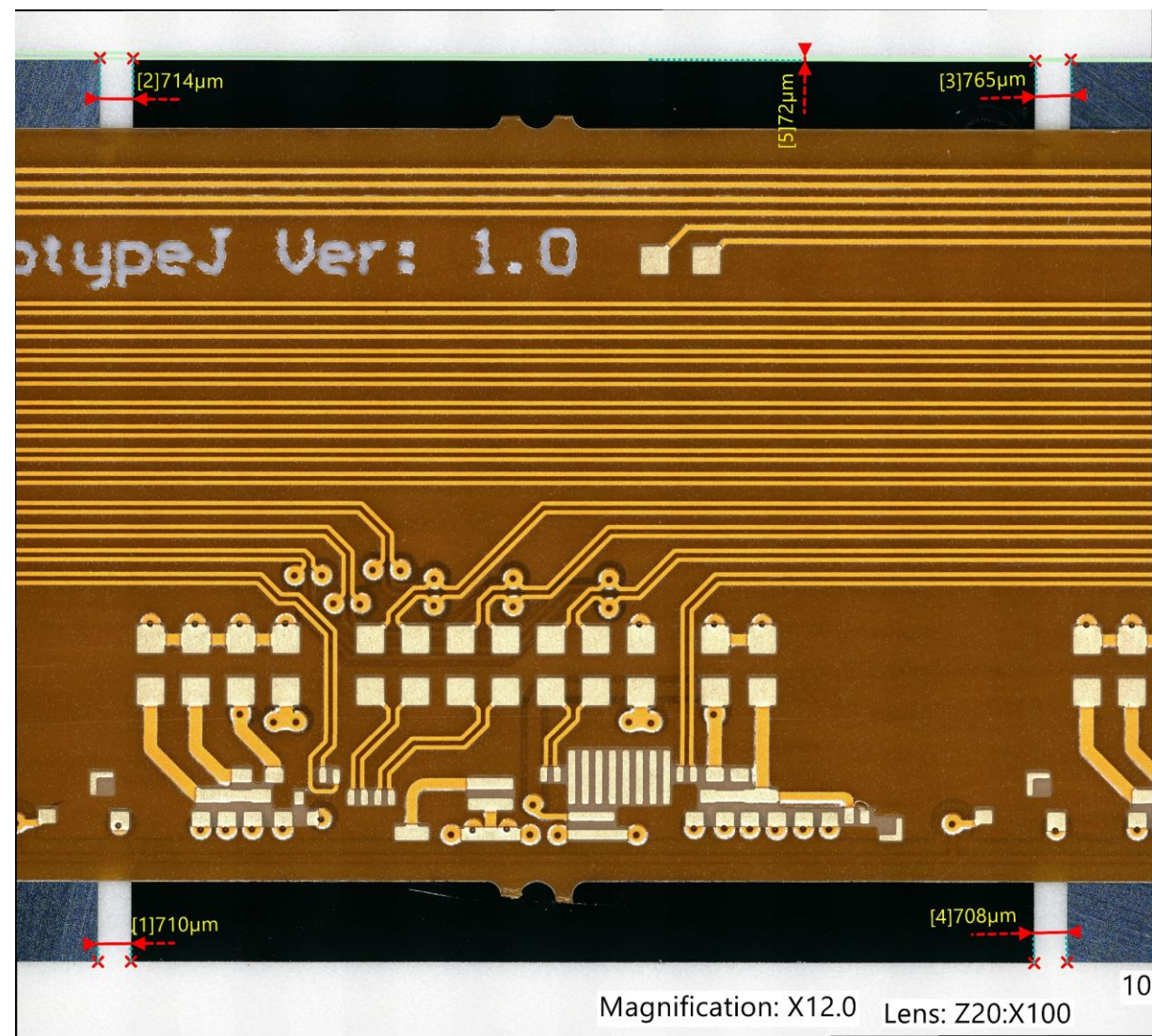
Measurement accuracy not ideal:

- Hard to distinguish chip from background (higher magnification and white background should help)
- Not all chips parallel

Expected gap from tool
drawings: 1.325

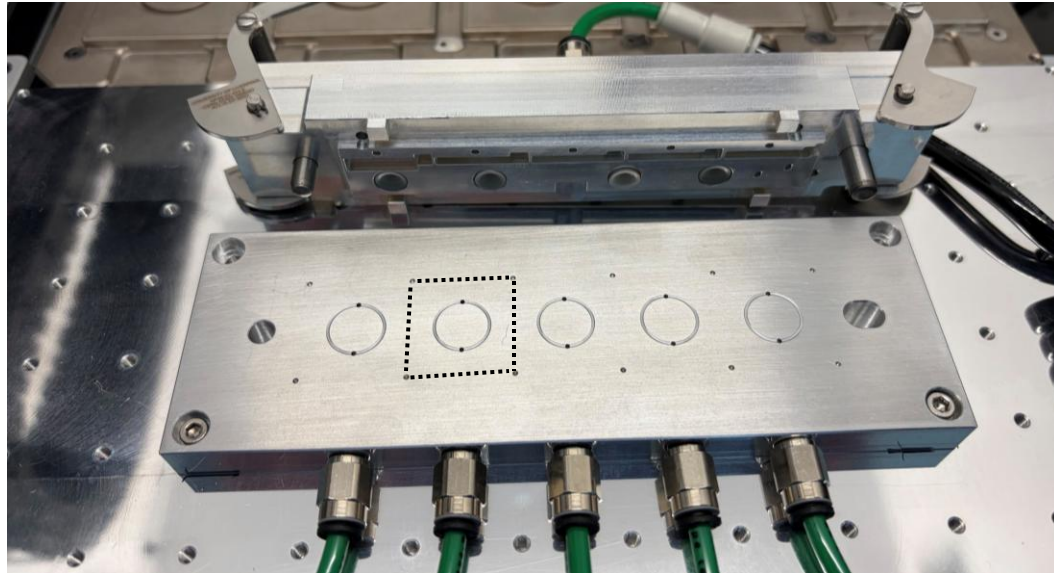


Higher magnification & white background

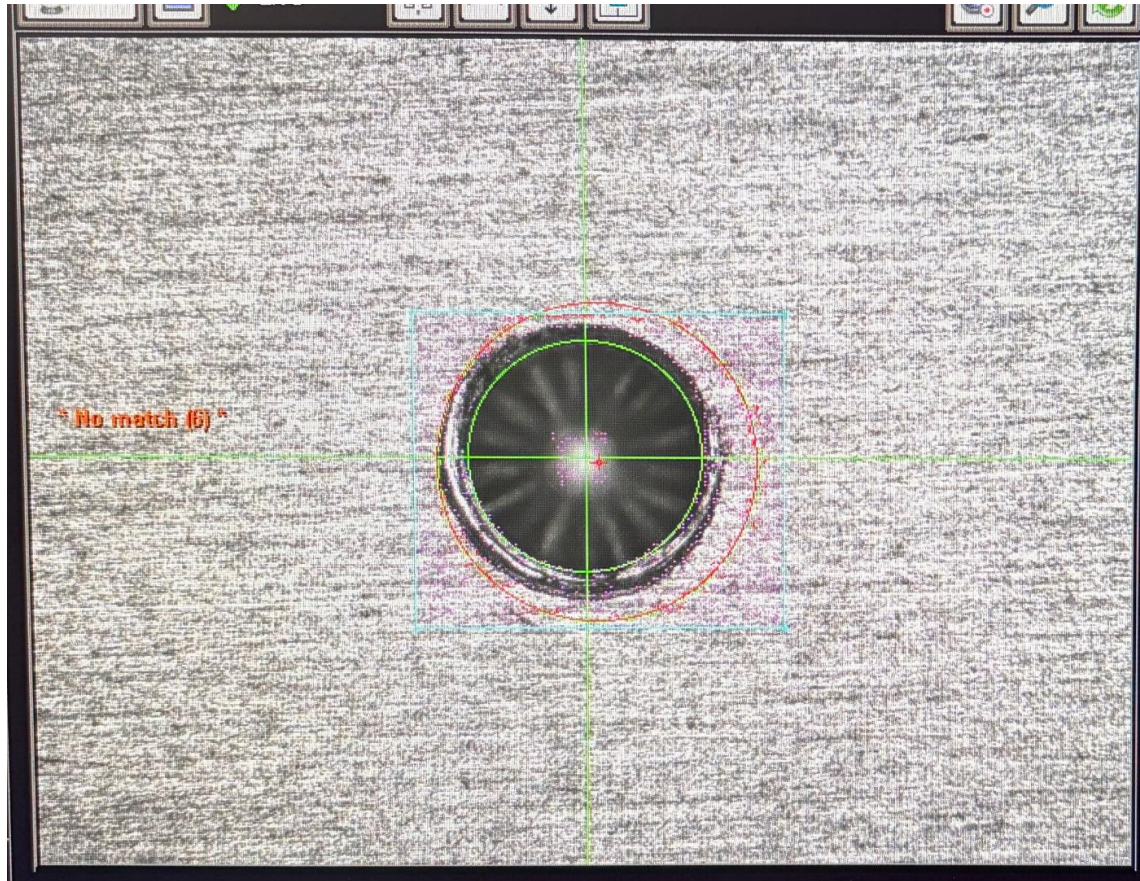


Top and bottom distance on right side different -> rotation

Alignment Issue



- 1mm holes in jig are supposed to be used for alignment
- Each chip should be centered in a rectangle with holes in 4 corners
- Holes should be usable for automated alignment using ImageProcessing feature of machine



- Machined holes not of sufficient quality for automated feature finding with pick-and-place machine
 - Workshop thinks it could be done with setting up machine correct
- Otherwise, needs to be changed
 - Use grooves/+ fiducial instead?
 - Brass bushings?

- Perform metrology of jig to check that alignment hole locations are correct
- Ask nicely in workshop if they could re-machine the holes in one of the jigs