A Celestica Company

Partner Committed to Innovation

DESIGN ENGINEERING · SUPPLY CHAIN · MANUFACTURING

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STATION
Semi test
Assembly Parts

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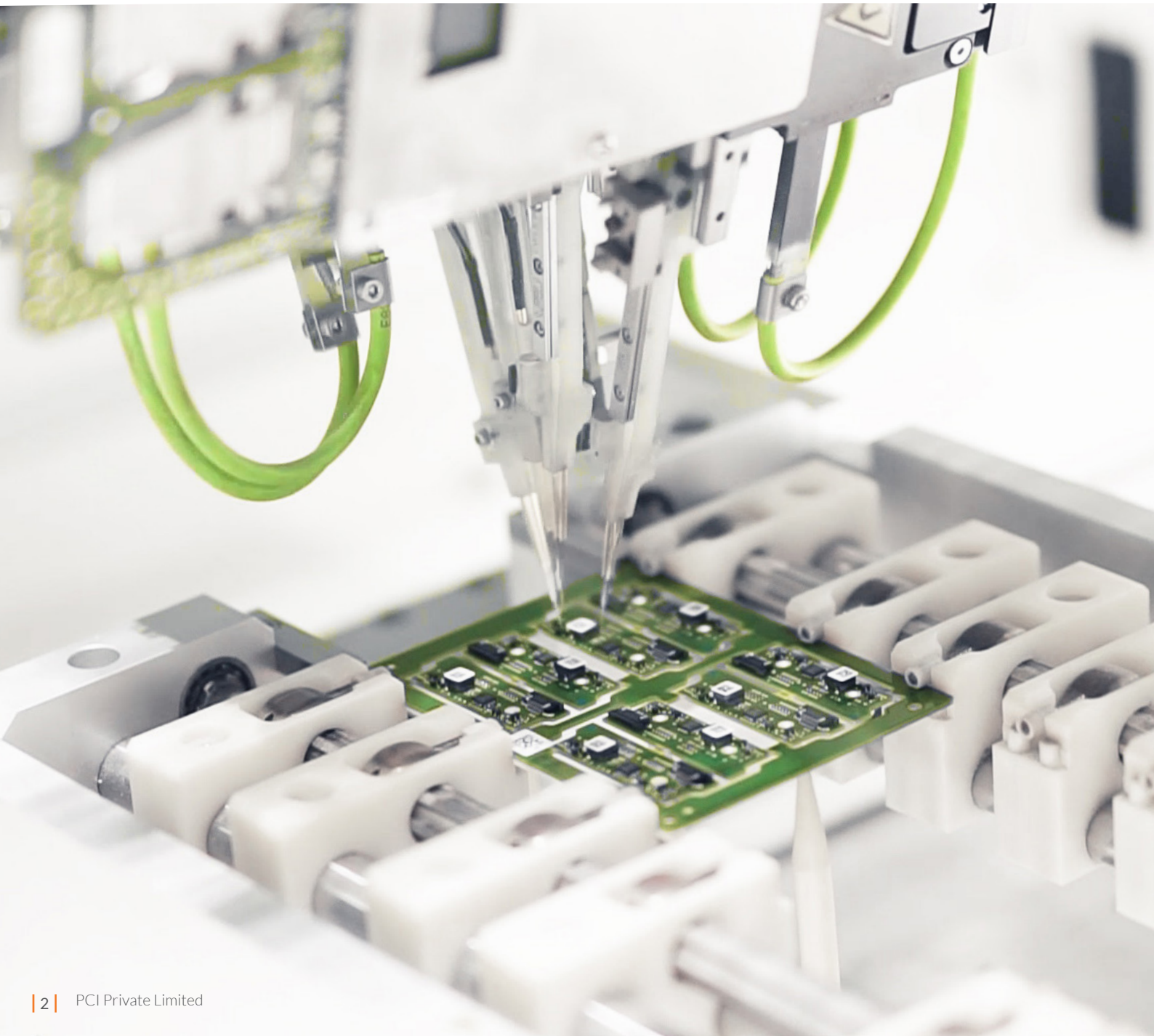
PCI is a global Electronics Manufacturing Service (EMS) provider with more than 50 years of experience in helping Original Equipment Manufacturers (OEM) design and manufacture state-of-the-art products and solutions for their customers.

We provide cost-effective, full-service design, manufacturing, and supply chain solutions for our partners. PCI designs product solutions that incorporate the latest technologies and methodologies in electronics, firmware, RF, antennas, and design for manufacturability. We support our partners' complete product lifecycles from design, product qualification, certification, and manufacturing. Additionally, we provide agile and flexible supply chain management. Our extensive experience in bringing solutions to market quickly and cost-effectively enables our partners to stay ahead of the competition and generate faster returns on investments.



Our goal is simple—to provide you with design, manufacturing, and supply chain solutions so you can reach your customers at a cost-effective and quick time-to-market to stay ahead of competition and realize faster returns on investments.

Partner Focus

Technologies for the Digital Dwellings of Tomorrow

SMART HOMES

From beds to grills and irrigation systems to music speakers, everything is becoming online compatible or WiFi enabled to join the smart home revolution. Many are using industry-leading sensors to capture metrics such as motion, temperature, humidity, and vibration to turn homes into fully automated digital utopias.

Our extensive expertise in smart home technology helps our partners make their products smart while offering a seamless user experience to enhance the way users interact with their devices.

Case Study: Product Redesign to Address Failure Rates in Record Time

A leading company in producing smart home devices was experiencing high failure and return rates of their products. They needed a new product design that not only addressed the product failure issues but also reduced costs. Our expertise in Human Machine Interface (HMI) and LCD displays transformed a nine to 12-month design-to-production process into only six months, while virtually eliminating the product failure rate and the sales of the product was back on track.

Solutions for the Factories of the Future

INDUSTRIAL SYSTEMS

Factories and assembly facilities are abuzz with technologies and sensors that streamline operations, automate production, and shorten lead times. Industrial operators now expect rich and intuitive interfaces on all types of equipment that provide seamless and comprehensive connectivity to reap benefits such as real-time data analytics which are then passed on to customers.

With our specializations in customized solutions, complex systems, and sophisticated integrations, we build products that can improve operational efficiency and productivity using advanced industrial technologies that can be tailored to your unique specifications. Our in-house radio frequency (RF) design capability and in-depth know-how in designing and manufacturing embedded systems provides our partners with quick, high quality, and high reliability product realization.

Case Study: High-Mix, Low-Volume With Unpredictable Demand Forecasts

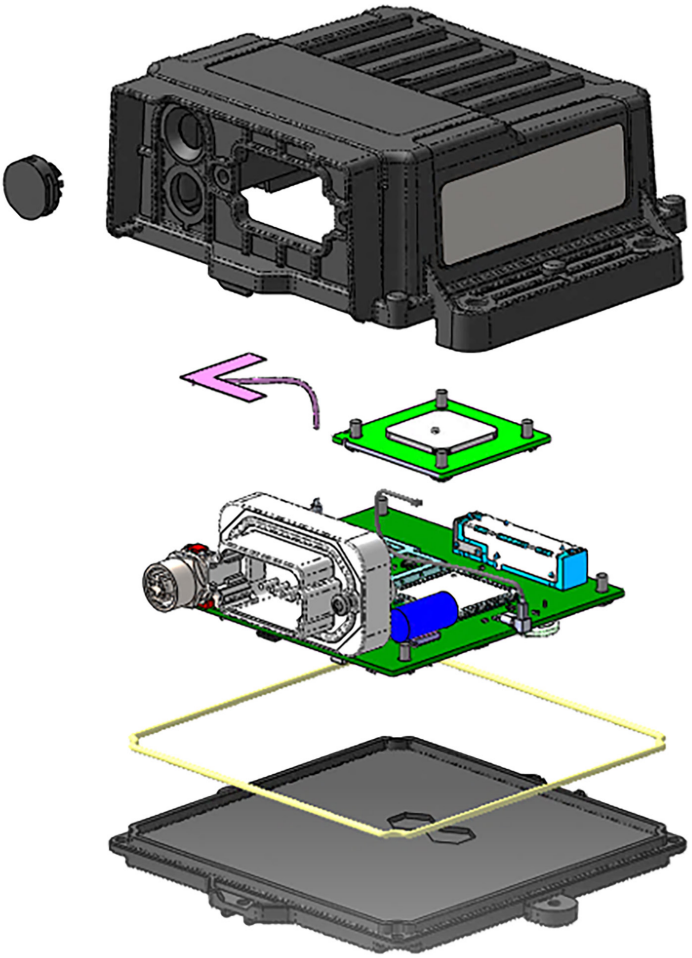
A world-leading provider of industrial products used in manufacturing and logistics automation faced constant challenges in high-mix, low-volume wide product variance and demand-forecast fluctuations. By partnering with PCI and leveraging our extensive manufacturing capability and highly agile and flexible supply chain management, they were able to meet unpredictable market demands and specific customers' requirements while continuing to achieve high level of customer satisfaction.

Gain Real-Time Insight Into Out-of-Sight Assets

ADVANCED TELEMATICS

Global operations send expensive heavy equipment, machines, and vehicles out into every corner of the world. Businesses now need real-time connectivity that bridge these assets together for enhanced resource management and improved performance insights—no matter the distance between them.

Telematics is one of the leading ways to improve fleet productivity through real-time data collection and analytics. Operators around the world are implementing advanced technologies that monitor assets in real-time—and in many cases, teach them to operate without human interference. With our expertise in telematics design, certification and manufacturing, we provide our partners with solutions that enhance driver safety, optimize dispatch routes, better manager assets, and predict maintenance requirements—all of which lead to increased productivity, efficiency, and cost-savings.



Case Study: First-of-its-Kind in the Telematics Industry

A leading provider of fleet management solutions required a telematics unit that can communicate real-time with the control center while providing personalized experience to drivers for behavior-based self-monitoring. Integrating a full-sized keyboard within the form factor of a telematics unit is no easy feat. Not only must it be highly functional, but it must also be secured in place while the vehicle is moving. With PCI's strong design and development expertise coupled with our know-how in product qualification and certification, the provider managed to launch a first-of-its-kind telematics unit to the market at record time, which is now one of its top selling products.

"As our Contract Design Manufacturing (CDM) partner, PCI demonstrates extensive expertise in software and hardware engineering and has the competencies to quickly bring products to market. Their engineering and manufacturing support continues through the entire product lifecycle even after products are launched, providing also reverse logistics and end-of-life tracking. This allows us to focus on feature enhancements and strategic product planning.

PCI's lean manufacturing process has allowed us to remain competitive in price in a market that's characterized by extremely tight margins. They continue to achieve product cost targets and provide year-over-year cost-savings for us." – *Leading provider of fleet management solutions*

From Diagnostic Care to Gaming – Specialized Solutions for Specialized Applications

SPECIALTY EQUIPMENT

Businesses often encounter limiting factors such as constraints in availability of production capacity and lack of in-house engineering design and manufacturing know-how in building specialty equipment. And regulated industries require specialized solutions and products that are compliant with regulations mandated by governing authorities.

Our in-depth experience in regulated industries and comprehensive certifications in quality management provides our partners with specialized design engineering to build high-quality products that will meet industry standards. With our expertise in human machine interface (HMI), single board computer (SBC), radio frequency (RF) and firmware design, we're equipped to design the products of tomorrow—to the unique and stringent specifications required of our partners.

PCI has developed a wide range of specialty equipment for industries and applications like fitness and wellness, business service and automation, building system and security, gaming, diagnostic and emergency care, and fuel sensors.

Case Study: Enhanced Social Distancing Monitoring Through Augmented Contact-Tracing

The Government Technology Agency (GovTech) of Singapore needed a better and more robust contact-tracing method for identifying persons who may have been exposed to COVID-19. Collaboratively, using our expertise in Bluetooth low-energy (BLE), we put together the highly portable TraceTogether (TT) Token from ideation to production in just eight weeks—a process which could have taken six to nine months. The token is designed to exchange short-distance Bluetooth signals with other tokens or TT mobile apps that are in close proximity without compromising the personal data and privacy of users. By distributing the tokens to the local community, the effectiveness of contact-tracing was increased and the accuracy in identifying infected persons' past contact-points was significantly improved.

> **"PCI has demonstrated its engineering capability and was flexible to respond to changes in product requirements."**
>
> **- GovTech Singapore**

Our partners benefit from our global footprint and strong network of distributors and suppliers who together provide comprehensive support. Our manufacturing centers are strategically located across Asia with our Research & Development center of excellence located in Singapore.

A Trusted Partner

With our unrivalled product design, supply chain and manufacturing capabilities, we help our partners build state-of-the-art products and solutions that delight customers. Our global team of engineering, supply chain, and manufacturing experts work hand-in-hand with your resources to bring your boldest ideas to life.

Leading innovators have trusted us to transform their complex visions into viable products. We support our partners in the key market sectors we serve and are continuously expanding our portfolio to form long-term, trusted partnerships:

- Fleet Management
- Smart Connectivity
- Manufacturing Automation
- Fitness & Wellness
- Business Service & Automation
- Building System & Security
- Lottery and Gaming
- Appliance
- Audio
- Utility Management
- Printing
- Scientific Instruments
- Electric Motor & Control
- Filtration & Compressor
- Photonics & Control
- Heavy Equipment & Construction

We are a trusted partner to some of the most renowned Original Equipment Manufacturers (OEM) in industrial, specialty equipment, telematics, and smart home sectors. We draw upon our extensive knowledge in product design, end-to-end manufacturing, and supply chain to collaborate with our partners in building leading products and solutions that their customers want.

Exceptional Capability Through Extensive Experience in Advanced Technologies

By collaborating with us, you gain access to an invaluable and global team of experienced and dedicated experts who ensure the success of every product and solution. With a sizable and growing number of design engineers and proprietary design platforms in IoT, telematics, embedded systems, and radio frequency antenna, our constantly-evolving design engineering solutions not only build your product to current market expectations, but futureproof them as well.

Telematics

Route optimization and fuel and driver behavior monitoring are no longer novelties, but prerequisites in today's world of telematics. We help our partners build state-of-the-art products for tracking machine behaviors down to the finest detail—even under the most extreme conditions—using solutions that meet Electronic Logging Device (ELD) mandates.

Our specialization in telematic design that encompasses CAN bus, LTE connectivity, embedded systems, and ruggedized casing helps equip our customers with the technology to accurately track, locate, and monitor their fleets. This includes incorporating preventive maintenance to improve productivity, reduce costs, and improve safety, and to maintain full compliance with local government regulations.

Our Key Expertise in Telematics Includes:

- Antenna Design
- Cellular Technology – 5G, LTE, 3G, 2G
- Bluetooth
- Wi-Fi
- GNSS – GPS, GLONASS, Galileo, BeiDou
- V2X
- RF Simulation
- Vehicle Communication – J1708, J1939 CAN
- Multi-Region Regulatory Compliance

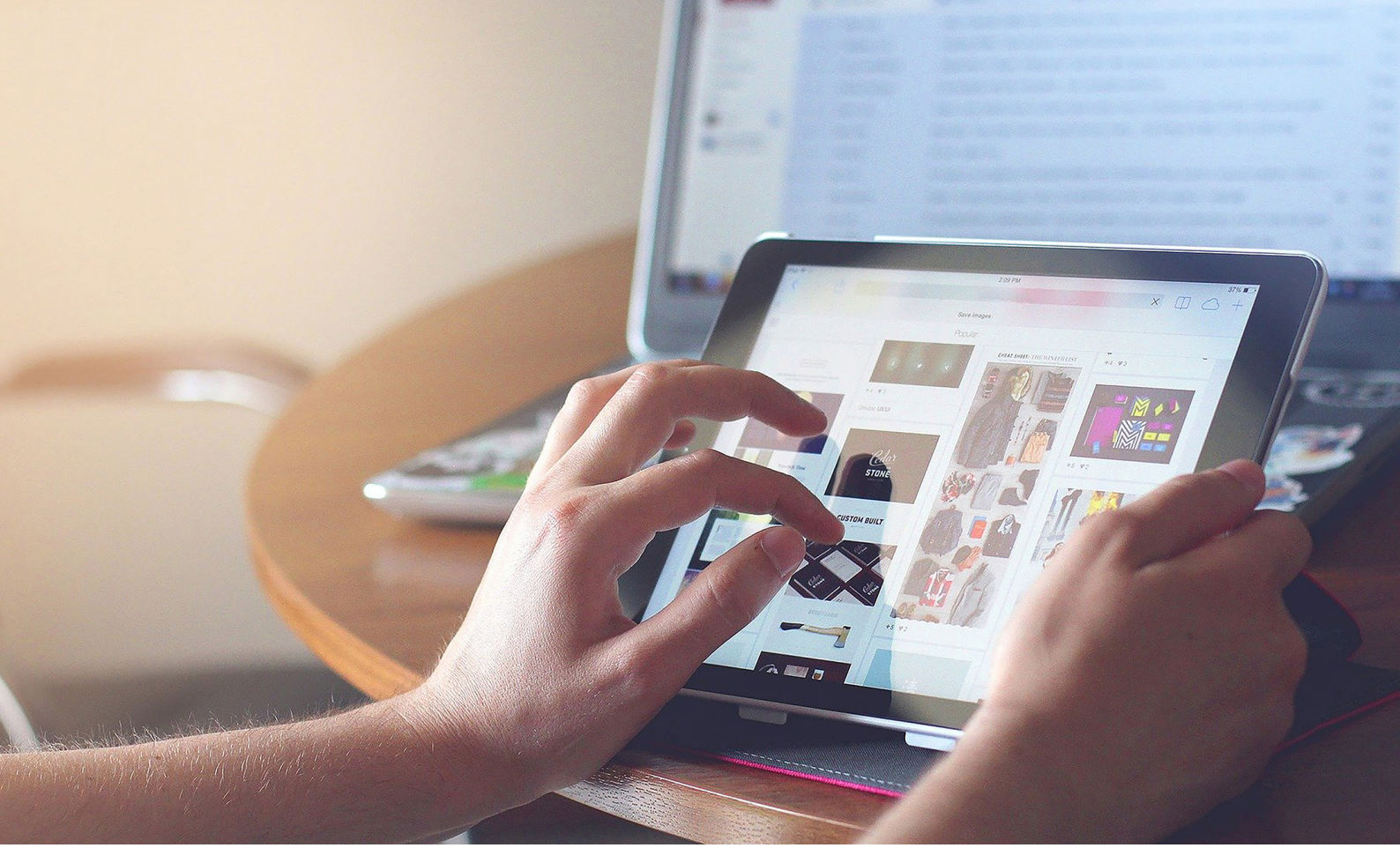
Human Machine Interface

Devices today must be designed to provide a seamless user experience to beat the competition. Sending commands through quick taps, swift gestures, and voice controls are now commonplace. What used to be buttons and knobs has turned into how a user feels about our products—the user experience is what makes a product great.

From fitness consoles to commercial-grade printers, our extensive know-how in Human Machine Interface (HMI) helps our partners build products that integrate the most user-intuitive form factors. We have a long history in display technologies and our established supplier partnerships and capabilities let us quickly transition your product from design to prototype to high-volume manufacturing. Some of our experience in display technologies include TFT, custom LCD, OLED, and 4K.

Our Key Expertise in HMI Includes:

- Design and manufacturing of custom LCD module with ACF and heatseal assembly
- Single Board Computer (SBC)—high performance and scalable processors such as NXP, Mediatek
- Clean-room (class 10K) assembly of Capsense, resistive touch screens, rubber keypads and polydome tact switches
- IP69K rated enclosures
- Sensors: light, temperature, pressure, proximity, magnetic, accelerometer, magnetometer, gyroscope, heart rate, infrared, gas (specific to volatile organic compounds), moisture
- Voice recognition
- Artificial Intelligence (machine learning)



Internet of Things & Smart Devices

The Internet of Things (IoT) give voice to appliances and devices we once viewed as static and silent. From street-lights to parking occupancy sensors, vending machines to outdoor grills, millions of devices are accessing the internet to improve our lives in exciting ways, with the trend showing no sign of slowing down. The emergence of Industrial IoT (IIoT) is spearheading advancements in robotics, while the convergence of Artificial Intelligence (AI) processors and IoT (AIoT) is saving time and bandwidth by adding device autonomy into decision-making rather than solely relying on the cloud for uploading data and post-processing.

Whether it's to re-engineer an analog product or create a brand-new innovation, we can help our partners design and create the next addition to the IoT revolution.

Our Key Expertise in IoT Includes:

- Embedding radio modules and bridging firmware applications into existing products to complete IoT solutions using one of the following standards: LoRA, Sigfox, BLE, NB-IoT, LTE CatM1 and Cat1
- Integration of various sensing modules such as accelerometers, gyroscope, magnetometers, hall effect, and VOC

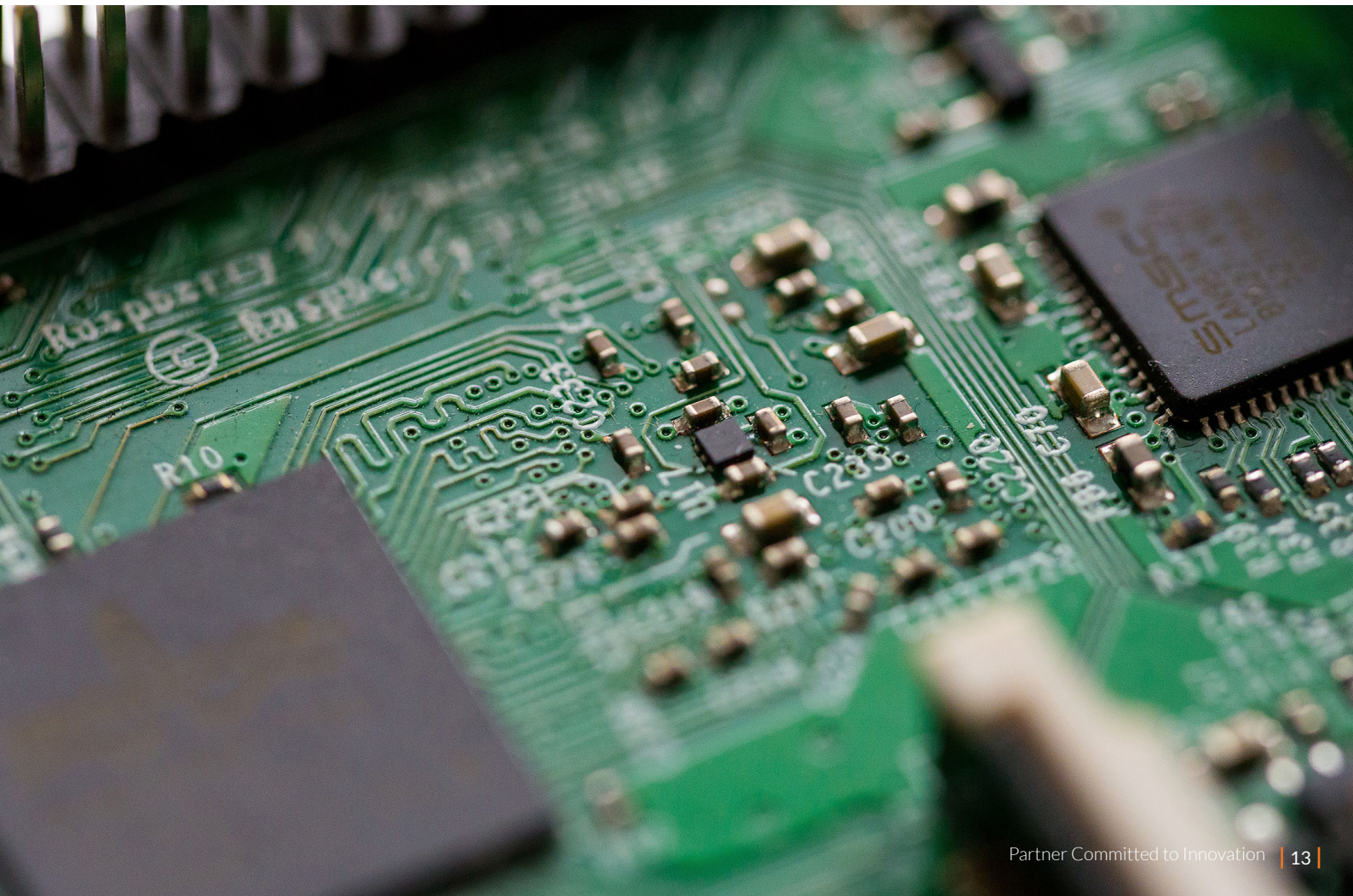
Single Board Computers

There are many off-the-shelf Single Board Computers (SBC) available in the market, but they are generic and lack customization support. At PCI, we embrace the most complex challenges when it comes to the world of embedded systems. Well-known for our agility, we can expedite time-to-market with highly customized SBC built from our existing design platforms.

We develop customized and cost-effective SBC platforms based on System on Chip (SoC) such as i.MX8 and i.MX6 which run on Linux or Android and typically last for five to seven years. Our robust research and development capability enables us to help our partners upgrade to the latest available technology ranging from full-featured products used in commercial activities to high reliability products used in industrial and transportation sectors.

Our Key Expertise in SBC Includes:

Features	Descriptions
SoC	NXP i.Mx6, i.MX8 series and MediaTek
Memory	DDR4L, DDR3L
Flash	eMMC (pseudo SLC mode)
Interface	MIPI, HDMI, D-LDVS, LDVS, MIPI-CSI
Wired	Gigabit Ethernet, USB 3.1, USB 2.0
Wireless	Wi-Fi, Bluetooth, LTE 4G, LTE M1, GPS



The Highest Quality at All Stages of the Product Lifecycle

Whether it's complex manufacturing specifications or tight lead times, no challenge is beyond us. At PCI, our team is impassioned about delivering top-grade end-to-end manufacturing supply chain solutions. We specialize in the full product lifecycle—from design to supply chain and ongoing customer service—and are committed to your success.

Product Design & Development

We help our partners bring ideas to life through our Design for Manufacturability (DFM) approach and extensive Value Add/Value Engineering (VAVE) program, which ensures ideas are viable and producible in the most cost-effective manner. We provide our partners with a wide range of customizations that are unique to product requirements and can incorporate leading technologies such as radio frequency (RF), wireless connectivity, telematics, HMI, SBC, system on modules, vehicle 2 everything (V2X), and IoT. Our VAVE program allows us to incorporate such technologies while keeping costs in-line with expectations by substituting specific materials, components, and processes without sacrificing product performance or functionality.

Our Design Services Portfolio Includes:

- Electronics
- Firmware
- Mechanical
- Antenna
- Test Development

Manufacturing, Testing & Certification

Manufacturing delays and product quality can mean missed opportunities not only for our partners' business but also for end customers. We take pride in being an extended arm of our partners and fully commit ourselves to delivering high-quality products and solutions on time.

We are constantly incorporating the latest manufacturing methodologies, customized solutions, purpose-designed testers, and certifications to ensure speed, quality, and industry compliance. To see our partners' product through to success, we have analytics tools such as Process Control Plan (PCP), Measurement System Analysis (MSA), Gauge Repeatability and Reproducibility (GRR), Failure Mode and Effects Analysis (FMEA), Design FMEA (DFMEA), traceability systems, Production Part Approval Process (PPAP), and Ongoing Reliability Tests (ORT).

Best-In-Class Manufacturing Principles

Our highly established and well-equipped manufacturing sites implement Lean Six Sigma methodologies which enable us to eliminate waste, focus on quality output, and increase efficiency. Kaizen projects are a norm in our facility, all of which form an effective continuous improvement model wherein reaped benefits are then passed on to our partners.

Unique Specifications Require Customized Solutions

Our manufacturing strategy centers around customizing manufacturing lines to meet our partners' requirements, be it high-mix low-volume or low-mix high-volume product variance for PCBA, sub-assembly or high-level box build product. Our flexible work cell production configuration and customized production line enables us to build products to our partners' unique specifications—even when it comes to process flow configuration.

To name, we have a high-speed, high-precision and fully automated Surface-mount Technology (SMT) line that comes with full traceability capability and is managed by our intelligent Manufacturing Execution System (MES) which allows real-time data collection and analytics for enhanced performance. We can trace Finished Goods (FG) down to the individual components date code: critical in identifying product non-conformance and defects. In addition, our comprehensive Chip-On-Board (COB) capability allows us to perform complex COB processes such as gold and aluminum wire-bonding via either ultrasonic wedge bonding or thermosonic ball bonding in a Class 1000 certified cleanroom.

Vigorous Testing Throughout the Entire Product Lifecycle

We don't just test products; we design and fabricate testers based on our partners' product and test specifications. Our vigorous testing capabilities include flying probe testing for proto build board, high-mix low volume PCBA fixtureless testing, and in-circuit testing, and extends to sophisticated Computed Tomography (CT) scans for the detection of faults in hidden soldering joints. We are committed to the success of our partners' products. That's why we perform rigorous mechanical tests throughout each product lifecycle to help our partners mitigate risks, reduce waste, and minimize costs associated with manufacturing discrepancies.

Beyond Certification

We are passionate about quality management and service and how this translates for our partners. We want to provide the highest quality product and best support you can find in a manufacturing partner.

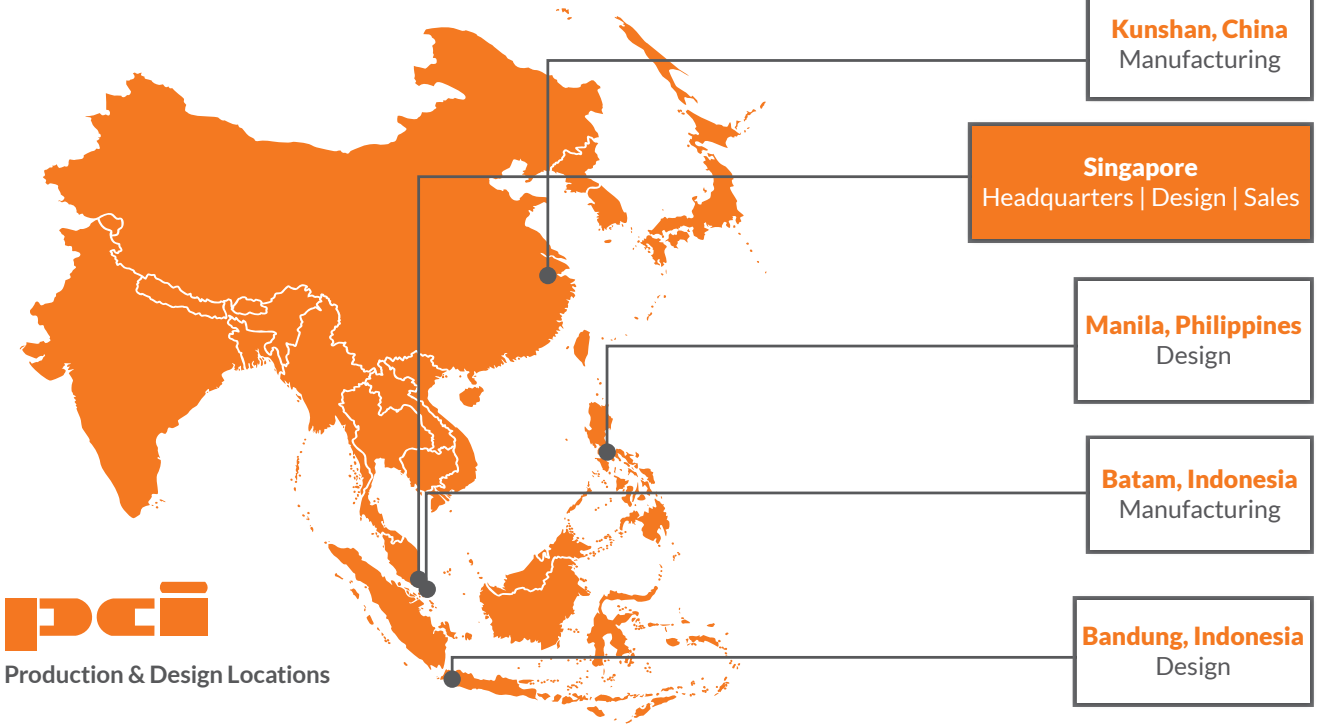
Certifications and Awards

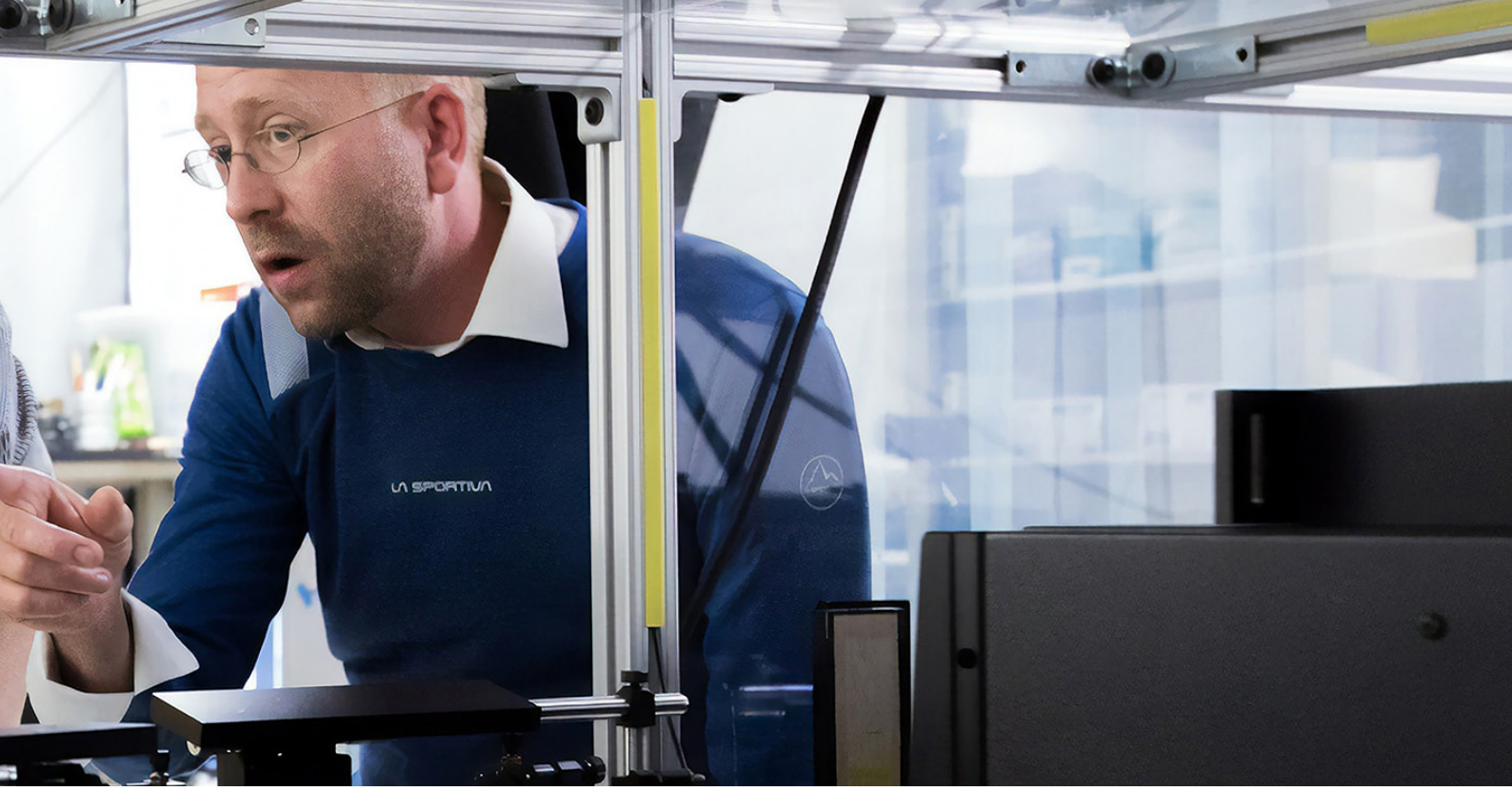
- ISO 9001:2015 – Quality management system
- IATF 16949:2016 – Quality management system for the manufacturing of automotive-related products
- EN ISO 13485:2012/AC2012 – Quality management system for the manufacturing of medical devices
- Singapore Quality Class (2012) – Business excellence
- ISO 14001:2015 – Environmental management system
- ISO 45001:2018 (bizSAFE Star) - Occupational health and safety management system
- Green Mark Gold Award (2013) - Environmentally friendly building – PCI headquarters

Supply Chain & Logistics Management

Where and how products are made and delivered can make or break profit and businesses. Our international facilities are strategically located, optimizing proximity and accessibility to our key suppliers, logistics providers, and customers. Our design headquarters in Singapore works alongside our design support offices in Indonesia and Philippines to provide cost-effective services and innovative capabilities in advanced technologies. With manufacturing facilities located in Indonesia and China, we provide cost-savings to our partners via a resilient global supply base.

Our locations are supported by our efficient supply chain initiatives including Integrated Business Planning, Supplier Managed Inventory, Just-In-Time programs, and a streamlined and robust Manufacturing Execution System (MES). Our fully digitized information and smart planning system provides accurate and timely supply chain visibility to avoid unnecessary delays caused by supply shortages.





Integrated Business Planning for a Seamless Management Process

Our next-generation planning solution provides our partners with access to a resilient, end-to-end supply chain capable of delivering the best solutions for even the most unique customer requirements. Whether it is planning production, procurement, or distribution, our real-time integrated business planning allows us to quickly respond to unpredictable disruptions such as changes in supply plans, schedule, and allocations—so that your products get delivered on time.

Digital Supplier Network for integrated Enterprise Resource Planning

Through our Digital Supplier Network, we provide our partners with data visibility and transparency across the entire supply chain in a real-time, two-way, and always-on communication and collaboration environment, turning your supply chain into an strategic differentiator.

The Future of Warehousing

Warehouse efficiency is the heart of the supply chain, and we continue to make improvements by digitizing end-to-end inventory control, the sourcing of materials, and product dispatch. Our team is equipped with real-time access to our warehouse management system—even on mobile devices—resulting in improved speed, agility, efficiency, and productivity for not just PCI, but for our partners as well.

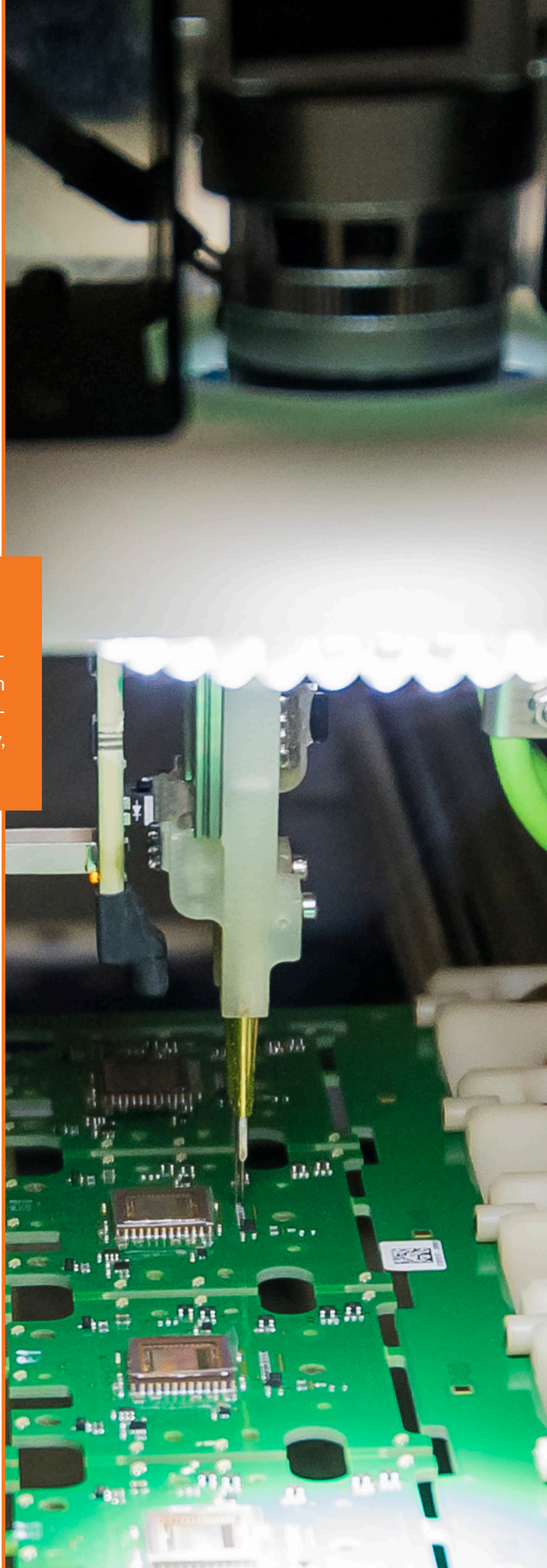
Manufacturing Execution System for Production Efficiency

Complex manufacturing operation requires a robust Manufacturing Execution System (MES). To ensure successful implementation of manufacturing operations and improved production efficiency, our MES is designed to streamline the flow of orders and production processes. Enabling status updates from raw materials to finished goods, our robust MES provides systematic evaluation and analysis on respective yields and quality while ensuring optimized resource management. In addition, our MES provides real-time data visibility, enabling lower production costs, reduced risk of loss, and minimized product variance.

Dedicated Customer Service

We think of ourselves as an extension of our partners—available whenever, wherever. A dedicated account team readily supports our partners through any product lifecycle, alongside responsive and engaged engineering, quality, and leadership teams.

We invest in pioneering innovative manufacturing processes and agile and flexible supply chain solutions to help our partners build high-quality products and solutions to meet their customers' fast-changing requirements. Our dedicated team is with you through and through—like an extension of your own resources.



Contact Us

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With more than 50 years of extensive experience in electronics manufacturing and strategically located facilities, we help our partners deliver their products and solutions to their customers at a cost-effective and quick time-to-market.

How can we help realize your product?

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