Automotive engineering
Innovation for success - Customized solutions for the automotive industry
Innovation for success
The purpose of automotive electronics is to improve the safety and comfort of vehicle occupants; however, it also makes a contribution toward protecting the environment. Regenerative braking systems in hybrid and electric vehicles are able to recover at least part of the kinetic energy. Adaptive Cruise Control (ACC) helps to reduce fuel consumption and the electrification of the drive train ensures that consumption and emissions are lowered further. The networked vehicle is no longer just a dream.

Active safety systems help to prevent accidents by warning drivers of potential risks at an early stage and are able to take supportive action in critical situations thanks to ABS, ESP and ACC. Passive safety systems protect the occupants of a vehicle. Driver fatigue recognition, lane departure warning systems, cross-traffic alert systems and anticipatory pedestrian protection are concepts that have long become reality. Parking aids, parking assistant systems, intelligent headlamp control systems – there is a long list of assistance systems and more innovative solutions are constantly being added. Technological advances are constantly broadening the range of new, fascinating opportunities for the development and manufacture of such systems.

Electronic components in vehicles have to withstand temperatures ranging from -40°C to +200°C. Vibrations, shocks and constantly changing air humidity levels are additional challenges that have to be overcome. 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 for automotive electronics. Our expertise and experience in quality assurance and risk management, together with our use of the latest design and development tools and manufacturing technologies, will ensure your success.
We are an international full-service provider offering a wide range of production options for printed circuit board assembly, system assembly, box building, switch box construction, cable assembly and plastic injection molding. As a global company with production sites in Switzerland, Romania and Asia (Singapore, Vietnam, Indonesia and China), we use our synergies to offer solutions based on extensive experience. Our offering comprises the development and manufacture of electronic components as well as complete devices and systems. We see ourselves as a partner for the entire product life cycle – from product development to serial production and after-sales services.

**Safety and quality management expertise**

The traceability of components and system configurations is a key factor in being able to guarantee that quality requirements such as functional safety and system stability can be met. Our quality data management system far exceeds what is legally required. It has an extensive range of functions that are configured according to each customer’s specific needs. Thanks to this system, we are able to offer customers a tailored level of traceability that meets stringent requirements. Our development expertise is further complemented by technologies such as Quality Function Deployment (QFD) and Rapid Prototyping.
Extensive development and process expertise

The automotive industry faces different challenges. Changing and wide-ranging customer requirements, stricter regulations and guidelines as well as technological drivers of change are all factors that suppliers have to contend with. Services and products in the automotive industry also 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. At Cicor, we develop and manufacture all of our products under the same roof. Our philosophy: Design for Manufacturing (DFM). We use the latest technology, architectures and design methods to implement regulatory requirements.

Competencies and services

Developments
- Advice/risk analyses/feasibility studies/specifications
- Hardware and software development
- PCB layout
- Mold design
- Redesign/reverse engineering

Test engineering
- Test engineering and test concept development (AOI/flying probe test/in-circuit testing/functional testing/x-rays/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 construction
- Initial sample testing

Production
- Materials procurement
- SMD/THT assembly
- Component programming
- Box building
- System assembly
- Cable assembly
- Component and system tests
- Coating and molding
- Winding coils
- Toolmaking (design & manufacture)
- Plastic injection molding

After-sales service
- Life cycle management
- Obsolescence management
- Component preference list
Together with our customers, we realize sophisticated, innovative and compelling products and solutions for use in the automotive industry. We are specialized in the manufacture of precision injection molding tools, precision injection molded plastic parts and 3D-MID technology (three-dimensional injection-molded interconnect devices). This technology offers countless possibilities in the miniaturization of electronic circuits as it allows a near-arbitrary design of interconnect devices. Integrating mechanical and electronic functions into one component allows functional density to be increased significantly. 3D-MIDs can also be used as housings, as they enable optimal use of space and a reduction in assembly times and processing stages. Thinking outside the box is one of our key strengths.

Electronics and plastics injection molding solutions from a single provider

Certifications
- ISO 9001 Quality management system
- ISO 14001 Environmental management system
- AQAP 2110 NATO quality assurance requirements for design, development and production
- ISO/TS 16949 Quality management system for the automotive industry
- Development process certified according to
  - ISO 9001
  - AQAP 2110
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 flexible 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 partners and customers to develop and manufacture sophisticated solutions and products, ranging from prototypes to large-scale serial productions. Our high degree of process stability combined with modern production facilities, consistent top-quality and absolute delivery reliability make us the perfect partner.

Technologies

Substrates

PCB
- Rigid, rigid-flex and flexible PCBs
- High Density Interconnects (HDIs)
- Multi-chip module (MCM)
- Rigid PCBs with 1–32 layers
- Multilayer circuit boards made from polyimide, polyimide glass, LCP, FR-4, FR-4 High Tg, and HF substrate
- Panel and reel-to-reel production
- Conducting structures of up to 25/25 µm
- Laser microvias of up to 30 µm
- Mechanical vias of up to 75 µm
- Filled blind vias
- Stacked/staggered microvias of up to 6-n-6
- Impedance-controlled PCBs +/-5%
- Thin basic materials of up to 12.5 µm
- PCB thicknesses of up to 4.0 mm
- Laser cavities
- Materials for temperature management
- Comprehensive portfolio of surface finishes
  - Immersion Sn
  - Immersion Ag
  - ENIG
  - ENEPiG
  - OSP
  - ASiG
  - Galvanic Ni/Au
  - HASL
- Electrical, optical and thermal tests

Thin-film technology

- Thin-film substrates on polymer, ceramic, steel, glass, ferrite, etc.
- Ceramic/polyimide multilayer circuit boards
- Flexible multilayer circuit boards with very high resolution (10 µm)
- Integrated resistors and couplers
- Thick copper thin-film circuits for performance applications
- High-precision, high-ohm resistors/networks of resistors
- Copper-filled via
- MEMS

Thick-film technology

- Thick-film substrates on Al₂O₃, AlN, ferrite, etc.
- Different interconnect materials (can be bonded, can be soldered)
- Printed resistors (actively/passively trimmed)
- Etched structures (up to 40 µm)
- DC/HF multilayer circuit boards
The car of the future will be connected to a network and will communicate wirelessly with other cars and the traffic infrastructure. The car will warn the driver of the many hazards that he or she would otherwise not see in time. The number of electronic systems in place within a car is constantly rising in order to meet growing economic and environmental requirements and to satisfy increasing customer expectations. This means that the requirements placed on automotive electronics are accordingly high. At Cicor, we collaborate with our clients to develop highly complex solutions in the field of sophisticated microelectronics and high-quality substrates and have all the necessary production processes to do so. As a result, the entire production process – from the initial design to the final testing – can be monitored, controlled and optimized. This allows us to guarantee that we will manufacture products of the highest quality and also provide a comprehensive service from a single source. We attend to our customers’ needs via a global service network and local contact partners in Europe, Asia and the US. As a result, we are able to provide you with a consistently high level of service quality throughout the entire product life cycle.
Reliability at every stage of the process

The success of innovations is often decided during the planning and development phase. Cicor is a one-stop shop that can support you from the initial idea to the development, manufacture and testing of the final product.

We work in close collaboration with our customers to develop pioneering solutions that prove to be impressive in use and meet customer expectations. Our innovative products and services in a wide range of categories, such as drive technologies, innovative safety, assistance, communication and entertainment systems and the networking thereof, satisfy all aspects of a pioneering solution.

Competencies and services

Microelectronics

Assembly

- Microassembly on flexible and rigid substrates (ceramic, steel, ferrite, glass, polymer, circuit boards, etc.)
- Component/module assembly
- Die attach, COB, flip chip, chip, MMICs, SMD (min. 01005), (μ)BGA
- Al- and Au-wire/ribbon bonding
- Automatic ball-wedge/wedge-wedge bonding
- Fluxing-agent-free soldering in a vacuum, and adhesive bonding

Packaging

- Circuit protection (passivation, glob top, paint coating, etc.)
- Hermetic housing (metal, ceramic)
- MEMS/RF MEMS packaging
- Customized housing concepts
- Module assembly incl. testing, screening and qualification

Certifications

- ISO 9001 Quality management system
- ISO 14001 Environmental management system
- ISO/TS 16949 Quality management system for the automotive industry
- OHSAS 18001 Occupational health and safety management

Production basics

- MILSTD883
- MILPRF38534
- ECSSQST6005

IPC documents

- IPC6011
- IPC6012
- IPC6013
- IPC6016
- IPCA600
The Cicor Group offers comprehensive outsourcing services and sound advice on applications in the automotive industry.

As a complete-solutions partner, we work together with our partners and customers to develop innovative products, solutions and services that meet customer requirements, regulations and guidelines and keep up with technological changes and trends.

Our broad portfolio of innovative technologies, services and global production capacities offers the right solution for even the most demanding requirements, such as high-tech and high-reliability applications. 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 the high level of requirements in the automotive industry using new ideas and cutting-edge solutions.
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