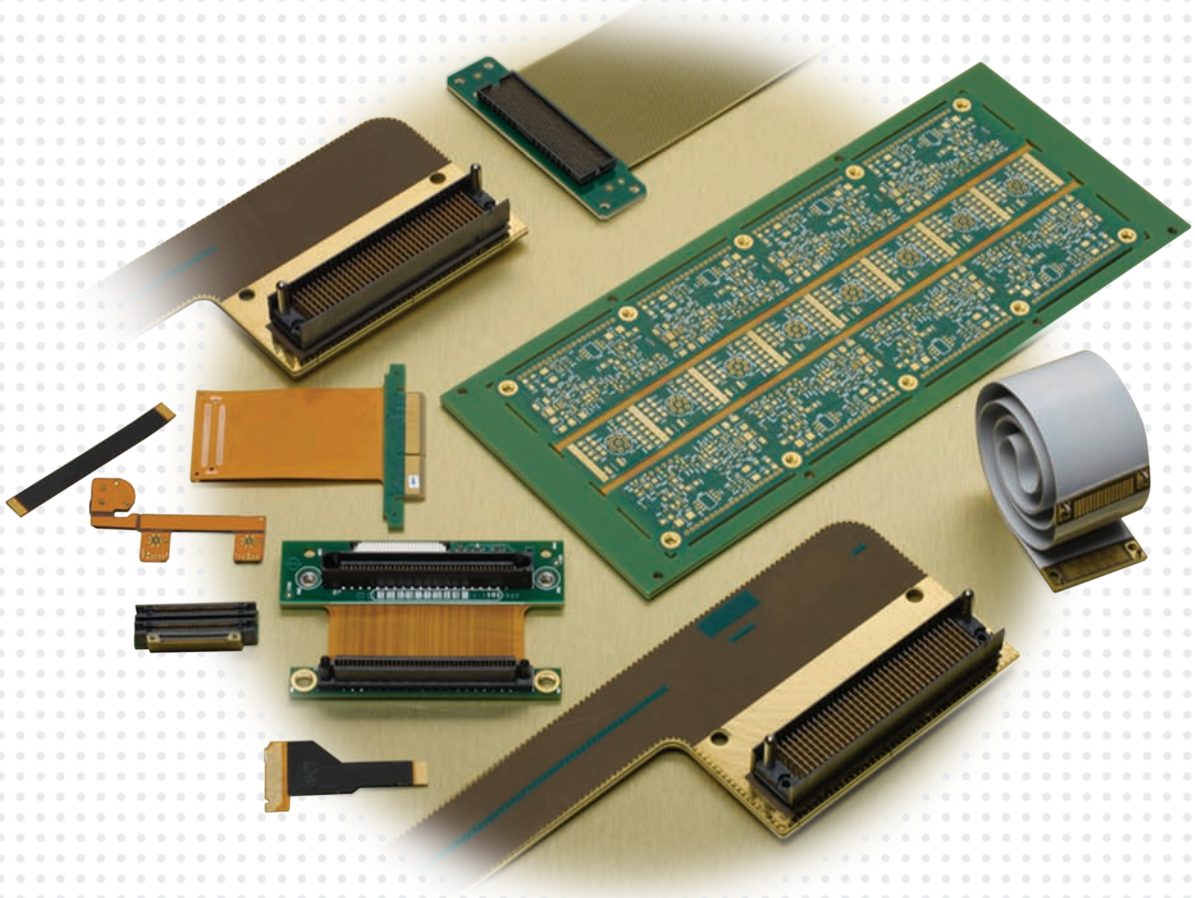
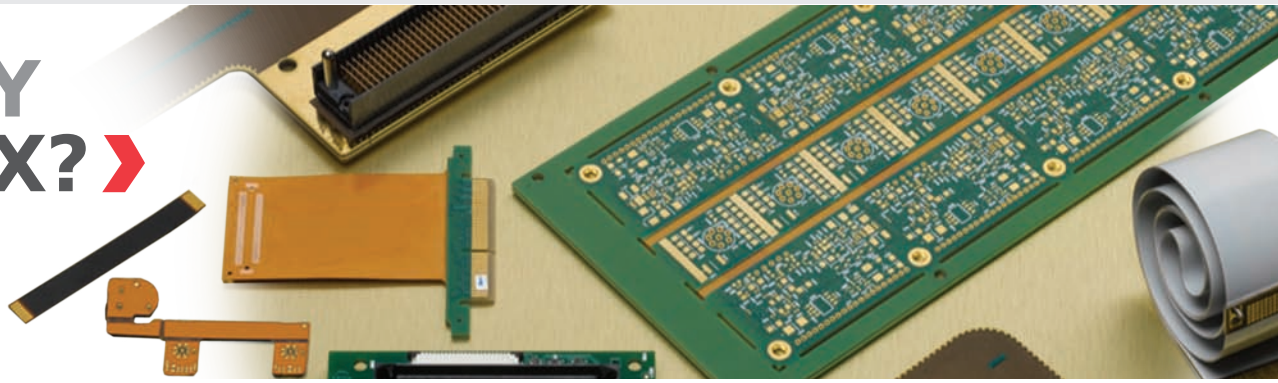
COPPER FLEX PRODUCTS ›



molex®

WHY FLEX?



Molex Flexible Printed Circuit Technology is the answer to your most challenging interconnect applications.

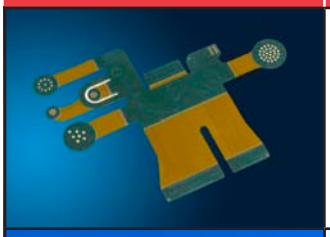
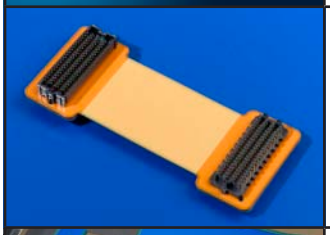
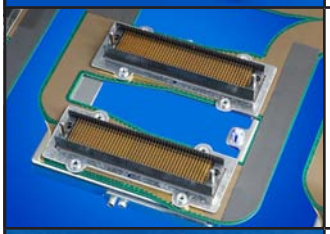
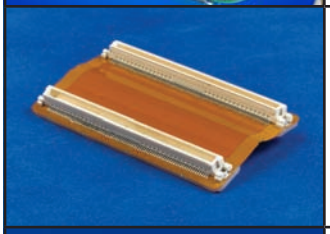
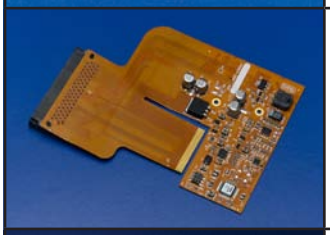
We are your total solution for Flexible Printed Circuitry because we design and manufacture both the flex and the connectors. A Flexible Printed Circuit (FPC or Flex) is an ultra-reliable technology. An FPC can be the best solution for creating products which are complex, small, lightweight or have harsh environmental conditions. Flex can be designed to meet a wide range of temperature and environmental extremes.

This custom solution has a variety of applications. Flex circuits are excellent for designs with high-density circuitry, and for dynamic applications such as hinge and drawer devices.

Flex circuits make electronic interconnection both simpler and more reliable. FPC interconnects are often used in applications where high signal speed, power distribution, heat, flexibility, or space savings are issues. Molex can provide your total interconnect solution.

There are several advantages that flexible printed circuits have over other interconnect devices:

- Signal Integrity - The material used in the construction of flex minimizes signal loss, maintaining high-speed integrity
- Impedance Control - Flex promotes a robust design pitch due to the close proximity of circuitry and ground planes/shields
- Temperature Resistant - Materials used in the construction of Flex have closely matching thermal expansion rates. This causes Flex to be suitable for hot and cold temperatures as well as large temperature fluctuations.
- Thermal Management - Flex does not require cooling from both sides. It also dissipates heat quickly.
- Space Reduction - Flex is able to occupy three dimensions. It can be bent around packaging and even over itself in order to fit into a much smaller device enclosure.
- Weight Reduction - Flex is significantly thinner and lighter than traditional circuit boards; products using Flex will naturally be lighter.

	Product	Features	Flex Types
	**Rigid Flex**	• Surface mount on both sides • Press-fit connector capability • Elimination of connectors and cables for improved reliability • Combination of flexible polymide and rigid FR4	• Rigid flex
	**High Speed Flex Assemblies**	• Typically 3 or more layers • Large number of interconnect options • High density routing • Impedance controlled • Low loss	• Multi-layer
	**Flex Backplanes and Backplane Jumpers**	• High-performance materials • Impedance Control • Improves airflow within the system	• Multi-layer • Rigid flex
	**High Density Flex and Flex Jumpers**	• Typically 2 or more layers • Tight line and space widths • Reduces weight • Better thermal characteristics than standard rigid board constructions • ZIF Jumpers	• Double-sided • Multi-layer
	**Flex Interconnect Assemblies**	• Virtually unlimited variety of interconnect options • Reduces assembly time • Excellent thermal management	• Single sided • Double-sided • Multi-layer
	**Power Flex**	• Eliminates wire harnesses • Reduces package size • Power and signal through one interface • Up to 20.0A per circuit • Low inductance	• Single sided • Double-sided
	**Resilient Flex**	• Impedance control • Coiling design • High speed	• Double-sided • Multi-layer

A complete source for flex and rigid flex circuit design, development, manufacturing and assembly

Design and manufacture customer interconnect solutions

- Molex flex circuit and connector manufacturing expertise
- Connector customization to meet application requirements
- Molex assembly expertise
- One supplier – complete assembly

Full range of flex circuit and assembly technologies

- One stop shop for flex assemblies
- Single, double, multi-layer and rigid flex; up to 18+ layers
- Impedance control design and manufacture
- Large form factor capability
- Value add assembly: Through-hole, SMT, BGA, Press-fit and mechanical hardware

Design the flex assembly with expertise in electrical, mechanical, reliability and manufacturing properties

- Multi-disciplined engineering support
  - Optimize electrical, mechanical, flexibility and manufacturing requirements to meet application needs
- Extensive background in mechanical design and manufacturing
  - Minimize points of flex stress; providing long term reliability products
  - Synergistic design approach to flex
- Standards certification support

Industry leader in signal integrity design

- Specialize in high speed design and materials support
- Full signal integrity modeling and testing capabilities
- Internally developed impedance calculator based on manufacturing parameters and material selection

Challenge our customers to ensure that the flex interconnect is not over designed

- Simplify design to meet application requirements, while minimizing costs
- Early engagement with complete design for manufacturing to streamline production release and builds

Multiple manufacturing locations

- Disaster recovery back-up
- Low cost geography manufacturing
- US and Taiwan design centers
- US, China, Taiwan and Mexico manufacturing facilities
- ISO 14001, ISO 9001 and TS16949 certified facilities
- ITAR compliant facilities and systems

Locations

- Flex Circuit Manufacturing:
  St. Paul, MN; Taipei, Taiwan
- Assembly Fabrication:
  St. Paul, MN; Taipei, Taiwan; Guadalajara, MX; Dongguan, PRC

Capabilities for Flex and Rigid Flex (Typical)

Layer Count
1 to 18 + Layers

Standard Panel Sizes (others available)

Taiwan	U.S.
250mm x 540mm	457mm x 610mm
250mm x 600mm	457mm x 762mm

Base Material
Rigid and Flex IPC-6011 sub specifications
/1 Adhesive and /11 Adhesiveless
Polyimide flex and Epoxy-glass rigid materials

Stiffeners
Thermal-set or Pressure Sensitive adhesive
FR4
Polyimide
Aluminum
Stainless Steel

Shielding
Etched Copper, Silver Ink, Shielding Film

Hole Size
Drilled: 0.20mm minimum
Laser drilled holes available

Aspect Ratio
10:1

Soldermask
Coverlay film
LPI
Thermal / UV cured inks

Inkjet / Silkscreen Legend Options
White, Yellow, Black

Finish Plating
OSP
Electroless Nickel / Immersion Gold (ENIG)
Electroless Nickel / Electroless Palladium / Immersion Gold (ENEPIG)
Electrolytic\Hard Gold
Electrolytic Tin
Electrolytic Tin/Lead
Immersion Silver

Finished Copper Trace / Space
External Layers
35um copper – 125um Trace / Space
70um copper – 203um Trace / Space

Inner Layers
12um copper – 50um Trace / Space
18um copper – 75um Trace / Space
35um copper – 125um Trace / Space
70um copper – 178um Trace / Space

Quality and Testing
IPC 6013 Class 3

Mechanical
Bend radius calculator, Environmental, RF, Optical Mechanical, Surface and Metallurgical Analysis, Thermal Analysis and Imaging, SEM, X-Ray Analysis, EMI

Electrical
Impedance Calculator, Crosstalk, Skew, Insertion Loss, Return Loss, Eye Diagram

Certifications
ISO 9001:2008
ISO 14001:2004
TS16949
MIL-P-50884
ITAR Compliance
IPC 600/610 certified
ULV94-0

Assembly
Through Hole, SMT, BGA, Press-Fit, Mechanical Hardware

Perimeter Tolerances (millimeters)

Feature	Steel Rule Die	Chemical Milled Die	Laser Profile	Hard Tool Die	CNC Drill	CNC Rout
Hole to Edge	±.254	±.254	±.051	±.051		
Hole to Hole	±.254	N/A	±.051	±.051	±.127	
Cutline	±.254	±.127	±.051	±.051		
Cutline to Hole	±.381	±.254	±.051	±.051		
Outline Dimensions	±.254	±.127	±.051	±.051		±.127
Trace to Edge	±.254	±.127	±.051	±.102		

Get customized insights at: **www.molex.com/product/ipd/copperflex.html**

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one company › a world of innovation

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