

Alternative Pitch-Adapter Bonding Fixture Design

Robert Johnson
Charlie Young
Richard Fernholz

G&A Fixture

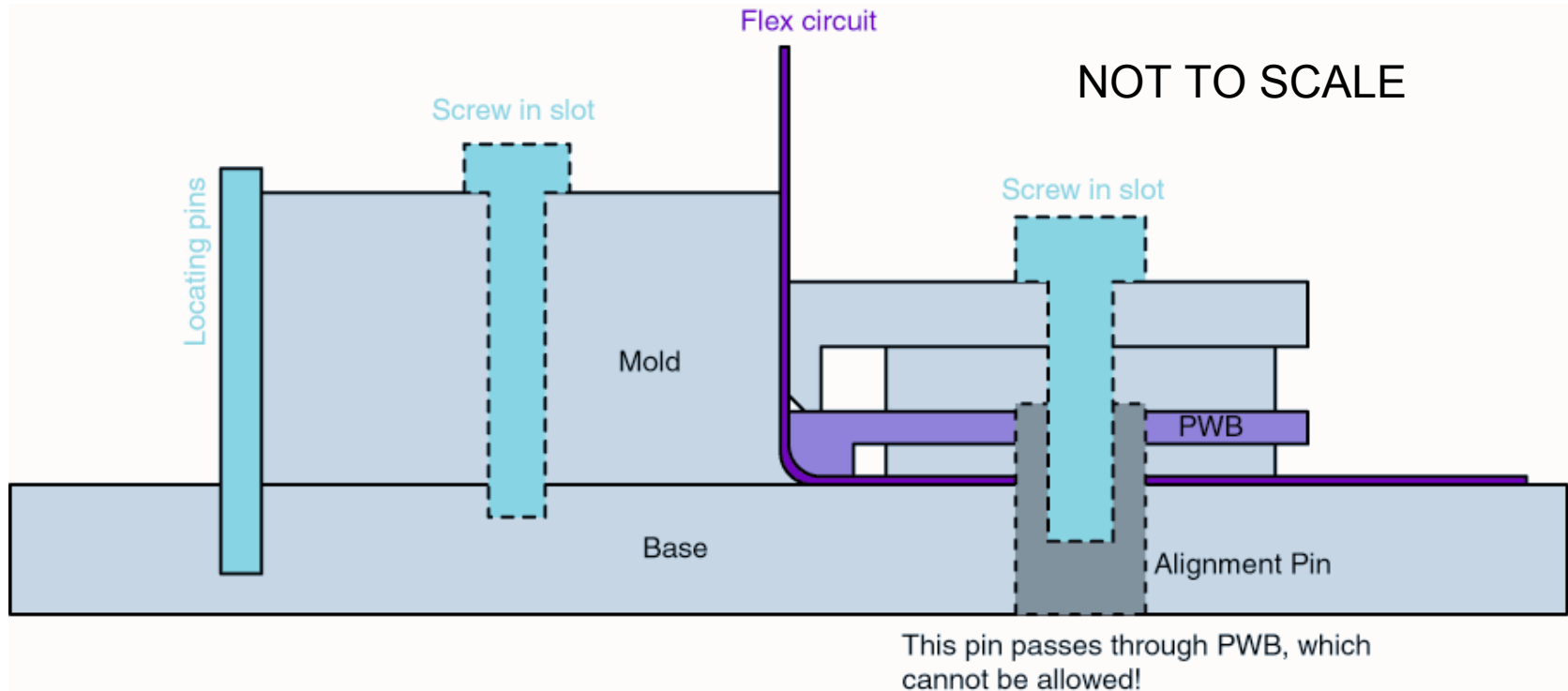
- The poor edge flatness and perpendicularity achieved with the Teledyne fixture causes a lot of extra time and expense at G&A during the wire bonding operation to connect MCMs to SSDs.
- Therefore, they proposed a different assembly method, in which the final pitch adapter profile is set by the shape of an external mold, instead of relying on the underlying PWB shape and a uniform bond thickness.
- The fixture also applies a lot of pressure to the glue joint without putting the pitch-adapter under tension.



Above is the prototype fixture made by G&A and tested successfully on several PWBs using Parlex pitch adapters:

- Excellent surface precision
- No cracking of traces
- Excellent bondline w/o voids

G&A Fixture Concept



- The fixture worked well as a demonstration but cannot be used for production:
 - The alignment holes cut through the PWB.
 - Too many little screws and pins to deal with.
 - Difficult to push it together by hand after applying glue.

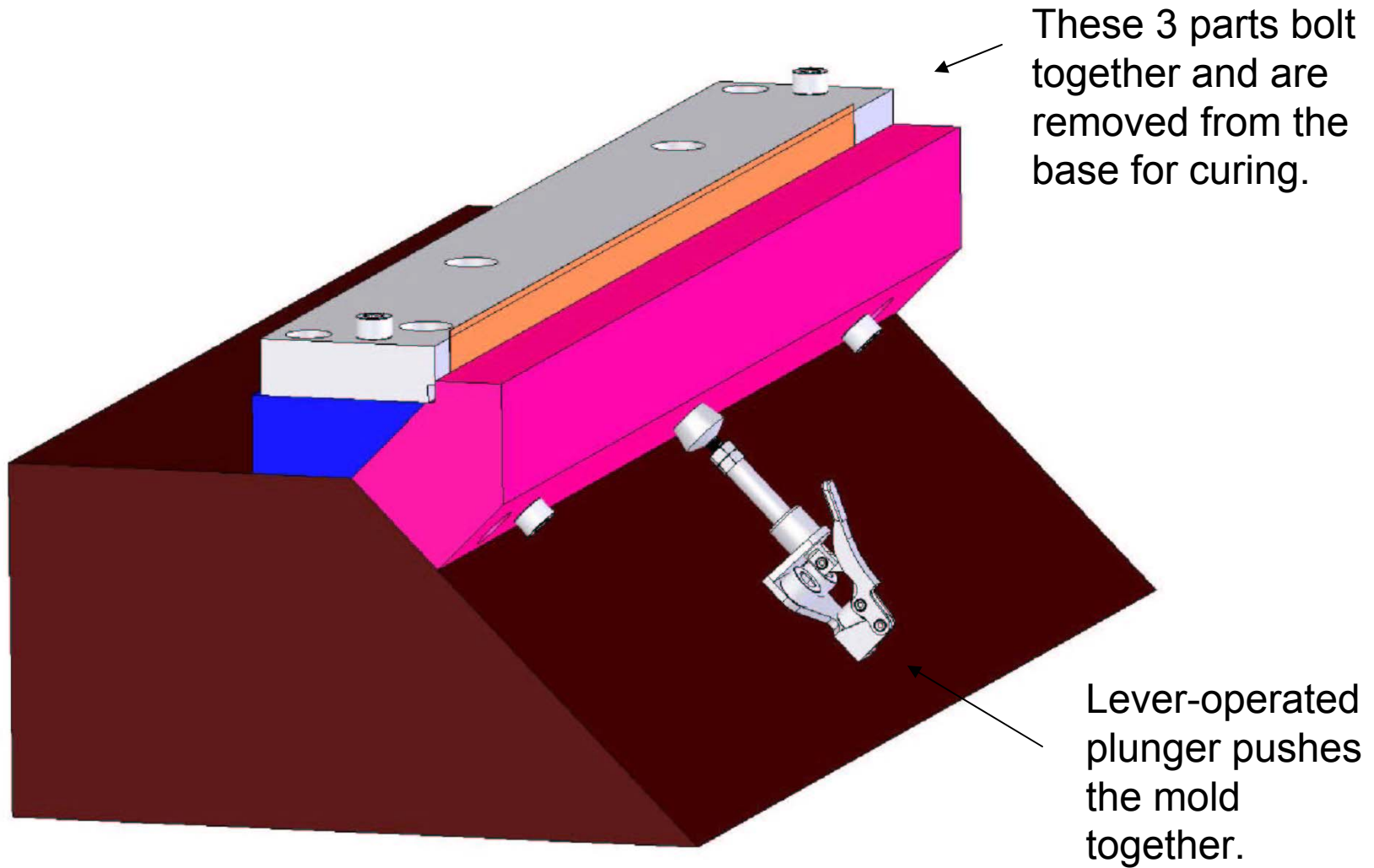
Can this Fixture Solve All Our Problems?

- No, the new Parlex pitch adapters probably crack badly even when used in the G&A fixture.
 - A test was done Tuesday with a very poorly machined PWB that had more of a slight chamfer than a 1mm radius. Almost all traces cracked.
 - We want to repeat the test asap with a properly machined PWB, maybe today.
 - But we do not expect to eliminate cracking when using the new Parlex pitch adapters.

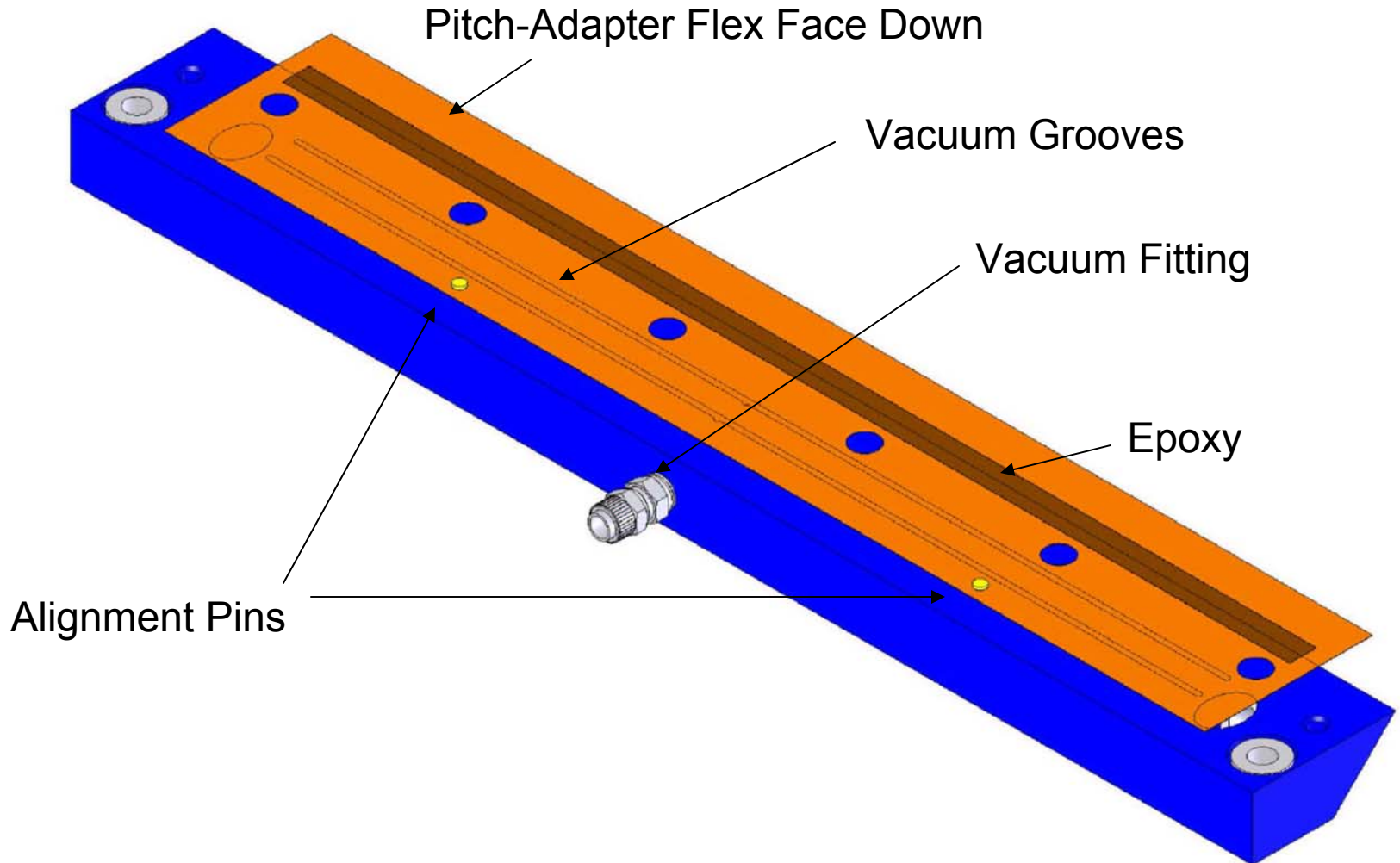
Production Fixture Design

- Being done by a contract engineer with a lot of experience making assembly fixtures for HEP experiments (Northstar Sci-Tek).
- Supervised by Johnson and Young.
- Goals:
 - Back-up solution in case we cannot get the Teledyne fixture working again.
 - Reduction in the incidence of trace cracking by eliminating tension.
 - Improvement in the flex-to-PWB bond by putting the joint under compression during curing.
 - Improved alignment of the flex-circuit to the PWB.
 - Greatly improved surface for wire bonding on the Italian edge.
 - Ease of use.
 - Save time and money by reducing MIP-1 and MIP-3 MCM rejections.

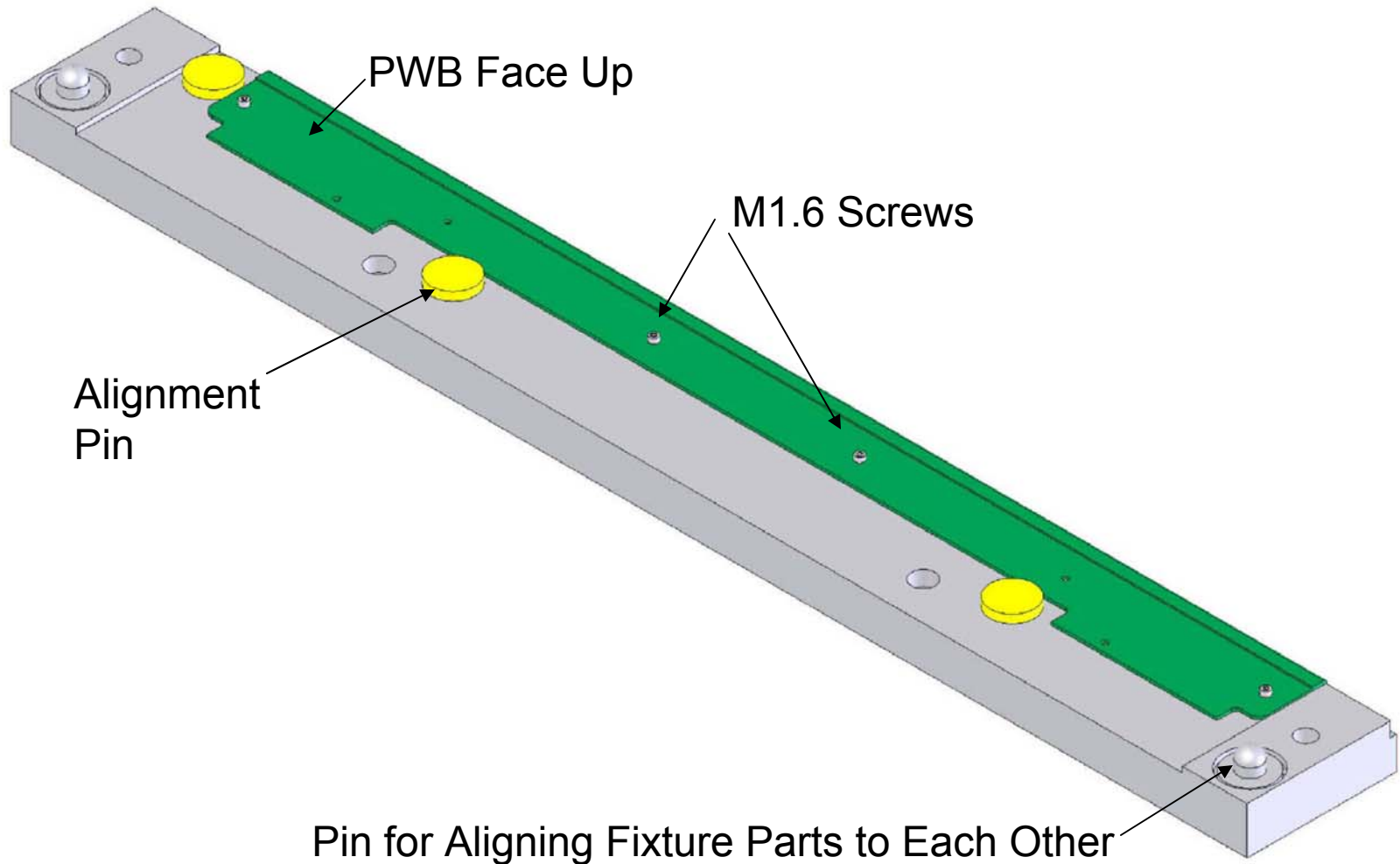
New Fixture Design: Assembly



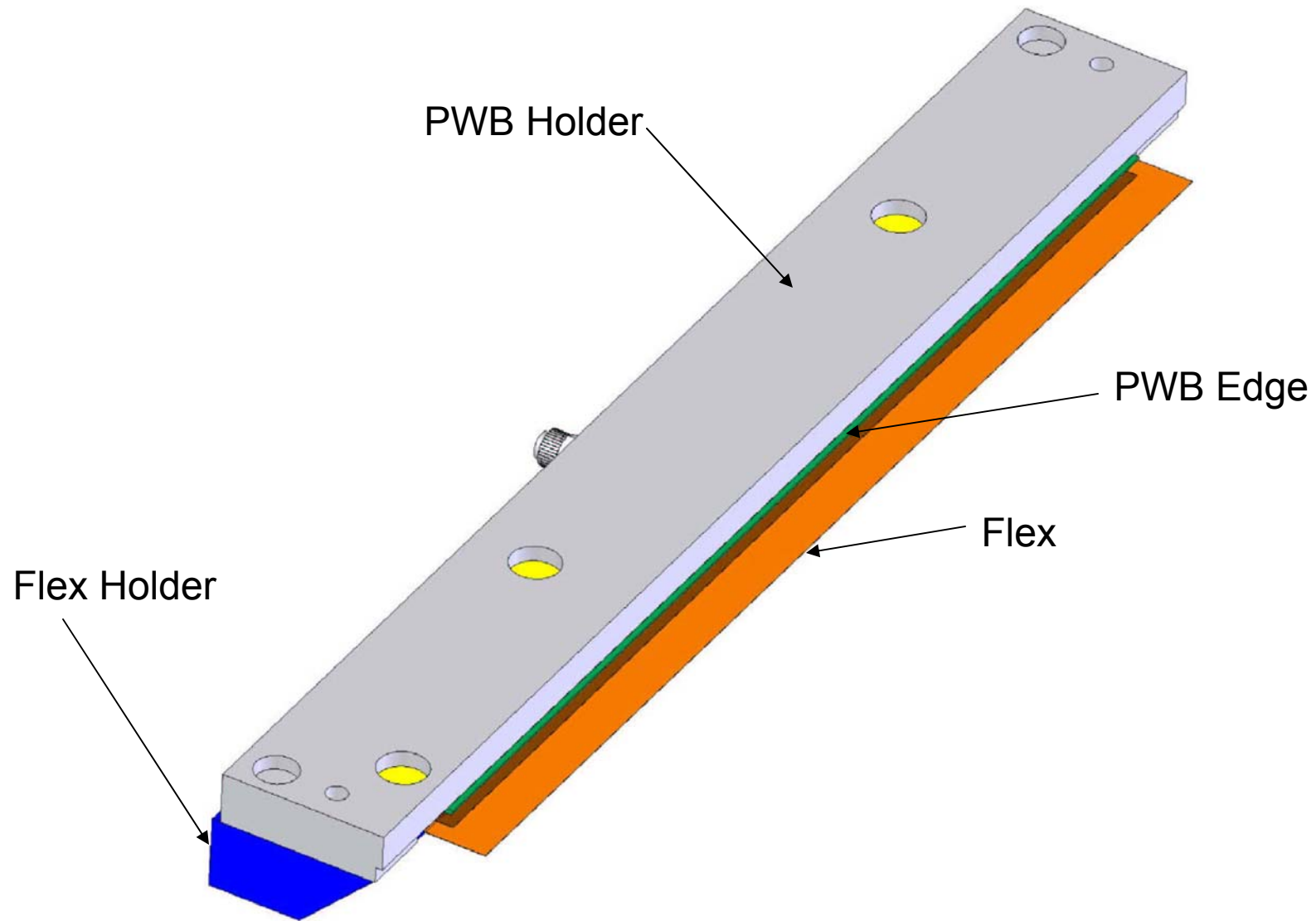
Mounting Flex on Holder



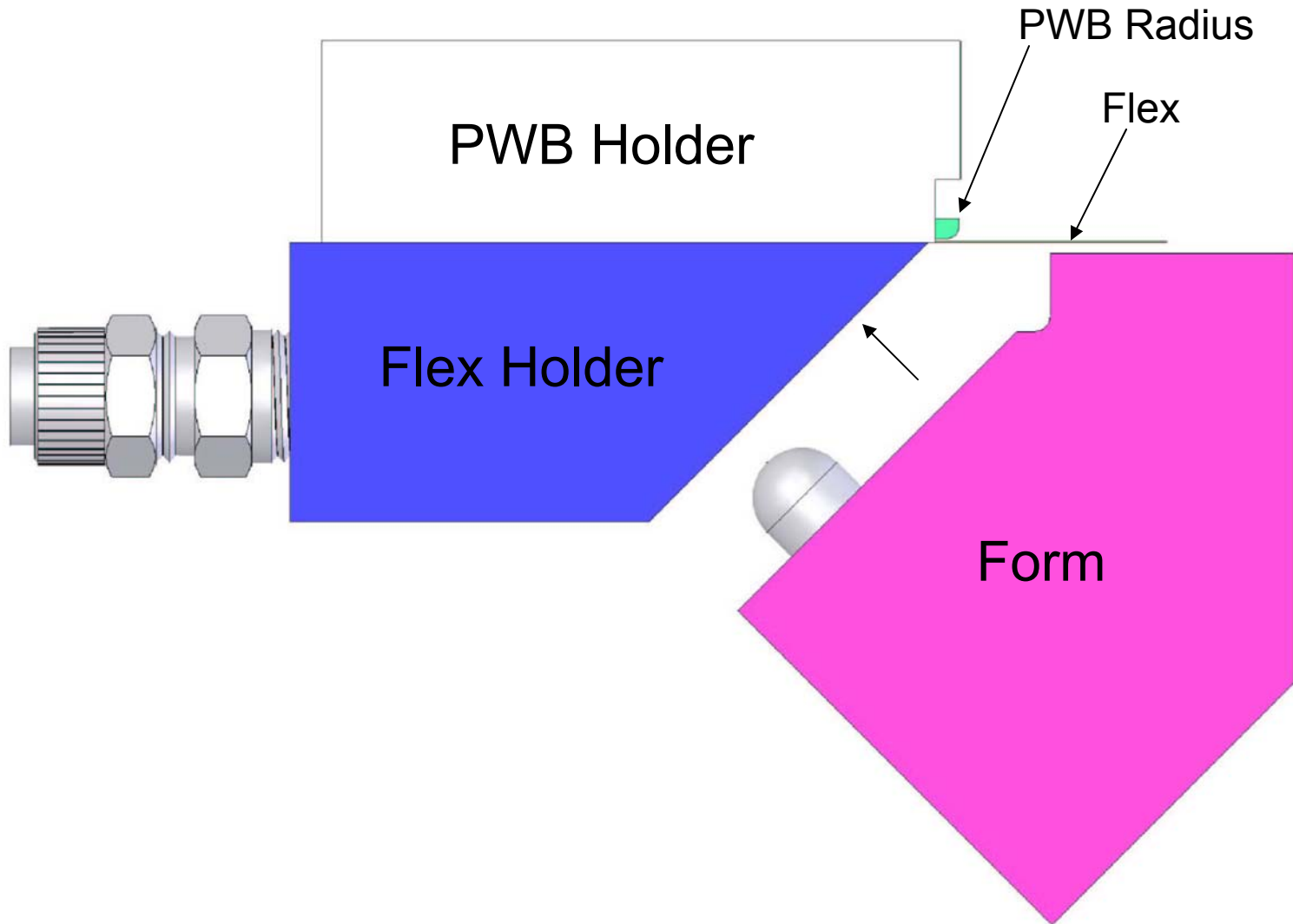
Mounting MCM to Holder



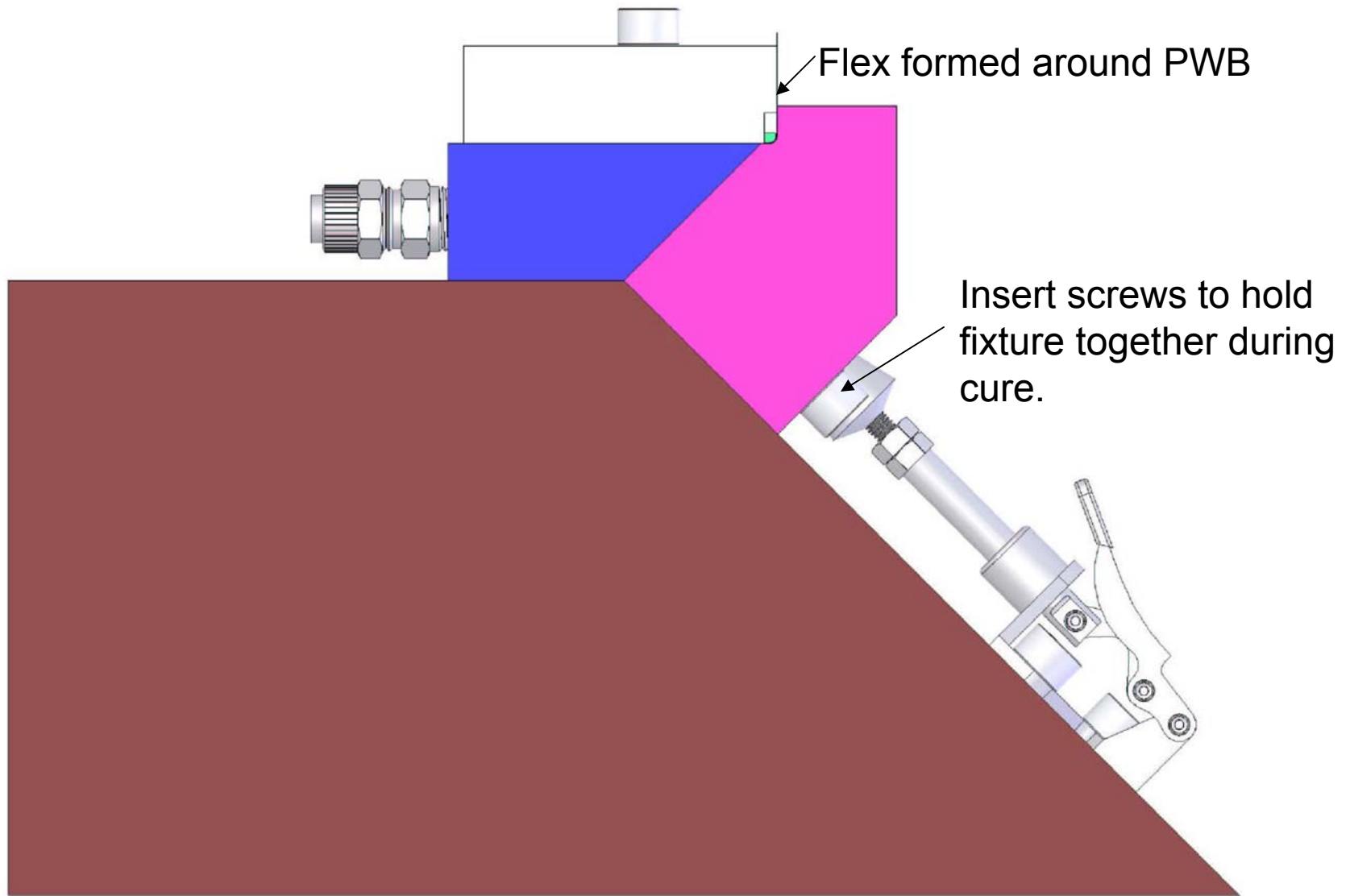
Stack the PWB onto the Flex



Push the Form into Place



Fixture with Mold in Place



Schedule

- Engineering drawings for manufacturing the fixture: next Wednesday.
- Machine and test 1 fixture as quickly as possible.
- Produce at least 4 fixtures, including a special MCM holder for tall MCMs.

- This will not solve the immediate schedule problem.
- But by reducing MIP-1 losses, this fixture could help speed up MCM production.
- And by providing a much better quality edge for Italian wire bonding, this fixture could significantly speed up the tray assembly rate at G&A.