FLEX INTERCONNECT
TECHNOLOGIES

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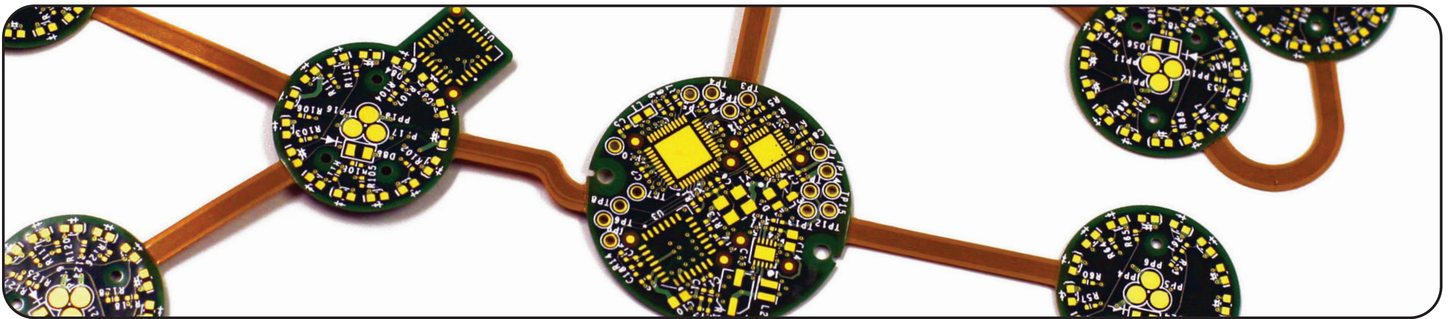
SOLUTIONS PROVIDER



DESIGNING RELIABLE FLEX CIRCUITS

Bend Area Consideration:

- Route traces perpendicular to bend line
- Traces must be evenly spaced across the bend area, wide & uniform, and staggered on adjacent layers
- Sharp angles should be avoided
- Traces should always come out perpendicular to the rigid edge, when transitioning to the flexible region
- Cross-hatch ground and plane layers, especially in the bend area
- Number of layers at the bend area should be kept at a minimum
- Flex layers can be separated (loose-leaf) for multilayer construction to increase flexibility
- Mechanical slots, slits or ICT custom hinge design can be used to increase flexibility
- No vias or PTH should be placed in the flex region, unless used for shielding or away from bend region
- Use RA copper grain direction for dynamic flexing or tight bend radius
- Conductors should be close to neutral axis, especially for dynamic application
- Minimize the dielectric thickness to reduce stress on the conductors
- Follow minimum bend radius rules

Pads, Holes & Mask Consideration:

- Tear-drop all pads and tie-down all unsupported pads
- Pad size should be large enough for selective plating the holes
- All vias should be in the stiffened/rigid area
- Stiffener holes should be at least 20 mils larger than finished hole size
- Gang open the coverlay wherever possible
- Use LPI/Coverlay combo for fine pitch components such as BGA, CSP, etc.
- Allow for possible squeeze out of the adhesive onto the pads

Strain Relief Consideration:

- Radius all inside corners. Additionally copper trace can be used as tear stop
- Use holes at the end of slits or slots as tear stop
- Use epoxy bead in the rigid to flex transition area
- Use appropriate stiffener thickness and material to support solder joints
- Keep vias, holes and SMT features at least 25 mils away from the board edge
- Vias on rigid-flex should be minimum 50 mils away from the rigid-to-flex transition edge
- Never have edge of coverlay opening and edge of stiffener right on top of each other

Material Selection Consideration:

- Take into account stress due to environment such as Temperature, Vacuum, Vibration, Bends, etc.

Flex Application Questions? Contact us at **(408) 635-3544** or **engineer@FIT4FLEX.com**

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MFG. CAPABILITIES	STANDARD	ADVANCED
Min Trace/Space	75 microns	50 microns
Smallest Mechanical Drill	0.150 mm	0.100 mm
Smallest Laser Drill	0.075 mm	0.050 mm
Max Aspect Ratio	8:1	10:1
Max Blind Via Aspect Ratio	0.7:1	1:1
Min Internal Pad Size	DHS + 0.350 mm	DHS + 0.200 mm
Min Clearance Pad Size	DHS + 0.600 mm	DHS + 0.400 mm
Min External Pad Size	DHS + 0.250 mm	DHS + 0.200 mm
Min Pad Size for Selective Plating	DHS + 0.450 mm	DHS + 0.400 mm
Min Soldermask Clearance	0.075 mm per side	0.050 per side
Min Soldermask Webbing	0.150 mm	0.100 mm
Min Mask defined Pad Diameter	0.125 mm	0.100 mm
Min Coverlay Clearance	0.200 mm per side	0.125 mm per side
Min Feature-to-Board Edge	0.250 mm	0.075 mm
Number of Layers	1 to 24	up to 30
HDI capabilities	Yes	Ormet Technology
Max Flex Length	57.15 cm	Greater than 58 cm
Via Fill Capability	Yes	Yes
Max Board Thickness	2.40 mm	3.10 mm
Min Copper Weight	9 to 18 micron	0.4 to 5 micron
Max Copper Weight	3 oz	4 oz
Shielding Method	Copper, Tatsuta, Silver Ink	Copper, Tatsuta, Silver Ink
Impedance Tolerance	+/- 10%	+/- 5%
Assembly	BGA, uBGA, Hot Bar, ACF Bonding, Flip Chip, Die Attach, 0201	
Testing	Flying Probe, Functional, JTAG, ICT	
Conformal Coating	Yes	Yes
Surface Finish	ENIG, ENEPIG, Soft Gold, Hard Gold, OSP, HASL, Lead-free HASL	
Panel Size	9x12, 12x12, 12x18, 12x24	

QUICKTURN CAPABILITIES		
Single Sided	5 days	3 days
Double Sided	5 days	4 days
Multilayer upto 6 layers	7 days	5 days
Multilayer over 7 to 10 layers	10 days	8 days
Multilayer over 10 layers	20 days	15 days
Assembly	3 days	24 hours
Design	4 days	24 hours

MATERIALS	Dupont, Taiflex, Thinflex, Panasonic	Dupont TK, Dupont LG, Zeta material, Embedded Passives, Tatsuta, Ormet Technology

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