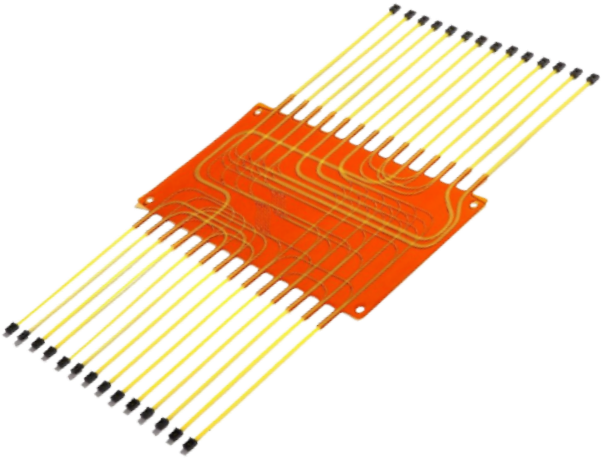
Fiber Optic Flex Circuit Assemblies (FOFCA)

Overview

Modern communication systems demand interconnect solutions that are smaller, lighter, and faster, driving widespread adoption of fiber optics in high-performance applications. Fiber Optic Flex Circuit Assemblies (FOFCA) provide a high-density, space-efficient solution for optical interconnects while supporting airflow optimization and complex system layouts.



FOFCA enables precise fiber routing between boards, across shelves, and through confined or irregular spaces. Fibers can be arranged in point-to-point, shuffled, or predefined routing patterns to meet application-specific requirements. Each assembly is manufactured from custom design files and defined parameters to ensure accurate, space-optimized integration within the system.

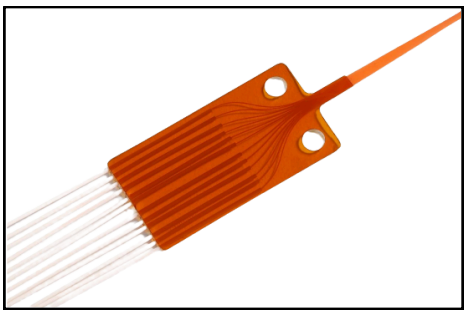
Constructed with polyimide substrates and conformal coating adhesives, FOFCA offers robust fiber protection suitable for harsh industrial environments. Each circuit consists of an adhesive substrate, optical fibers, protective coating, and termination connectors. Key specifications—including substrate size and shape, fiber type, channel count, fiber exit configuration, connector type, routing paths, and optical cross-connect relationships—can be fully customized.

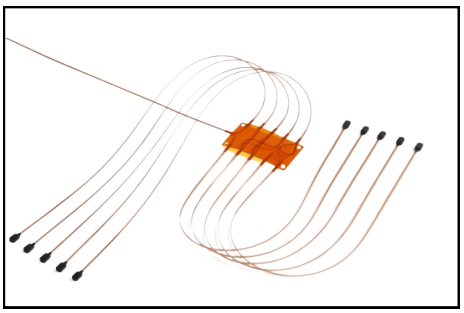
Flex circuits may be terminated with industry-standard connectors such as MTP, MXC, LC, or SC, or supplied unterminated for field termination. Circuit sizes range from a few millimeters in width to large, complex layouts up to 1,240 square inches; a typical 500 mm × 500 mm substrate can accommodate more than 300 fibers.

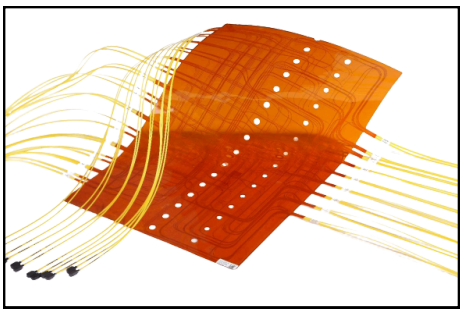
A single optical layer can support anywhere from a few channels to several hundred—or even thousands—depending on the design. For higher fiber density, multiple layers can be combined using one of two stacking approaches:

Physical Stacking
Most designs achieve optimal flexibility with fewer than five stacked layers. However, configurations with five or more layers can be implemented when higher channel counts are required.

Integrated Stacking
For highly complex routing applications where physical stacking is impractical, integrated stacking treats all layers as a single unified structure. This approach enables advanced cross-routing and reorganized fiber outputs, supporting extremely dense and sophisticated interconnect architectures.







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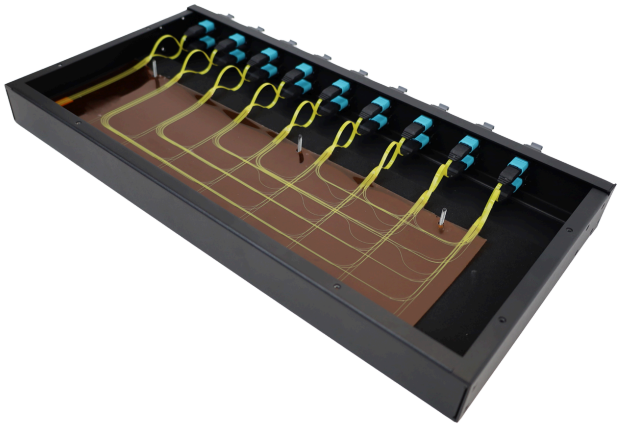
Features



- Customizable:
  - Bypass hole and positioning hole
  - Substrate size, shape and packaging
  - Routing schemes
- Long ribbon leads eliminate the need for splicing
- Supports both bulk and single-fiber terminations
- Offers direct termination or fusion splicing options
- Routed to substrate and locked with conformal coating
- Proper bend radius designed for long-term performance

Typical Applications

- Aerospace
- Card-to-card
- Telecommunications
- Optical cross-connect (OXC)
- Intra-rack fiber management
- High-density fiber management
- Backplane interconnection assemblies
- CPO optoelectronic integrated package
- Flexible optical harness, breakouts, and shuffles

Technical Specifications

Terminations Supported	MTP, MPO, MT ferrules, LC, SC, MXC, MDC, etc.
Position Accuracy On Substrate	±0.01mm
Fiber Modes Supported	Singlemode, Multimode, and Hybrid versions
Fiber Diameter	250µm and Special Fibers
Material	• Optical Fiber Protection: Conformal Coating • Substrate: Polyimide
Operating Temperature	-40°C to +85°C
Maximum Size	950 mm x 1200 mm
Substrate Size Tolerance	± 3mm 300 fibers (500mm x 500mm substrate)
Optical Performance	<0.1dB loss (excluding connector)