Smart Wearable Devices
Innovation for success – Sophisticated solutions in the area of wearable electronics
Innovation for success
The world of wearable electronics

Wearable electronic devices – smartwatches, smartglasses, headphones or smart-textiles – have become a reality and a part of everyday life. Wearsers of a smartwatch can control many functions on their smartphones from the wrist. No need for them to get their smartphone out of their pocket to answer an incoming call or listen to messages, as voice control allows a number of actions to be performed via the watch. Fitness trackers measure the wearer’s pulse, calories burnt and distance covered while he or she exercises, or can give them an impression of their running style. The data gathered allows users to track and develop their training. Smartglasses enable wearers to take photographs, navigate or perform an online search via voice control – provided they are connected to a smartphone. Information appears on a mini display within the line of sight of the wearer.

Wearables in the healthcare and medical technology sector offer a wide range of services and ever expanding opportunities. They can perform medical services and gather and provide valuable information for diagnostics, regardless of whether the patient is at home or in a medical facility. Certain health parameters can now be measured in any setting, with medical wearables opening up entirely new possibilities in the treatment of patients. Wearables that can treat chronically ill patients as well as wearables for the treatment of patients with sensory or physical disabilities are already being developed. For example, both an implantable lens and a smart lens to treat eye diseases are currently in development. This will give patients an easy way of measuring certain parameters, such as intraocular pressure or blood sugar levels, themselves.

However, the demands placed on such innovations, especially on products used in the medical sector, are exceptionally high. Ensuring consistently high quality is an absolute must; absolute reliability and functionality have to be guaranteed at all times. Cicor is a reliable and innovative partner in the development of convincing solutions. Our expertise and experience in quality assurance and risk management, together with our use of the very latest design and development tools and manufacturing technologies, will ensure your success.
As an electronics service provider with an international structure and a broad range of production capabilities in printed circuit board assembly, system assembly and box building, and in the areas of toolmaking and plastic injection molding, our offering comprises the development and manufacture of electronic modules as well as complete devices and systems for wearable devices.

As a company with global operations and production sites in Switzerland, Romania and Asia (Singapore, Vietnam, Indonesia and China), we offer solutions based on extensive know-how. By supporting our customers early on in the planning and design phase, we can guarantee an optimal solution that is tailored specifically to customers’ needs. We see ourselves as a partner for the entire product life cycle – from product development to serial production.

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**Innovative technological solutions for your electronics**

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**Electronic Solutions**

- **Product development**
  - Layout
  - Mechanical design
  - Test development
  - Redesign

- **Test concepts**
  - Validation
  - NPI
  - Logistic model
  - Procurement

- **Warranty**
- **Repair services**
- **Maintenance**
- **Modification**
- **Obsolescence management**

- **Prototyping**
  - Board assembly
  - System assembly
  - Plastic injection molding
  - Toolmaking

- **Life cycle management**
- **Development**
- **After-sales**
- **Industrialization**
- **Production**
- **Quality management**
Quality data management guarantees safety and traceability

Our quality data management system far exceeds what is legally required. It has an extensive range of functions that can be configured in line with specific customer requirements. This allows us to guarantee absolute transparency in all production and after-sales processes at every location.

Especially in the field of medical technology, products demand a high degree of reliability and trust. As we hold the requisite ISO certifications, our customers can rest assured that we comply with all quality standards. Our philosophy: Design for Manufacturing (DFM). At Cicor, we develop and manufacture all of our products under the same roof.

Processes that are compatible across locations

We work with integrated production and quality assurance processes, identical or compatible production facilities, test systems and standard ERP software (SAP). This allows an optimum choice of production sites, simple relocation of production and rigorous cost control.

Competencies and services

Development
- Consulting, risk analysis, feasibility studies, specifications
- Hardware and software development
- PCB layout
- Mechanical design
- Redesign, reverse engineering

Test engineering
- Test engineering and test concept development
- (AOI, flying probe test, in-circuit testing, functional testing, X-ray, boundary & frame scan)
- Setup and programming of test systems
- Integration of test systems into the production environment
- Quality data management ensuring traceability throughout the entire product life cycle

Industrialization
- Layout testing
- Evaluation of second-source components
- Discontinued component testing (EOL)
- Validation of production and test systems
- Development of logistics and packaging concepts
- Prototype production
- Initial sample testing

Production
- Materials sourcing
- SMD/THT assembly
- Component programming
- Box building
- System assembly
- Plastic injection molding

After-sales service
- Life cycle management
- Rework & service
- Obsolescence management
We work very closely with our customers to develop sophisticated and innovative solutions. We are specialized in the manufacture of precision injection molding tools, precision plastic injection molded parts and three-dimensional injection-molded interconnect devices (3D-MIDs).

3D-MIDs
3D-MIDs enable the integration of mechanical and electronic functions in one component in an extremely small space. The electronic circuit is integrated in the housing, which allows for more compact design and significantly higher functional density. Producing three-dimensional injection-molded interconnect devices allows us to reduce assembly times, as well as the number of processing stages and components.

Certifications
- ISO 9001 Quality management system
- ISO 13485 Quality management system for medical products
- ISO 14001 Environmental management system
- Development process certified according to
  - ISO 9001
  - ISO 13485
- Development in line with
  - ISO 60601
  - ISO 62304
As a leading manufacturer of sophisticated microelectronics and high-quality substrates, we can provide you with a broad range of products and services of the highest standards. In the area of microelectronics, we offer state-of-the-art assembly and interconnect technologies as well as packaging technologies, while the manufacture of highly complex rigid, rigid-flex and flex circuit boards and thin- and thick-film interconnect devices is what marks us out from the competition in the area of substrate manufacturing and processing. We work closely with our customers to develop and manufacture sophisticated products, ranging from prototypes to large-scale serial productions. We offer a high degree of process stability combined with state-of-the-art production facilities, consistent quality and absolute delivery reliability.

Technologies
- Rigid, rigid-flex and flexible PCBs
- 1- to 32-layer boards
- High-density interconnects (HDIs)
- Stacked/staggered microvias of up to 6-n-6
- Panel and reel-to-reel production
- Rigid and flexible circuits using thin- and thick-film technology
- Flexible multilayer polyimide, LCP, silicone, FR4, high-Tg FR4, polyimide/glass, BT and BT epoxy, and HF substrate circuits
- Microassembly
- CiP – Chip in polymer/plastic
- Packaging
- Screening, tests, reliability checks
Flexible circuits are not only far lighter than rigid circuits, they can also be fitted more easily to the design requirements of small, portable devices. The use of liquid polyimide allows for very thin circuits of 6 to 7 µm with a high functional density. This results in a total circuit thickness of less than 0.02 mm. It also enables the production of multilayer circuits with high-resolution structures. The various metallizations are suitable for all manner of assembly and interconnect technologies.

Since complex circuits also require the implementation of very small components, we assemble high-quality components onto finely structured circuits with the utmost precision. Cicor’s modern equipment and highly qualified staff also apply extremely miniaturized components directly from wafer to substrate. Multiple contacts can be placed and assembled onto 200x200 µm. Wire bonding to the chip is possible at diameters of 12.5 – 500 µm, and fully automated microassembly allows straightforward and efficient processing of the smallest components down to SMD 01005.

More than just clothing – smart textiles

Cicor is tapping a new area of application for wearables: the monitoring of vital functions. Our offering in this area includes, among others, technology that allows a patient’s vital signs to be measured in a reliable and precisely timed manner, or a means of managing a patient’s training program. Flexible and thus highly adaptable sensors record data on temperature, pressure, acceleration or humidity, before transmitting it to a readout unit. Embedded in items of clothing, the sensors and readout units are paving new ways for this technology. The flexible and washable circuits have no impact on the comfort of the garments. Data may be transmitted via conductive yarns or wirelessly.
Reliability at every stage of the process

The success of product innovations is often decided during the planning and development phase. We are a one-stop shop that can support you from initial idea to development, manufacturing and testing of the final product. We work together with our customers to develop innovative products that will prevail in application.

Competencies and services

- Extensive experience
- Detailed technical advice, development and support
- Electronics design
- Design for Manufacturing (DFM)
- Miniaturization
- Feasibility studies
- Use of biocompatible materials
- Fast prototyping
- Broad portfolio of surface finishing
  - Galvanic Au
  - Immersion Sn
  - Immersion Ag
  - OSP
  - ENIG
  - ENEPIG
  - ASIG
- Qualified traceability of processes and components
- Flexible manufacturing capacities
- Electrical, optical and thermal tests

Certifications

- ISO 9001
  Quality management system
- ISO 14001
  Environmental management systems
- OHSAS 18001
  Occupational health and safety management system
Cicor Group offers comprehensive outsourcing services and sound advice on applications in the field of wearable electronics.

As a complete-solutions partner, we work together with our customers to develop innovative products and solutions that meet the needs of the market, reflect the latest trends and convince through their application.

Our broad portfolio of innovative technologies, services and global production capacities offers the right solution for even the most demanding requirements. Thanks to our focus on consistent quality and maximum traceability, rapid prototyping, flexible choice of materials, miniaturization and realization of potential savings as well as our development and assembly services, we are a partner that is able to meet even the highest requirements of innovative, wearable electronic products using new ideas and cutting-edge solutions.
Innovation for success
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