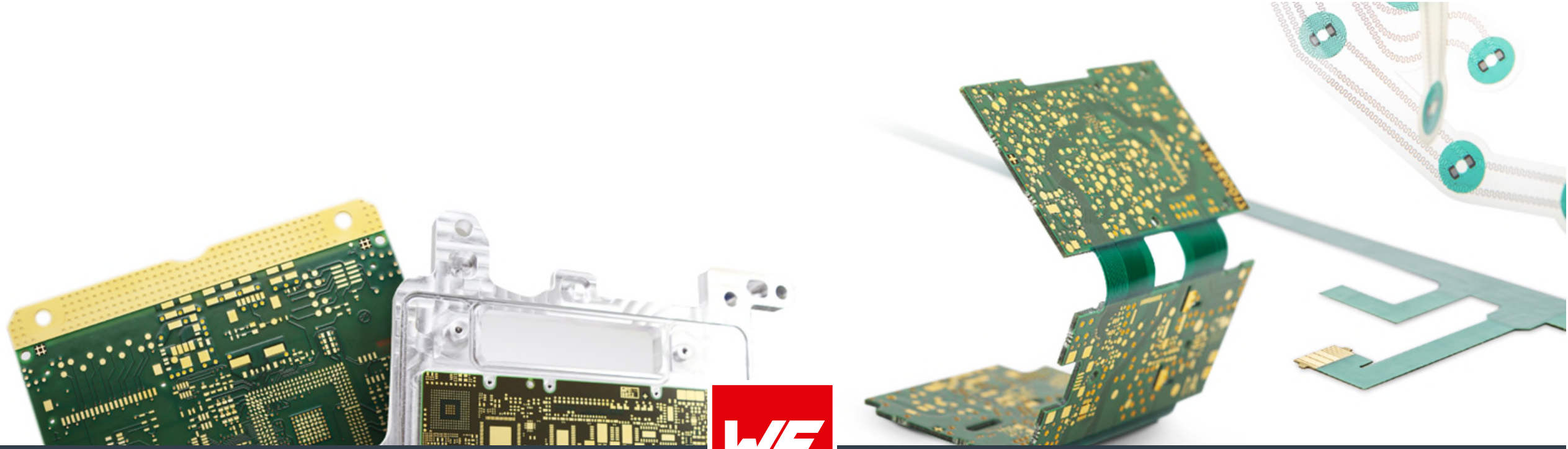


ZIF CONTACTS
SELECTION AND DESIGN OF THE INTERFACE AT RIGID.FLEX

Werner Öchslen

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

AGENDA

ZIF contacts - selection and design of the interface at RIGID.flex

1. ZIF-interface
   - Applications and advantages
2. ZIF-connector types
   - Types
3. ZIF-contacts
   - Similarities
   - Laser cutting
   - Differences
   - stackups
   - surfaces
4. ZIF-interface
   - Application conditions
   - Tips und tricks
   - summary

Werner Öchslen
Technisches Projektmanagement

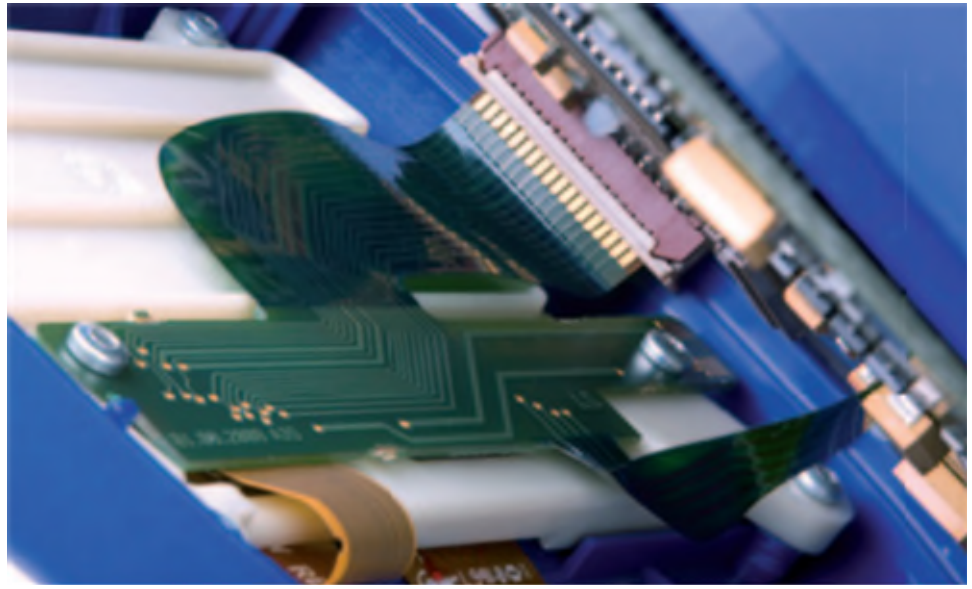
ZIF-INTERFACE

Applications and advantages

ZIF = Zero Insertion Force

- Detachable and cost-effective connection solution
- Modular system structure
- Low construction heights

- Connection via ribbon cable (FFC)
- Customized Flex / Rigid-Flex Printed Circuit Board (FPC)



ZIF-INTERFACE =

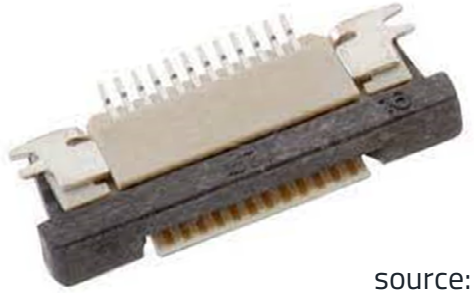
ZIF-connector **+** **FPC ZIF-contact**

ZIF-CONNECTOR TYPES

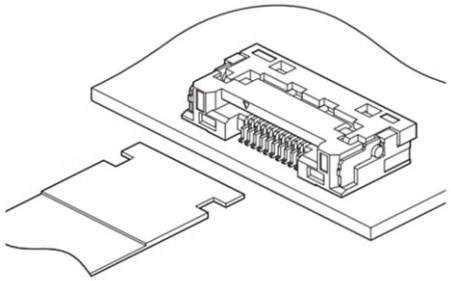
Examples

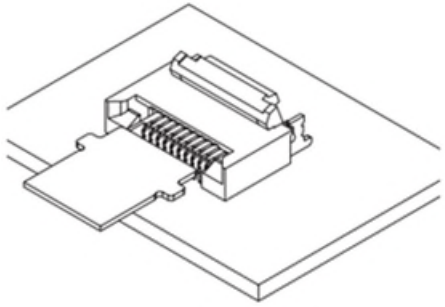
ZIF-types
- BACKLOCK
- FRONTLOCK
- FLIPLOCK
- NON-ZIF (LIF)
- …

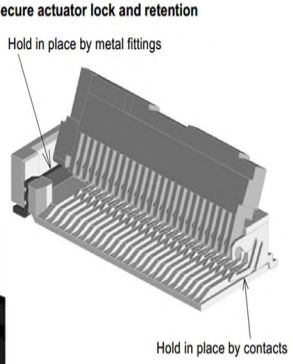
Options
- number of contacts
- pitch of the contacts
- Surface
- Case height
- "HIGH SPEED"
- Locking
- Contacting above and/or below
- Area of application
- 1/2 – row contacts
- Standing / Lying
- …

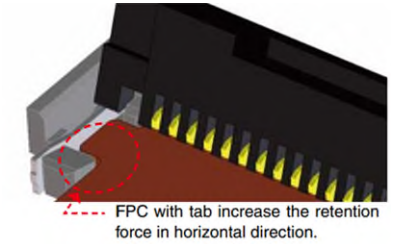


source: WE

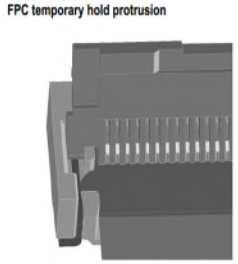


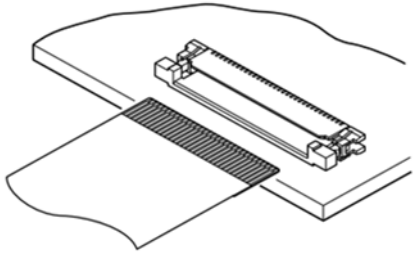






source: Hirose

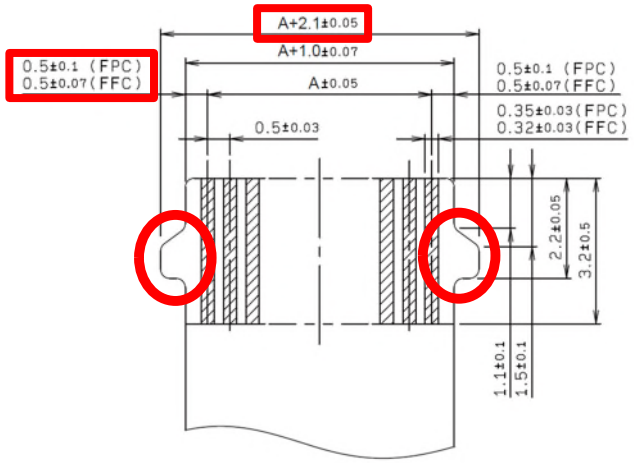


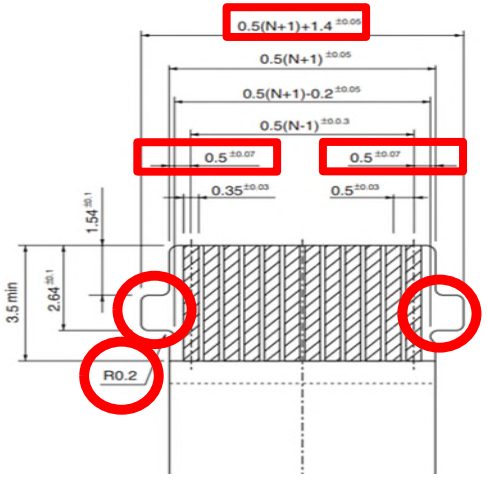


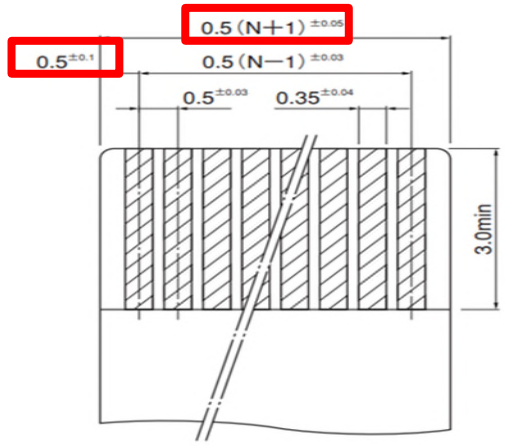
source: JST

ZIF-CONTACTS

Similarities







Similarities

- Small contour tolerances
- Small tolerances contacts to the contour
- Small radii at the interlocks

Consequences for production

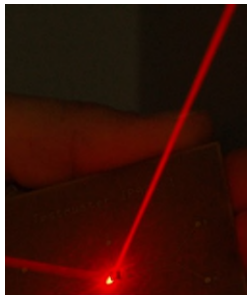
- Tolerances and radii not possible via milling process
- Contour processing generally by laser cutting

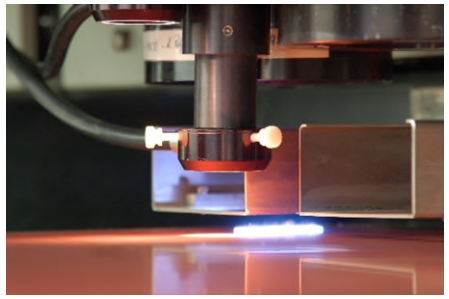
ZIF-CONTACTS

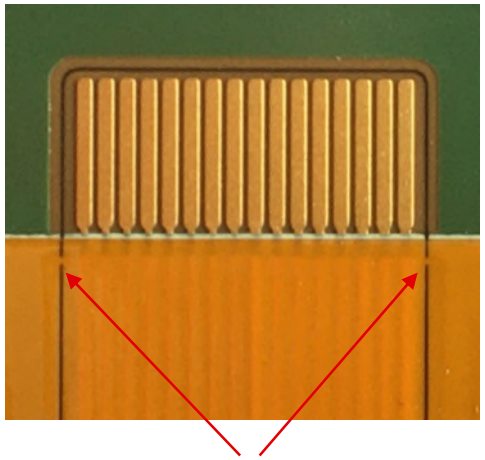
Laser cutting

Lasercutting of the ZIF-contact and flex area

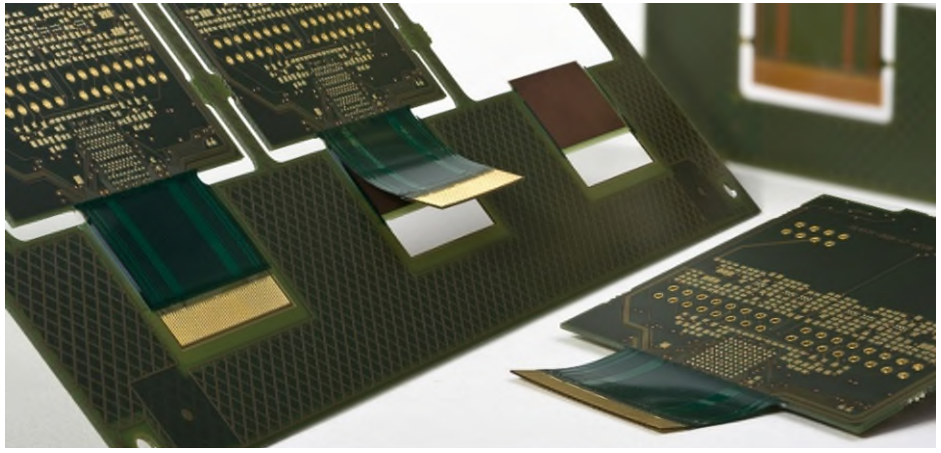
- Registration of the laser via the conductive pattern
- Connection via laser micro bridges in the delivery panels
- "simpler" depaneling
- Delivery panel more stable (FR4 remains unglued under the flexarea)
- Optimized delivery panel design with smaller distances

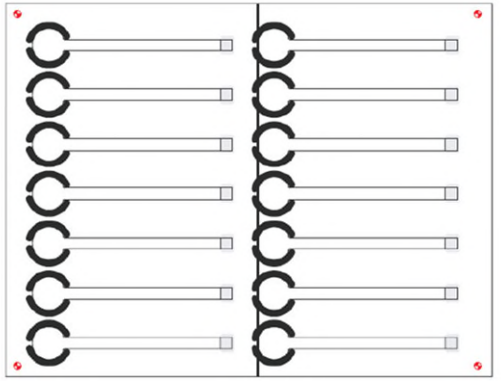


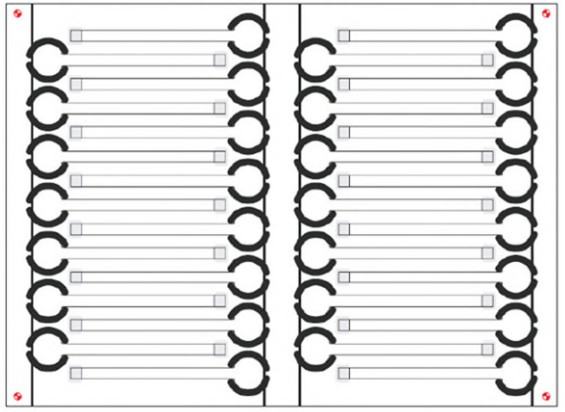




Laser micro bridges





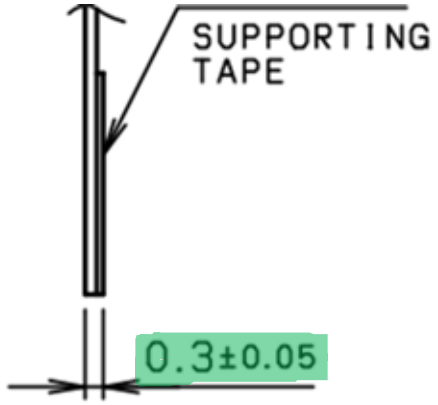


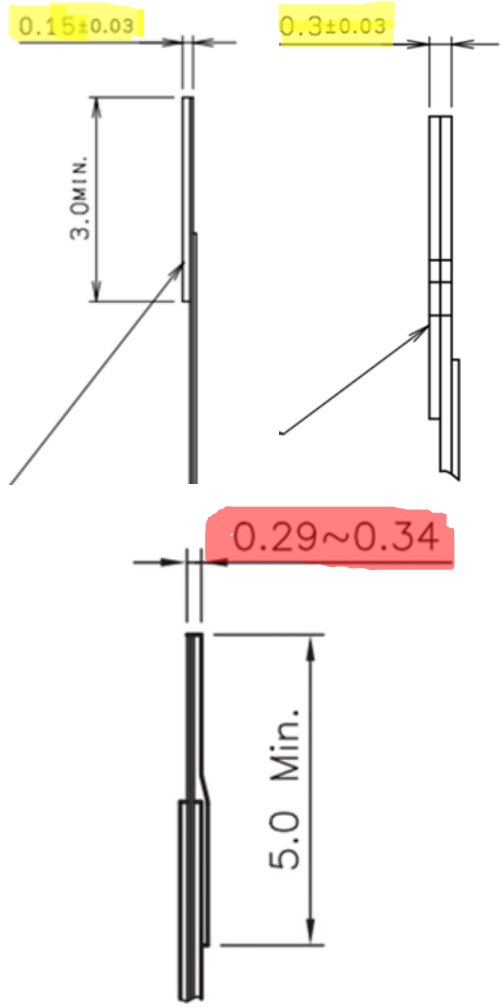
ZIF-CONTACTS

Differences

Thickness tolerance

- Standard tolerance +/- 0,05mm
- Advanced requirements +/- 0,03mm
- Smaller tolerances for PCB production not possible
  - FFC tolerance 0,29-0,34mm not produceable



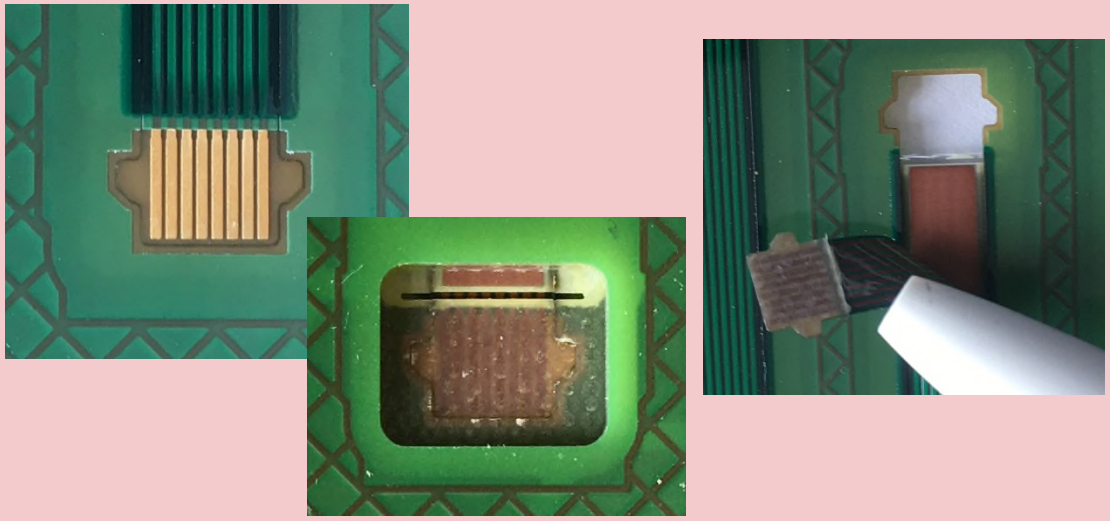
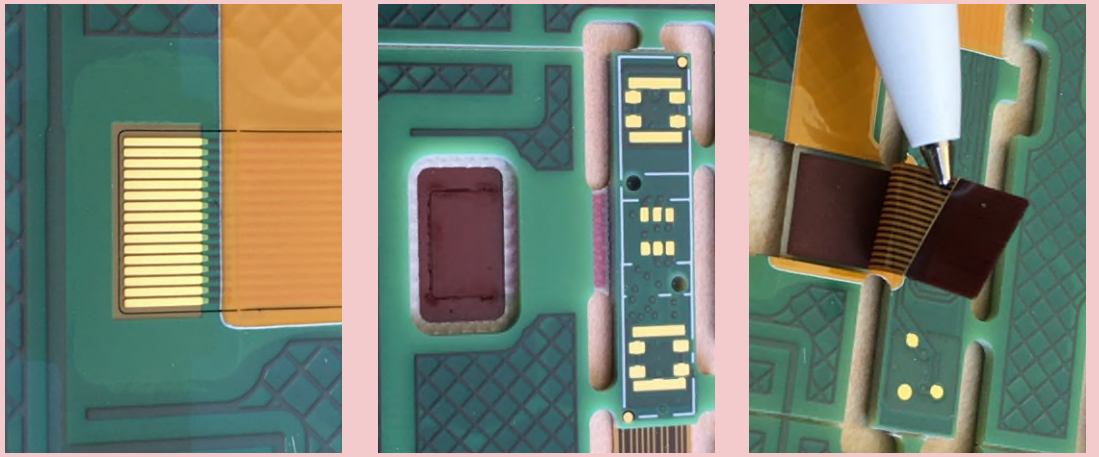


Consequences for production

- Standard: FR4 stiffener via depthmilling (+/- 0,05mm tolerance)
- Advanced: Polyimid stiffener (+/- 0,03mm tolerance)

ZIF-CONTACTS

Stackups

Standard: FR4 - Stiffener	Advanced: Polyimid- Stiffener
	
▪ Recommended standard ▪ Via automated depth milling process ▪ Thickness tolerance +/- 0.05mm	▪ More effort + higher costs ▪ Polyimide stiffeners must be inserted manually ▪ Thickness tolerance +/- 0.03mm

ZIF-CONTACTS

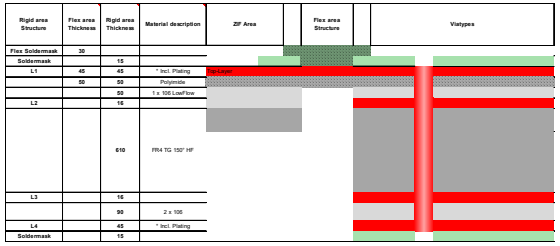
Stackups

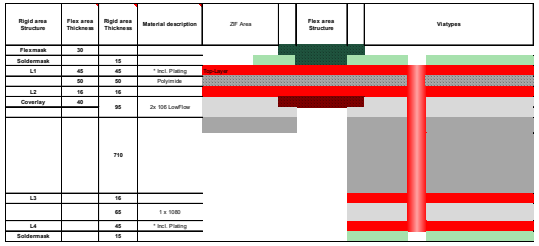
1F-xRi stack

2F-xRi stack

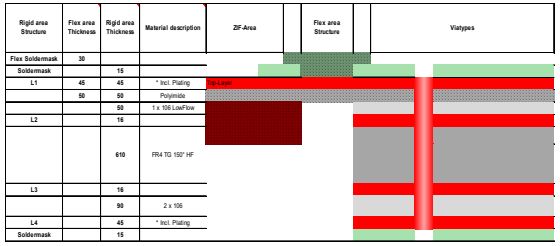
xRi-2F-xRi stack

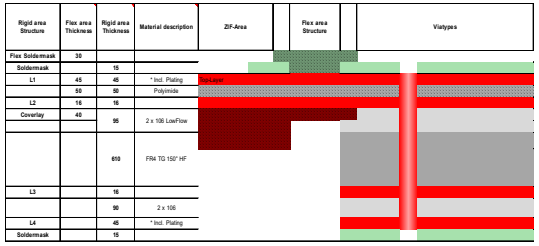
FR4 Stiffener

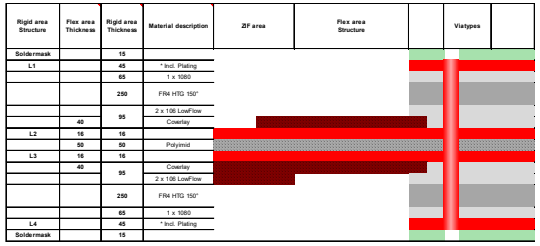




Polyimid Stiffener



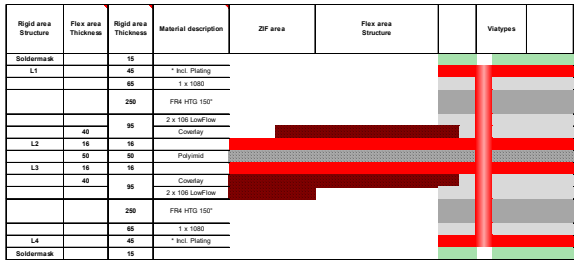




ZIF-CONTACTS

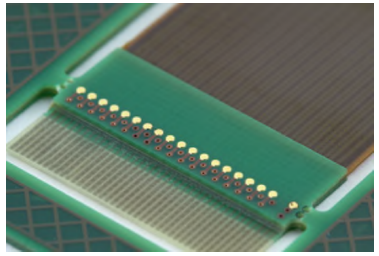
Cheaper alternative stackup

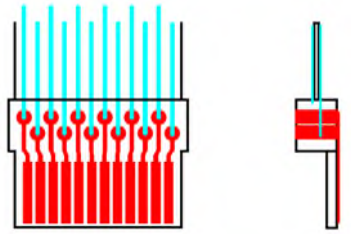
xRi-2F-xRi stack

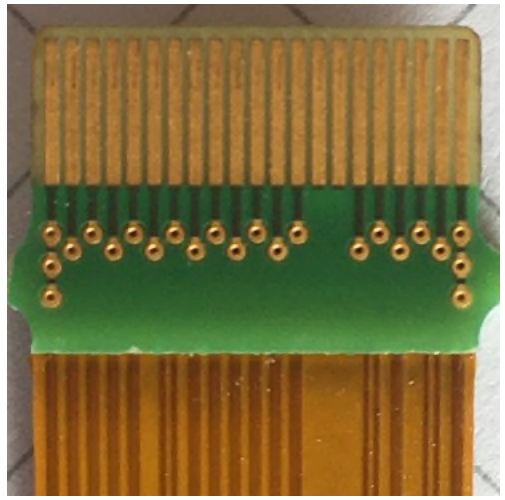


xRi-2F-xRi stack

- Switch via vias to the outer layer
- Rigid part infront of the ZIF-contact

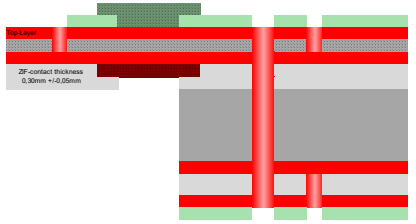


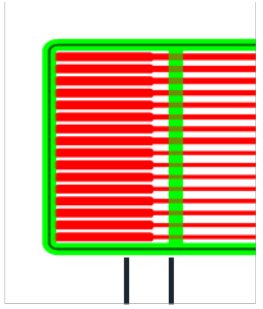




2F-xRi stack

- Production „simpler“ compared to an xRi-2F-xRi stack
- Layerchange in the flexarea possible
- Contacting to the reference layer is possible via microvias

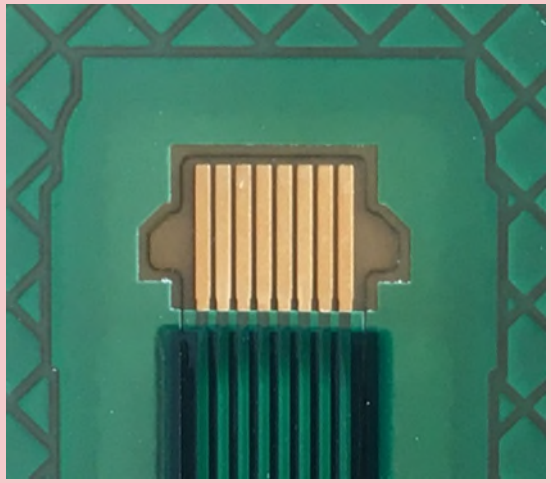
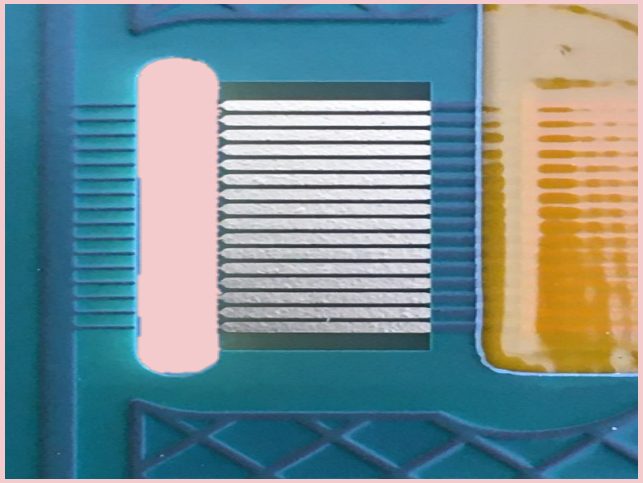




Bereich für Microvias
(nicht im Kontaktierbereich)

ZIF-CONTACTS

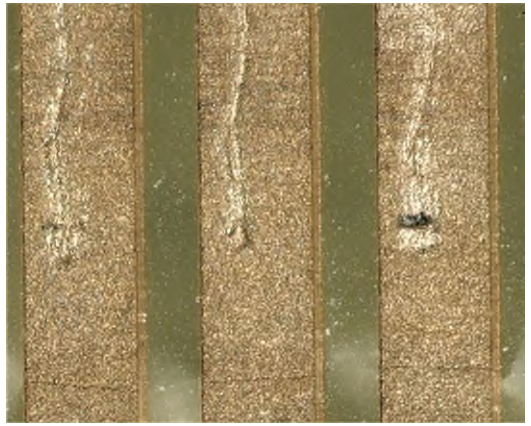
Surfaces

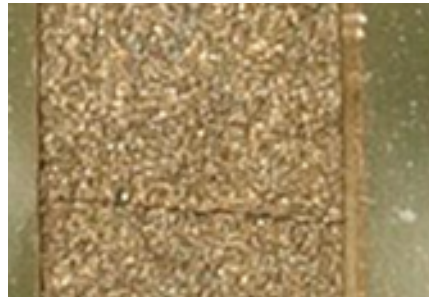
Immersion Ni/Au	Galv. Gold / Hardgold
	
▪ Au thickness 0,05µm – 0,10µm ▪ Recommended standard surface	▪ Au thickness 1µm – 3µm ▪ Gold connections necessary to panel border ▪ The front side must be milled because lasercutting is not possible (danger of copper burrs) ▪ More effort + higher costs

ZIF-INTERFACE

Application conditions

- Cheap, but not reliable connection
- No dynamic forces may act on the interface
  - No dynamic bending stress
  - No high vibration load
  - The gold layer can be rubbed off through the spring contacts (mostly with NON-ZIF; LIF)
  - contacts at the transition from the ZIF housing can break
- Other plug connections are recommended for a reliable connection under vibration, dynamic bending, …





ZIF-INTERFACE

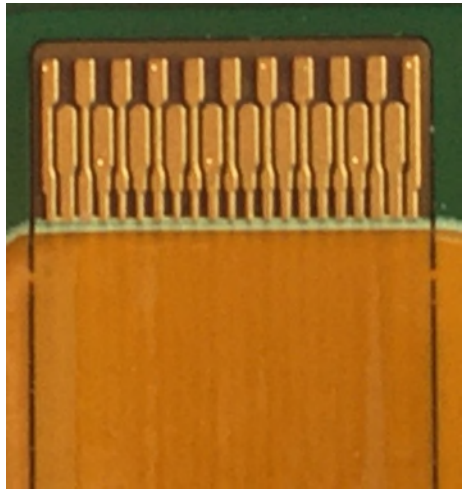
Tips und Tricks

Better Handling

- „Ears“ at the stiffener area

2-row Version

- Pitch 0,30mm
- Min. isolation diastances >100µm (possibly the layout can be modified)

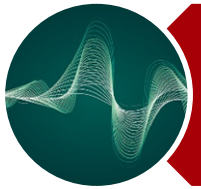


Polyimid-Stiffener

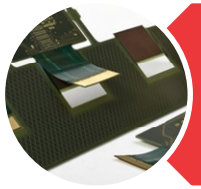
- ZIF contacts in a row for easier handling
- Stiffener is inserted by a stripe (no single part)

ZIF-INTERFACE

Summary



ZIF interfaces are not suitable for all application conditions



Laser cutting enables small contour tolerances and an optimized delivery panel design.

The selection of a suitable ZIF connector and the PCB stackup saves effort and costs.

We can support you with the correct selection of connectors, the circuit board structure and the design of the delivery panel

THANK YOU FOR YOUR ATTENTION

ZIF contacts
selection and design of the interface at RIGID.flex