Tooling Update

SCIPP

October 27, 2025

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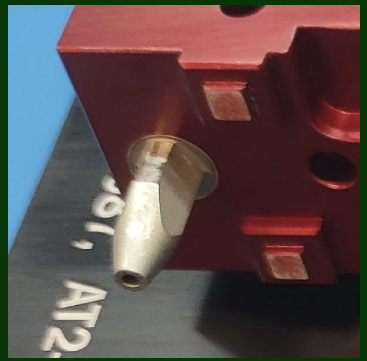
Special Materials

Metapor Aluminum

Metapor aluminum is porous to let air and moisture escape, which prevents bubbles and blemishes. These sheets must be milled to expose the pores; average pore diameter is 0.0006” with a total porosity of 15%. Available from McMaster-Carr.

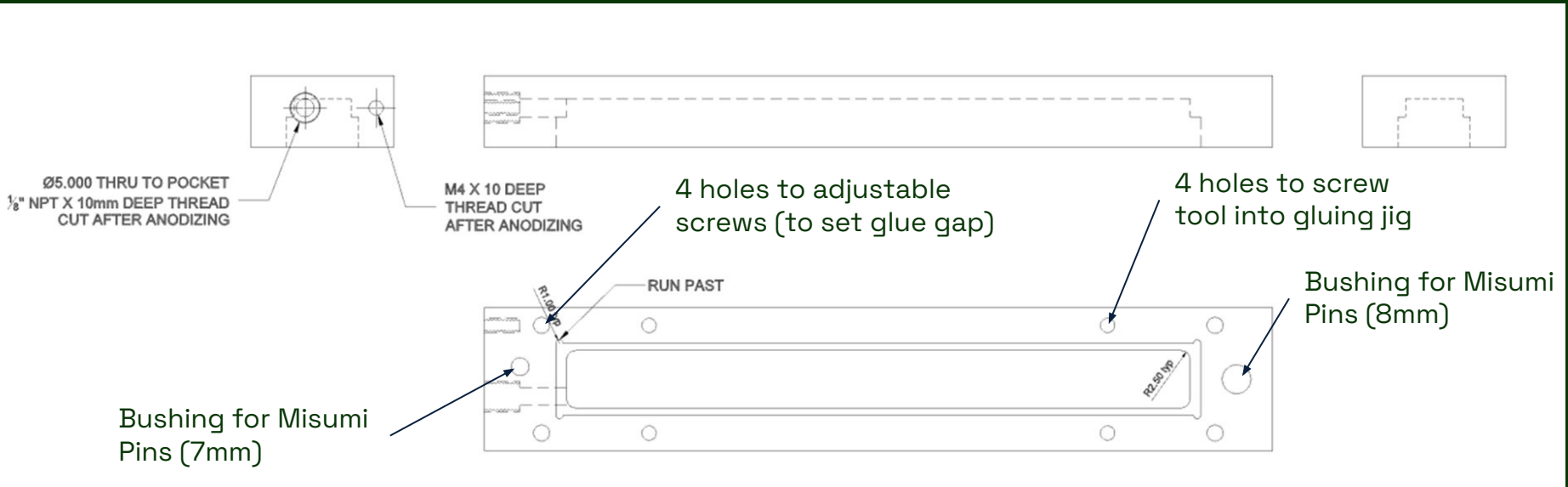
Misumi Pins



High precision hardened steel or stainless steel locating pins in both round and diamond head configurations, with matching bushings. Mounting features are machined into the shank, with options for press-fit, threaded, or tapped. Website

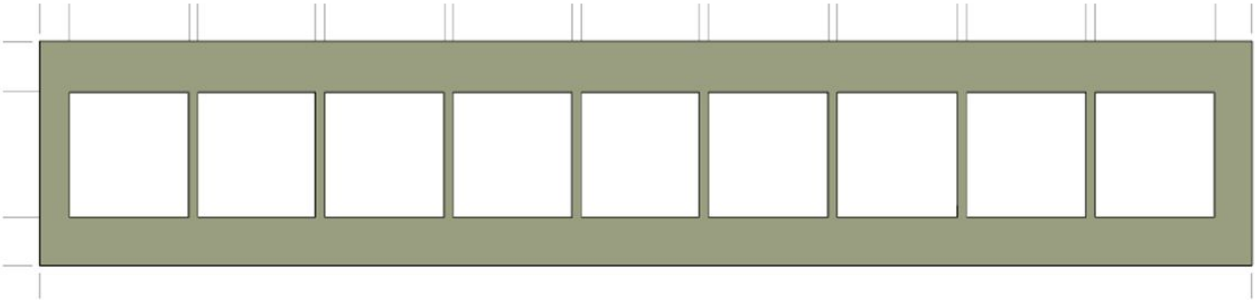
Chip Pickup Tool

Tool has inset piece of Metapor sintered aluminum to provide vacuum and maintain flatness of chips while curing



Chip Aligner – option 1

- Alignment of V3 and V5 chips (with ~1.3mm gap) can be done with stencil



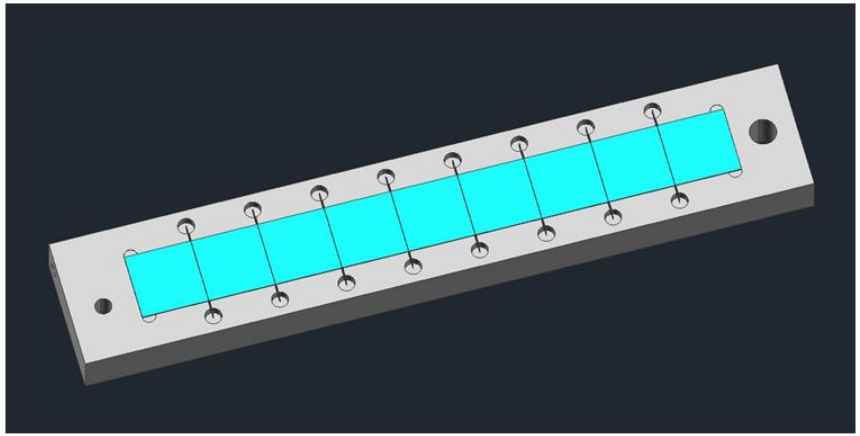
- Alignment of V6 chips with 100um gap is proving more challenging
- Stencils cannot be cut with thin enough cross bars
  - We are investigating larger gaps (from 200um to 500um)

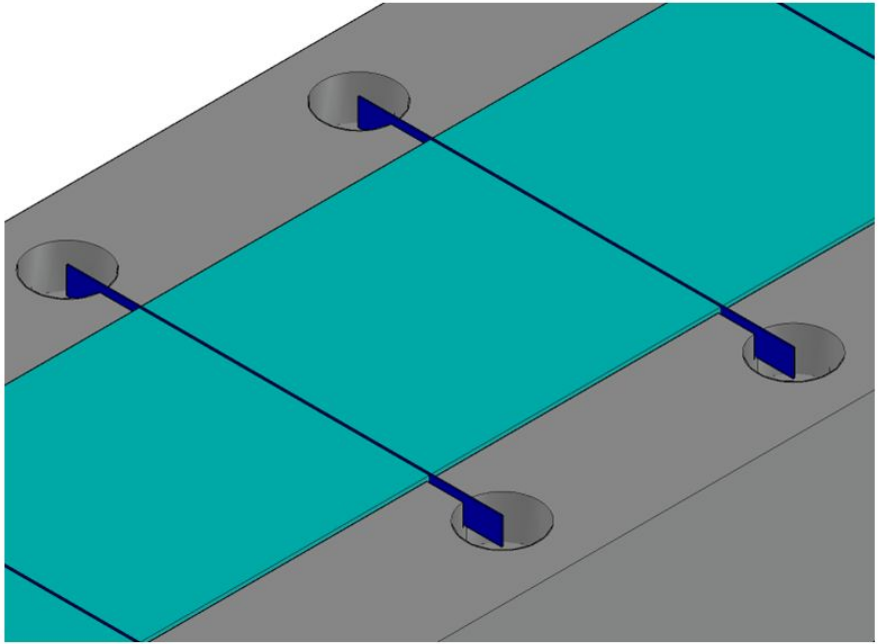
Chip Aligner – option 2

Vertical slots may be possible, but would require significant hand-crafting to align the cross bars

Bars probably will not hold up to prolonged use

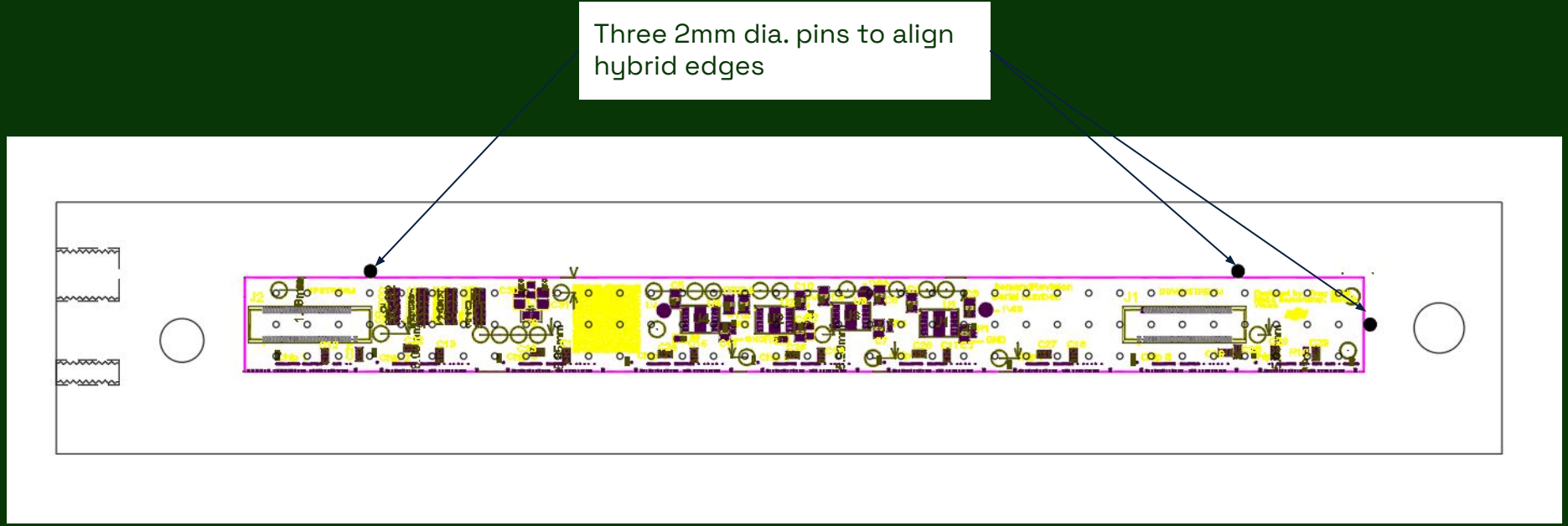
Cross bar material can't be more than ~1.5mm deep





Hybrid Pickup Tool

Three rows of vacuum holes under PCB to flatten it before picking up.
Misumi pin locations need to be adjusted for new extrusion shape

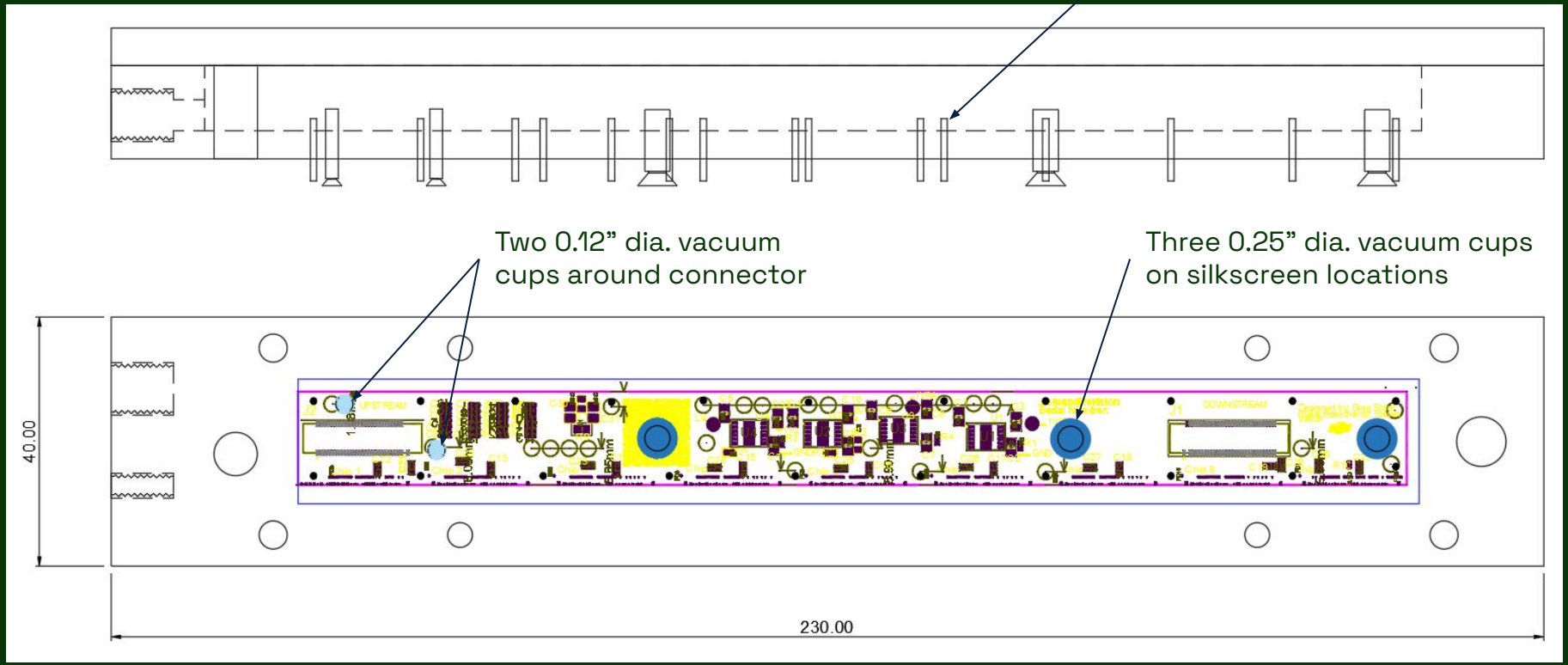


Hybrid Pickup Tool

Misumi pin locations need to be adjusted for new extrusion shape

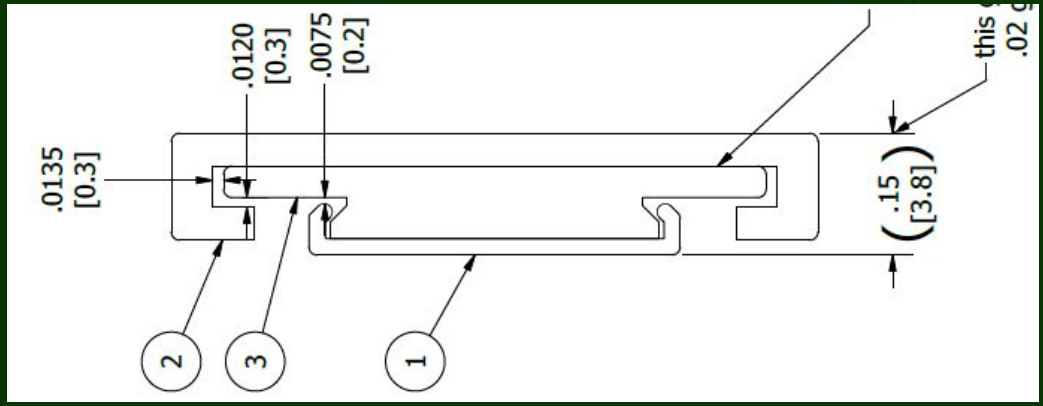
I need to know the connector height

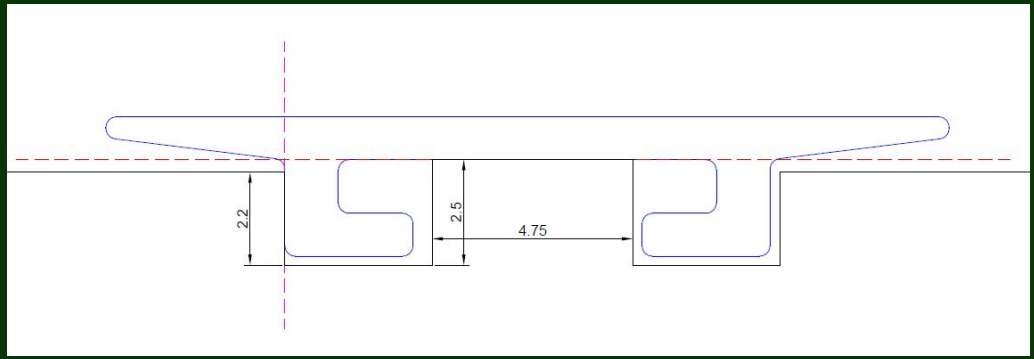
Lots of 1mm dia. pins to set height of PCB against vacuum cups



Extrusion Profile

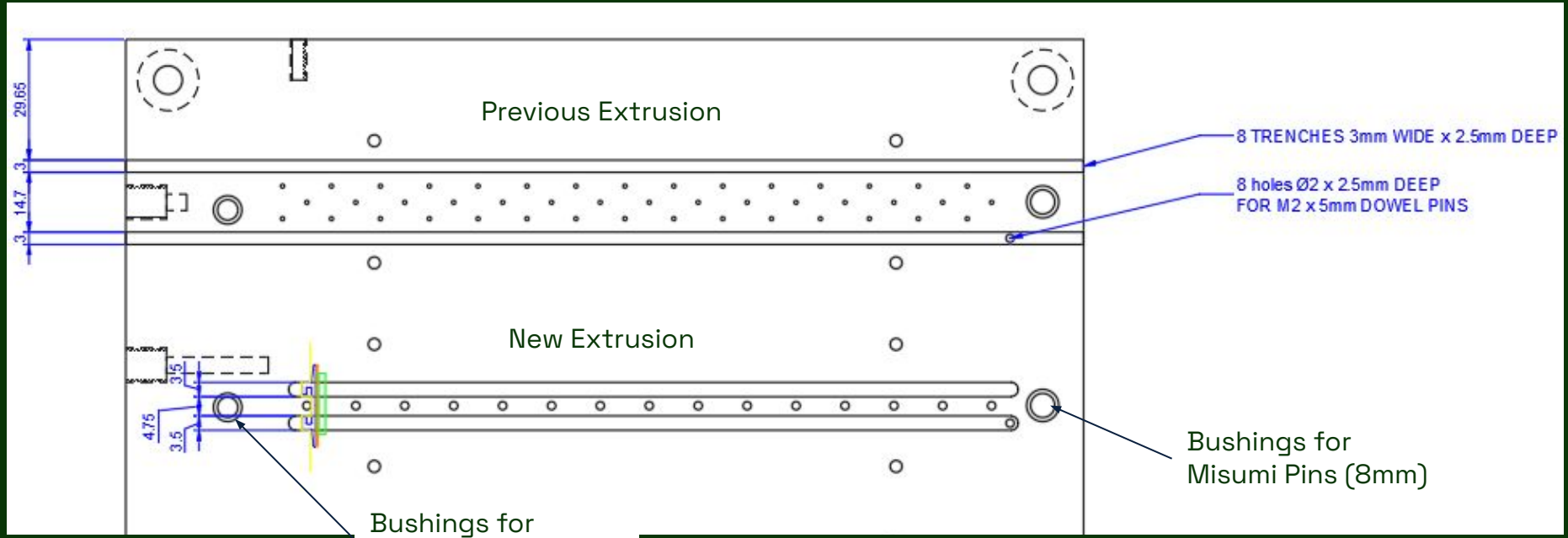
Extrusion profile has been significantly changed.
Need to adjust the tooling drawings for the gluing plate and the bonding plate, and check to make sure that the approach used is still viable.



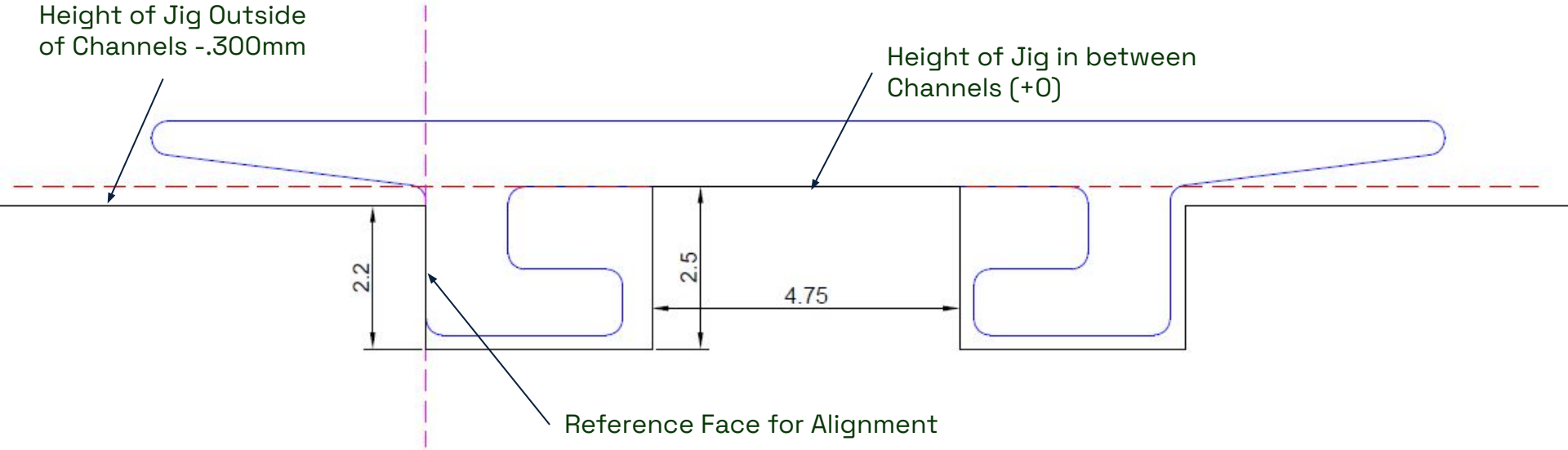


Chip/Hybrid Gluing Plate

Now only 1 row of vacuum holes fits in the center of the channels, but is that enough to hold the extrusion during curing?



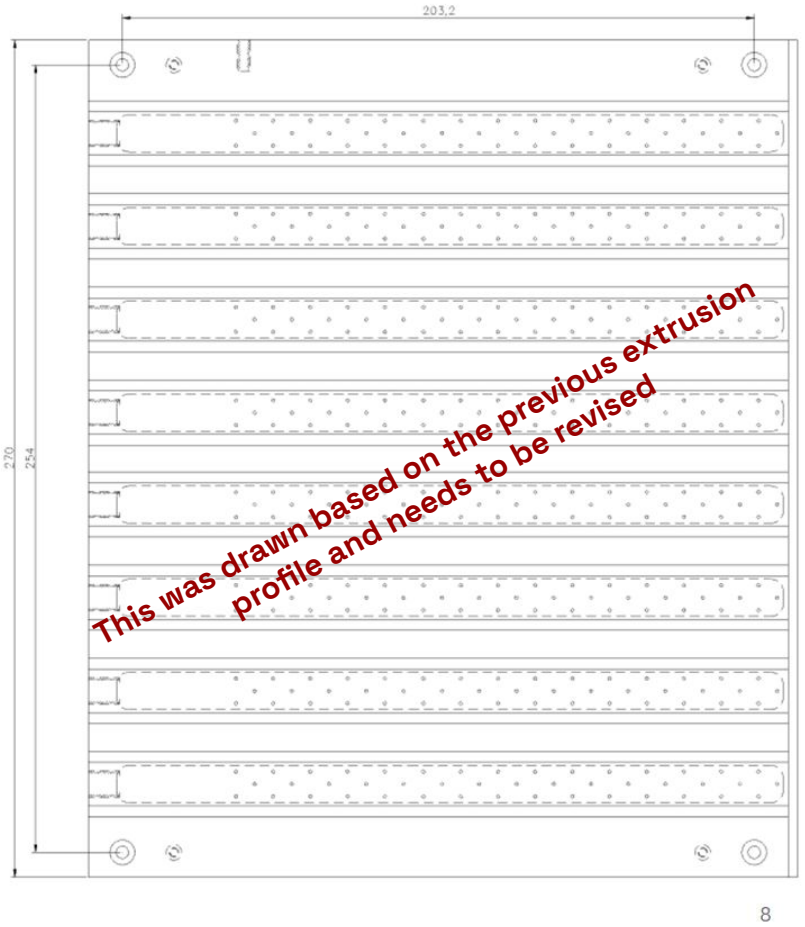
Extrusion Profile



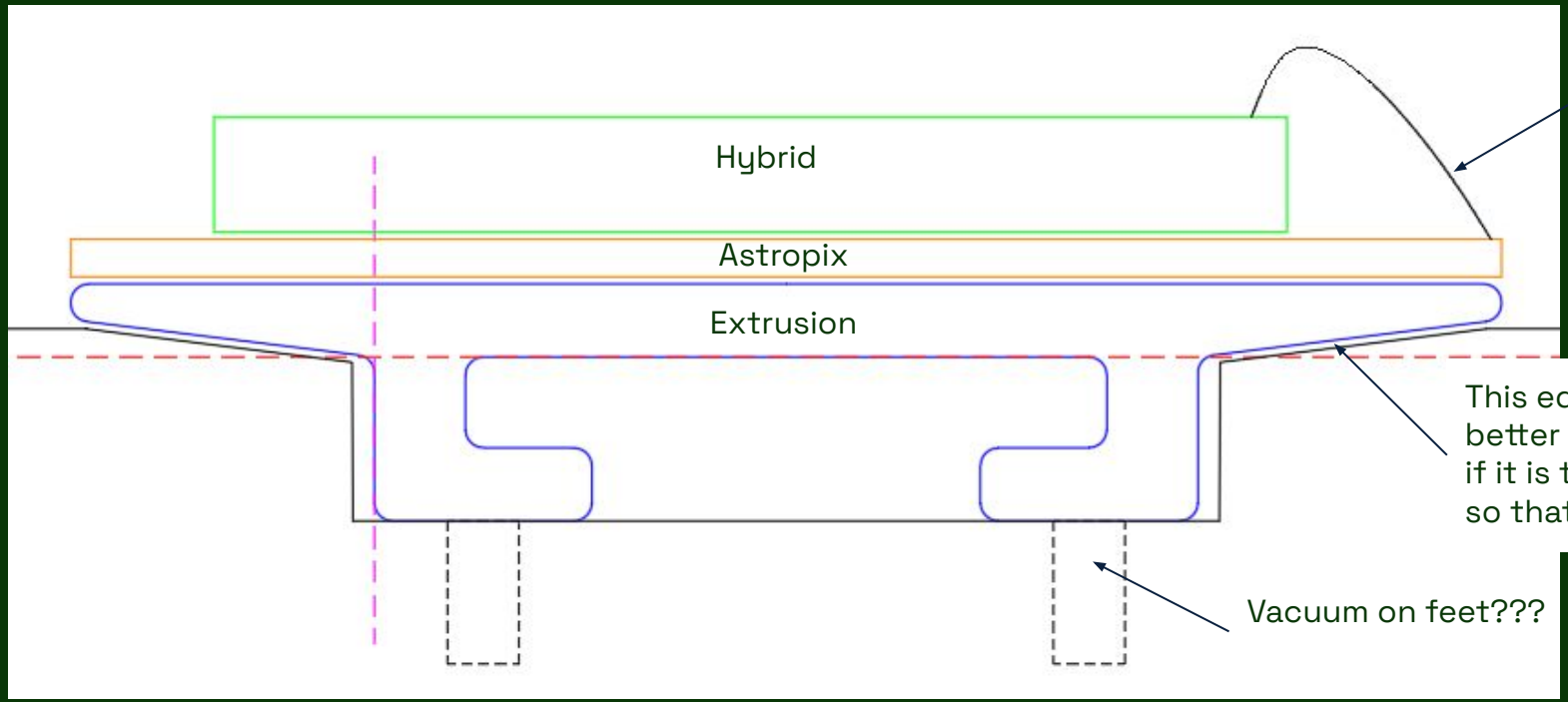
Width in between the channels for vacuum is now less than 5mm. Extrusion may tip.
Radiused corner on extrusion means that the reference face is no longer plumb, so central section of jig needs to be 300um higher than the rest (i.e. most of the jig gets planed by 300um).

Bonding Jig

- 8 modules can be bonded at once
- Independent vacuum control for each location
- Wider slots for extrusions allow modules to be placed from top or side (end stop on right side)
  - Less accuracy for positioning is needed for bonder fiducial-finding
- Holes in corners at 1” spacing for compatibility with ThorLabs bonding stage



Bonding Plate - Detail



The angled edges on the extrusion are highly likely to cause wirebonding problems due to lack of support.
A narrow (<5mm) vacuum pedestal in the center will not hold them well enough to prevent tipping.

Summary of Tool Designs

Tool	Status
Chip Alignment Tool	Difficulty with 100um spacing still to be resolved
Chip Pickup Tool	Needs updated Misumi pin location
Hybrid Alignment Tool	Needs updated Misumi pin location
Hybrid Pickup Tool	Need to check height of connectors; Needs updated Misumi pin location
Gluing Plate	Increased size to hold 6 modules at once; Needs updated extrusion routing, Misumi pin location, and vacuum routing
Bonding Plate	Needs updated extrusion routing and angled cuts???

Thank You