

5 MOST FAQs for Medical Sensor Circuits

1 - When should an FPC circuit (polyimide) instead of a printed silver circuit be used?

This decision is always about balancing out the need for higher performance with the desire to utilize the most economical materials possible. Printed silver ink (on polyester film) provides the most economical circuit solution and is currently the preferred method for disposable medical sensors. This technology, however, has more limitations when it comes to attaching electronic components due to the fact that polyester circuits will not withstand the temperatures of many soldering processes. Additionally, FPC circuits provide lower resistance than printed silver circuits.

2 - What are the available methods for attaching components to a printed silver circuit (on polyester film)?

The available methods for interfacing an electronic component to a printed silver circuit include:

- **Connector:** a PCB mounted connector (LIF or ZIF) can be incorporated on a PCBA and the circuit can be directly plugged into this connector.
- **Solder Tab/Solder:** Solder tabs can be stitched on the polyester circuit and then the component can be directly soldered to this conductive tab.
- **Conductive Epoxy:** Conductive epoxy can be discretely dispensed onto pads on the circuit where the component needs to be attached.
- **Anisotropic Film Adhesive-**These conductive film adhesives can be placed on the circuit for both electrical and mechanical bond of the components.
- **Mechanical Attachment-** Micro-Rivets and/or custom crimpable components can be used to attach batteries and other items to the flexible circuit.

3 - When do we need to use silver/silver chloride inks versus standard silver ink for circuit traces?

Silver/Silver Chloride is typically used when a silver pad/trace needs to come in direct contact with hydrogel. Silver/Silver Chloride can be used in combination with standard silver as there are no compatibility issues between these two inks.

4 - Can conductive contacts be on opposite sides of the polyester circuit?

Yes. Traces can travel from one side of a circuit to the opposite side by utilizing printed through-hole vias.

5 - What methods are used to attach a medical sensor to a patient?

The two most common methods for attaching a sensor to a human are:

- Apply a bio-gel directly on to the circuit. The bio-gel acts as the interface between the human and the electrical circuit.
- Utilize an off-the-shelf electrode (ie 3M Red Dot™), which would come in contact with the human. A connector that would be mounted on the sensor would create the connection from the circuit to the electrode.