

cicor

Innovation for success



Success in the medical sector

Thin film substrates for medical implants

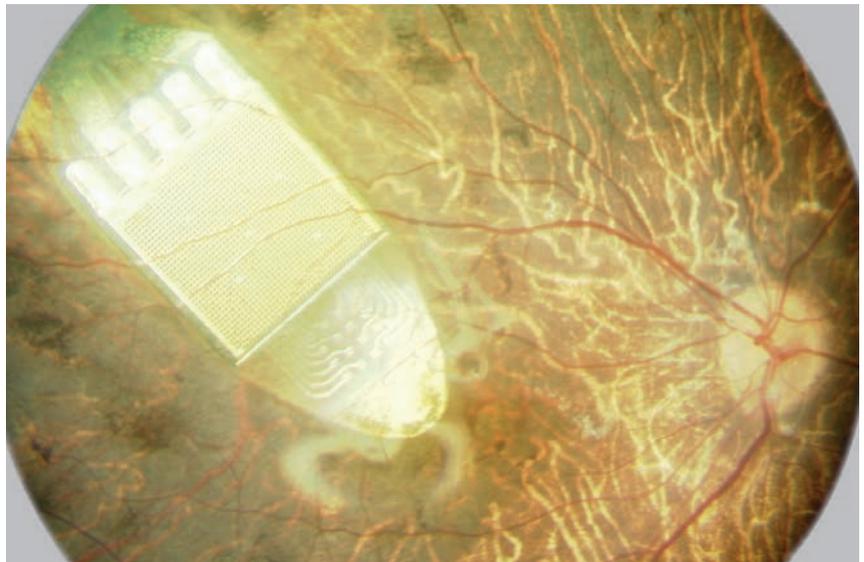
Retinal implants for Retina Implant AG, Germany

“Our mission: To restore sight to blind people and thus increase their quality of life. This requires courageous, motivated people and properly developed expertise to provide an outstanding technical solution.”

Gaining an edge together

Cicor is producing ceramic substrates for retinal implants developed by German company Retina Implant AG. Absolute precision and reliability are required to meet the exacting standards.

About three million people worldwide suffer from an insidious eye disease that leads to total blindness. A microelectronic retinal implant gives these people back some quality of life and enable them again the partially seeing. This chip was developed by Retina Implant AG.

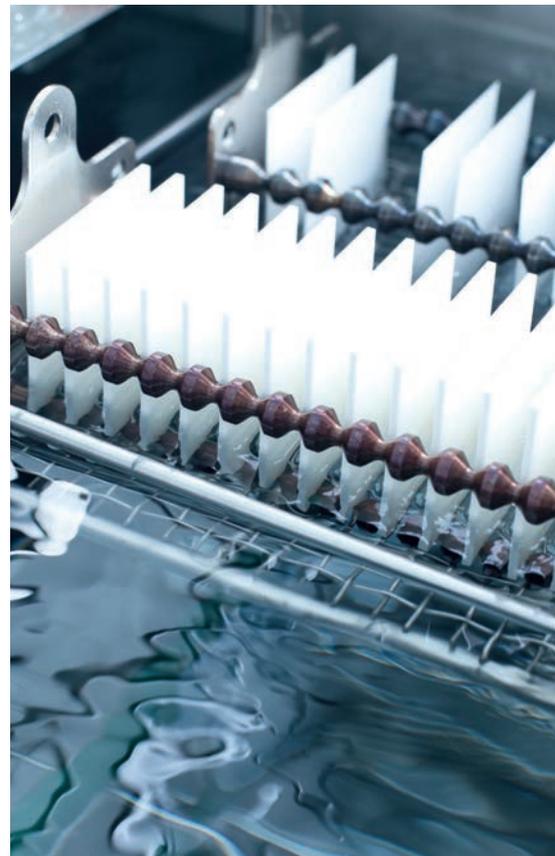


Leading innovator

Retina Implant AG*, based in Reutlingen in Germany, is an innovative developer and producer of medical products for visually impaired and blind patients. As one of two global companies, the Retina Implant AG manages to bring functional subretinal retinal implants on the market. One of the

main things required to get closer to this aim is a ceramic substrate that links the cabling to the polyimide ribbon. This ceramic substrate is manufactured in thin film technology and produced at Cicor in Ulm.

* Retina Implant AG, founded in 2003, was formed out of the BMBF-sponsored SUBRET Consortium. This was created in 1996, providing a forum for the University Eye Clinics of Tübingen and Regensburg and major research institutions to research the principles of retinal implants and develop clinical prototypes.



Exacting requirements – a customized solution

One of the central requirements for the implant is a filigree thin film substrate appropriate for medical use. Only biocompatible materials could be used for the manufacturing: Ceramic as the carrier substrate and the other metallizations of gold, platinum or titanium. The biggest challenge is presented by the complexity of the substrate structure: The resistance of the conductors must achieve the lowest possible level so the implants work reliably with minimal energy consumption.

Through the use of highly specialized thin film techniques of Cicor a sophisticated ceramic substrate was manufactured, that meets the stringent requirements for the long-term use in the sensitive eye.

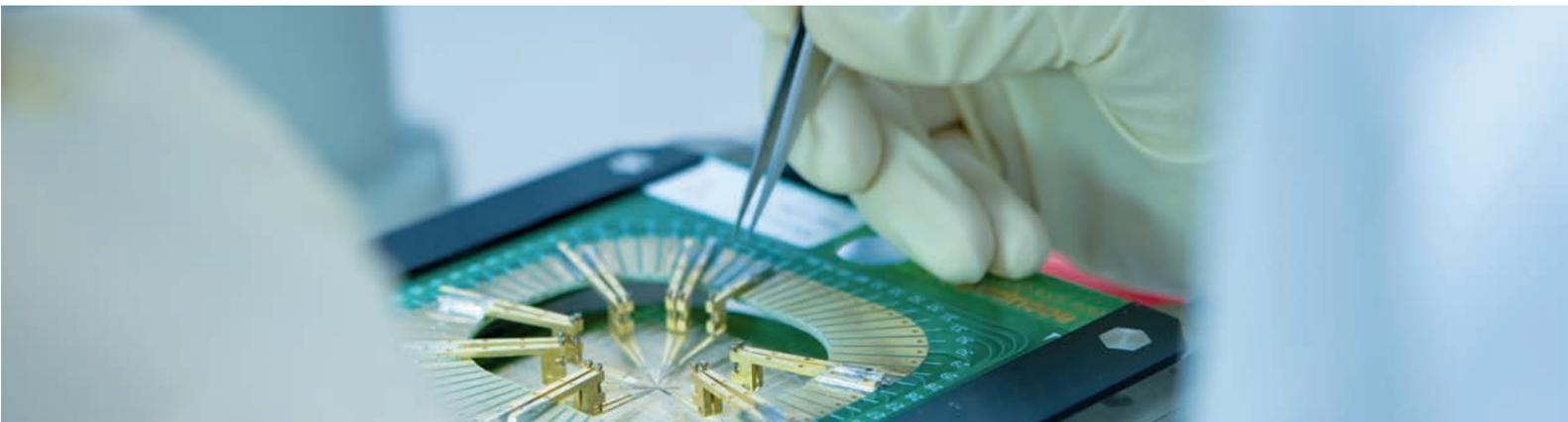
Our technological know-how and the transparency of all production processes met all customer specifications by the Retina Implant AG and promoted the rapid development to the market.

Cicor is a leading manufacturer of sophisticated microelectronics and high-quality substrates. In the area of microelectronics we can offer you the latest technologies in packaging, assembly and interconnection techniques. In the field of substrate manufacturing and processing we are characterized by the production of highly complex rigid, flexible and rigid-flexible printed circuit boards and substrates using thin- and thick film technology.

Complex solutions depend on experience, technological capabilities and highest quality. Cicor is synonymous with all these things and is a proven partner for companies like Retina Implant AG.

**“As an experienced partner in substrate manufacturing,
we are in a position to find solutions that go a step further:
Towards the future.”**

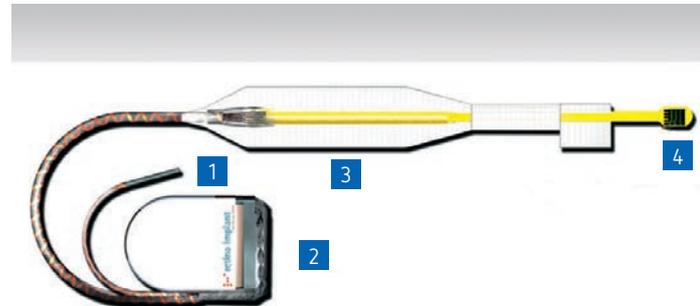
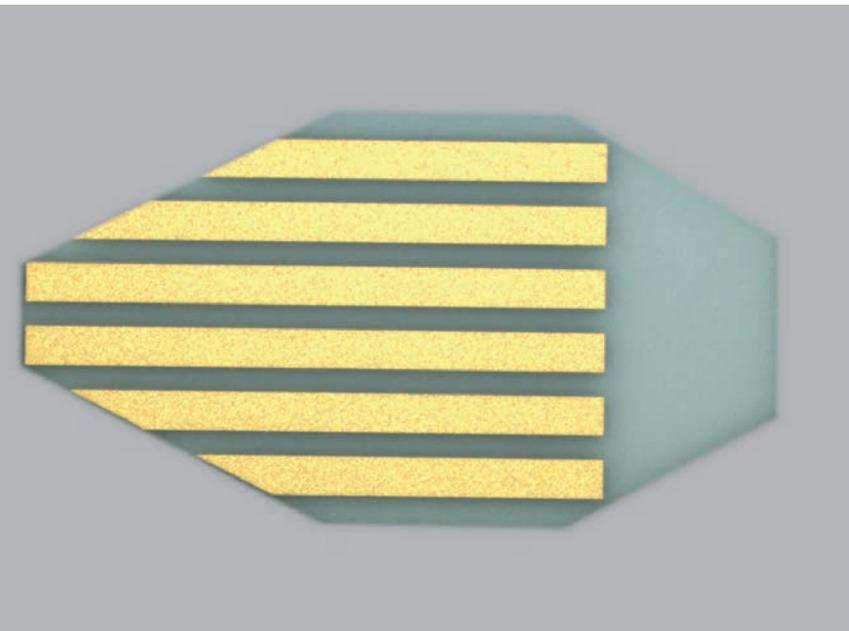
Cicor



Thin film substrates for retinal implants

The implants are made up of four main parts: A chip for recognizing and processing images (4), a thin film substrate (3) and a wireless power supply (2) with a cable linking it to the rest of the implant (1). The core of the implant is a CMOS microchip of about 3 mm in diameter, on which 40 x 40 pixels are arranged. The size of one pixel is around 70 x 70 μm^2 . The crucial link between the chip and the rest of the implant is supplied by a flexible substrate and the thin film ceramic. This technically ingenious solution, made by

Cicor, meets all requirements with regard to connectivity and biocompatibility. Cicor is responsible for developing the coating technology and for the photolithographic patterning. The company paid particular attention to optimizing conductor properties. Wire bonding is used to make the electrical connection between the flexible and the ceramic substrate. The whole unit is then sealed in silicone. The reliability and functionality of the products made at Cicor have been confirmed in extensive tests.



- 1 Connector cable
- 2 Subcutaneous RF power supply
- 3 Flexible substrate
- 4 CMOS chip

Developing innovative solutions

The challenge

- Reliability and functionality
 - Maximum reliability for long-term use in the human eye
 - Low to no defect density
 - Fault resistant
- Developing a new product
 - Researching new technological procedures
 - Collaborating on the development of a new medical product
- Miniaturization
 - Achieving precise geometry
 - Small and flexible construction methods for high complexity
- Technical requirements
 - Delicate and accurate structures
 - Optimal packaging

Requirements

- Materials
 - Ceramic
 - Long-lasting, biocompatible materials
- Precision
 - Stable processes
 - Expertise
 - Maximum cleanliness
- Quality
 - Guaranteed product quality
- Experience
 - Advanced technologies
 - Competent and motivated staff
- Partnership

The Cicor solution

- Substrate using thin film technology
- Optimized conductor geometry
- Reinforced vias
- Biocompatible material
- Low defect density

Benefits

for Retina Implant AG

- Everything – from idea to prototype to series production – from a single source
- Experienced partner for microelectronics especially substrate manufacture and assembly
- Expert support in product development
- Competent and qualified staff
- The latest production equipment
- Innovative technologies, focused on the greatest-possible reliability

... for the end-user

- Patient regains some sight
- Spatial orientation
- Ability to see without visual aids (apart from spectacles): At least count fingers, ideally recognize faces
- With visual aids: Recognize letters
- Implant fits naturally into the eye



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