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
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

These 3 parts bolt together and are removed from the base for curing.

Lever-operated plunger pushes the mold together.
Mounting Flex on Holder

Pitch-Adapter Flex Face Down

Vacuum Grooves

Vacuum Fitting

Epoxy

Alignment Pins
Mounting MCM to Holder

- PWB Face Up
- M1.6 Screws
- Alignment Pin
- Pin for Aligning Fixture Parts to Each Other
Stack the PWB onto the Flex
Push the Form into Place

PWB Holder

Flex Holder

Form

PWB Radius

Flex
Fixture with Mold in Place

- Flex formed around PWB
- Insert screws to hold fixture together during cure.
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.