# Manufacturing Solutions

INNOVATION

RELIABILITY

UNMATCHED QUALITY
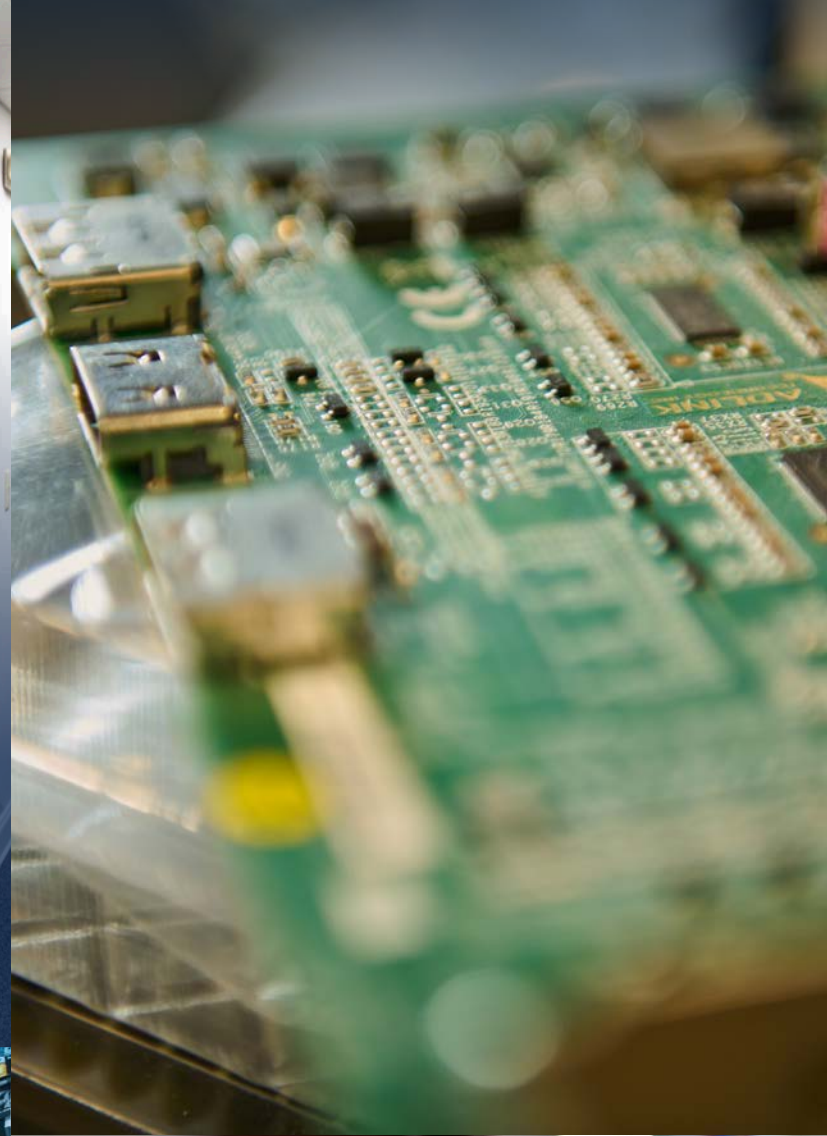
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MADE IN THE USA

SEALEVEL

# SEALEVEL®

Delivering Design & Manufacturing Excellence Since 1986
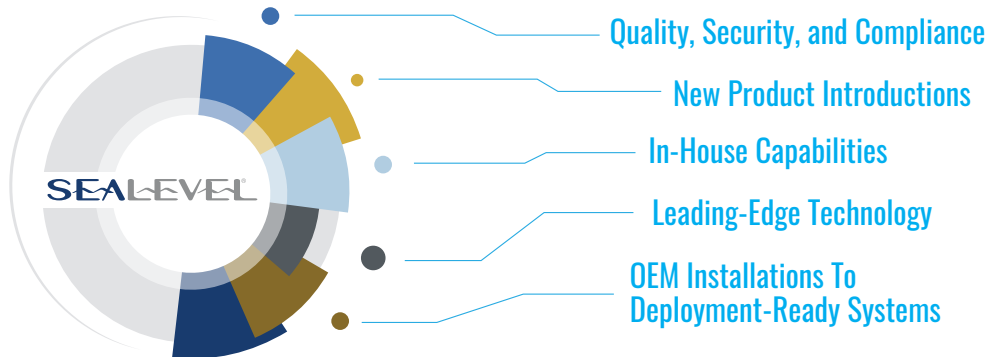
# WHERE THE RUBBER MEETS THE ROAD

Sealevel Production

Sealevel's production and manufacturing lines truly are "where the rubber meets the road" – taking you from dreaming, to doing.

# UNMATCHED CREATIVITY AND EXECUTION TAKE YOUR PRODUCT FROM A DREAM TO DELIVERED

From custom electronic hardware and manufacturing services to standard products, Sealevel **designs, builds,** and **tests** at our US headquarters for **OEMs** and wide-ranging **industry leaders**. Your product is subject to the highest **quality standards** and superior **test procedures** under **ISO 9001:2015**, developed in partnership with our in-house engineers. Our services include:



- Quality, Security, and Compliance
- New Product Introductions
- In-House Capabilities
- Leading-Edge Technology
- OEM Installations To Deployment-Ready Systems



### Sealevel Facility
Sealevel's 52,000-square-foot facility sits on a 17-acre site. To protect electronic components during design, assembly, and test, we have installed over 30,000 square feet of ESD tiling spanning our manufacturing, engineering, and tech support departments.
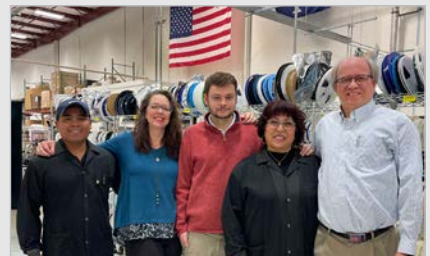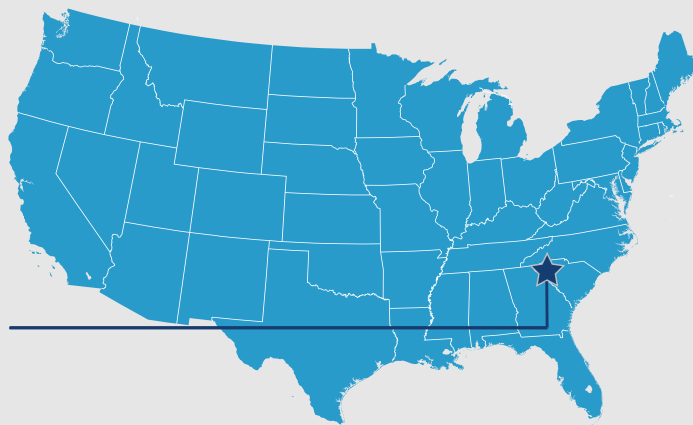




### Sealevel Team
Sealevel's team of over 90 employees spans our engineering, manufacturing, and business departments.

### Our Mission
Sealevel Systems, Inc. is committed to **engineering** leading-edge communications solutions, **manufacturing** our products to the highest quality standards, **growing** a creative team of trailblazers, and **sustaining** a legacy of community investment.

# QUALITY, SECURITY, AND COMPLIANCE

Our team begins with the end in mind, carefully evaluating the applications for our products across industries to ensure we meet all I/O, processing, environmental, safety, and security requirements. Sealevel's manufacturing, quality, security, and engineering teams collaborate closely from concept to official production. Together, these teams assess each project's unique requirements.

## Guaranteed Quality, Backed by Proven Processes

Our sales and program managers facilitate processes including research, development, testing, approval, and production. A quality control manager assesses all projects – custom and standard – to define any specific security, parts traceability, or other requirements beyond Sealevel's standard policies and procedures.

## Security: Cyber, Device & Physical

Our standard security procedures include practices as outlined by CMMC and NIST 800-171. Our team is equipped to meet specific requirements for cybersecurity and device security, and our special projects area allows for customer-specific physical security as well. All design, manufacturing, assembly, pre-certification testing, and ongoing support services take place at our facility in Liberty, South Carolina, allowing us to maintain and regulate our rigorous security protocols.

## Compliance – and On-Site Pre-Certification

With a "design for certification" approach, every embedded computer and industrial I/O solution is refined to meet safety and environmental requirements. Sealevel's in-house compliance and test engineers complete evaluations utilizing our multi-angle transmissive x-ray, 2-axis vibration table ,and multiple thermal and environmental chambers. This pre-certification analysis, validation, and test methodology reduces time to market as well as costs for our customers.

### Industry Certifications & Compliance
- ISO 9001:2015 Registered
- RoHS Compliant
- REACH Compliant
- ESD S20.20 Compliant
- IPC-A-610 Certified
- J-STD-001 Certified

### Military & Commercial Standard Experience
- MIL-STD-810
- MIL-STD-461
- MIL-STD-1472
- MIL-STD-901
- MIL-STD-464
- MIL-STD-167-1
- EMC (FCC, CE)
- EFT
- IEC/EN
- IP (Ingress Protection)
- NEMA
- ATEX
- IECEx
- CID1 and CID2
- Thermal Shock
- Environmental Stress
- Radiated Emissions
- Endurance Testing
- Impact Resistance

### In-House Inspection & Test Equipment
- LabMaster 10 Zi-A High Bandwidth Modular Oscilloscope
- Automated Screen Printer with 2D Inspection
- 5-Camera Automated Optical Inspection
- Multi-Angle Transmissive X-Ray
- 2-Axis Vibration Table
- Thermal Walk-In Chamber
- Environmental Chambers

# NEW PRODUCT INTRODUCTIONS (NPIs)

NPIs for embedded computing, specifically in critical communications applications, present known challenges related to time, costs, and risks. To minimize these hurdles – and achieve successful deployment – Sealevel leverages multilevel coordination and validation as you capitalize on emerging technology.

## Schematic

### Mitigating Risks

Sealevel engages our procurement team for "second sourcing" early in the design to inform R&D of suggested components and what to avoid.

### Delivering Quality

Sealevel's manufacturing and test teams are in the same location as our electrical engineers. This facilitates early planning for specific test points, product functionality testing, and overall product reliability.

## Layout

### Mitigating Risks

Our team often creates – and manufactures in-house  – an early prototype for debugging and prototyping new, complex circuitry. Having on-site manufacturing and testing capabilities makes this possible without negatively impacting the schedule.

### Delivering Quality

Design for Manufacturability (DFM) dramatically reduces the potential for production errors and increases efficiency by optimizing the overall design and component placement.

## Mechanical

### Mitigating Risks

By working closely with metal fabrication partners, Sealevel has a clear understanding of their capabilities and tolerances to ensure our overall mechanical design.

### Delivering Quality

Early feedback on the overall design of enclosures results in a better end-product and improved production efficiency.

## Manufacturing

### Mitigating Risks

In the absence of in-house manufacturing, you lose the control over inventory, processes, and schedules. As our Director of Operations says, "We can build anything at Sealevel any day we want to because we control the use of our parts".

### Delivering Quality

Sealevel's production and build teams have direct access to our Quality Manager in order to improve the product-build process to continually refine and improve.

# IN-HOUSE CAPABILITIES

Sealevel manages the entire product development, manufacturing, testing, and packaging cycle. Our Electronic Design & Manufacturing Services (EDMS) are available for projects ranging from turnkey design and production to quality assembly of your design. By employing state-of-the-art equipment and a skilled American workforce, we can scale as needed to meet customer requirements.

### Receiving

Sealevel's receiving team operates within our quality department and relies on software and other programs to verify drawings and dimensions. Meticulous standards and procedures are in place to maintain parts traceability for identification and tracking.

### Printed Circuit Board Assembly

Our printed circuit board (PCB) assembly process is driven by a state-of-the-art Surface Mount Technology (SMT) line. Sealevel employs methods for defect tracking and trending, route verification, feeder verification, and real-time process alarming. Electrostatic Discharge Controls (ESD) and Moisture Sensitive Device (MSD) Controls are in place throughout the facility.

### Through-Hole Assembly

Our in-house team of solder technicians is J-STD-001 Certified and IPC-A-610 Certified. Following through-hole assembly, boards are cleaned via our inline aqueous cleaner.

### Board Level Test

Full functional testing is completed on all Sealevel standard I/O and computing products. Custom test plans are developed in partnership with customers to facilitate optimal field performance. Our on-site x-ray, vibration, and thermal test equipment enable pre-certification testing.

**Box Build Assembly**

Sealevel's automated conformal coating equipment allows for accurate, defect-free conformal coating and protection of electronics. For assembly, technicians follow comprehensive procedures for product building, labeling, and modification.

**Special Projects Area**

Within Sealevel's 52,000-square-foot facility, there is a dedicated space for the manufacturing and testing of high-profile projects. This space allows for enhanced physical security – in addition to our extensive standard cyber and device-level security – as required and is configurable to meet product specifications, ensuring optimal production for OEMs.

**Finished Goods Inventory**

Sealevel maintains dedicated warehouse space to allocate for custom project storage. Standard I/O and computing products are replenished in accordance with product lifecycle management.

**Shipping**

Standard shipping configurations include reinforced enclosures as well as ESD foam and materials. Sealevel's shipping team completes a detailed packaging evaluation for all products – standard and custom – oftentimes partnering with OEMs to meet their requirements.

# LEADING-EDGE TECHNOLOGY

All board-level assembly and testing take place at Sealevel using our state-of-the-art surface mount manufacturing line. Products are visually screened using Automated Optical Inspection (AOI) and 100% of the functionality is tested before shipment.



**60-Spindle High Speed SMT (60,000 CPH Placement)**



**30-Spindle-High Speed SMT (34,500 CPH Placement)**



**7-Spindle-High Speed SMT (16,500 CPH Placement)**



**7-Spindle-High Speed SMT (16,500 CPH Placement)**

**Automated Screen Printer with 2D Inspection**

**10-Zone Forced Convection Reflow Oven**

**5-Camera Automated Optical Inspection**

**Closed-Loop Inline Aqueous Cleaner with Isolation**

**Multi-Angle Transmissive X-Ray**

**2-Axis Vibration Table**

**Thermal Walk-In Chamber**

**Environmental Test Chambers**

**Automated Conformal Coating**

# OEM INSTALLATIONS TO DEPLOYMENT-READY SYSTEMS

Sealevel's team of engineers and manufacturing experts partner to create a variety of solutions – standard and custom – every day. With our in-house surface mount line capabilities, through-hole assembly team, and box build assembly team, we are uniquely equipped to consistently produce high-quality solutions in different form factors to meet our customers' specific needs.

## COM-Based Carrier Solutions

Sealevel specializes in rugged hardware designed to withstand environmental challenges including hazardous locations, shock and vibration, and temperature extremes. With COM architecture, the connectors are mounted directly to the carrier board, eliminating cable connections and enabling maximum reliability. Sealevel's engineering and manufacturing teams have valuable experience in designing and producing high-performance carrier boards for both standard and custom applications.

## Data Acquisition Devices

Sealevel's SeaI/O data acquisition devices provide powerful digital, analog, and serial expansion to any monitoring and control system. With robust optical isolation, as well as wide operating temperature ranges, SeaI/O DAQ devices are engineered and manufactured for reliable performance in extreme environments. Connect to the host via wireless, Ethernet, USB, RS-485, or RS-232 to add the functionality required for your particular DAQ application. Multiple units can be daisy-chained using convenient pass through connectors to create a versatile remote monitoring network.

## Embedded Computing Systems

Designed for applications where reliable computing and SWaP-C² optimization is a must, the Relio family of embedded I/O computing systems combines the reliability of a PLC with the configurability of an industrial computer. Relio embedded computers feature a fanless, solid-state design and offer extended temperature and vibration tolerance. COM Express design allows for technology migration, future-proofing your industrial PC. Choose from a variety of compact form factors and processor options, all with long term availability and superior lifecycle management.
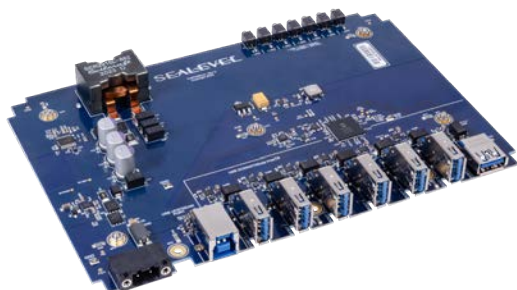
## OEM-Ready Solutions

Sealevel offers a variety of OEM solutions across our serial, digital and analog, and rugged USB hub portfolio. These products are intentionally designed for simple integration with existing enclosures and cabinets, and easy deployment using our software drivers and utilities. OEM partners benefit from Sealevel's extensive in-house planning, traceability, quality, and testing processes to deploy solutions with superior reliability and guaranteed long-term availability.

## Serial Cards & Interfaces

Sealevel offers the widest selection of serial choices for data-intensive applications. Our serial adapters are trusted for military, aerospace, and commercial applications where reliable, high-speed communications are required. These interfaces support RS-232, RS-422, RS-485, and RS-530 electrical interface standards and offer a traditional bus-based approach, as well as USB and Ethernet solutions.





## Touch Panel Controllers

Achieve computing, I/O, and HMI requirements with Sealevel rugged HazPAC and SeaPAC touch panel controllers. Our fanless, industrial panel PC systems are designed to operate over wide temperature ranges for unmatched reliability. HazPAC touchscreen control systems are certified by ATEX and IECEx and for Class I, Division 2. These hazardous area computers also maintain NEMA 4/IP64 protection from sprayed liquids.

## More than a Manufacturer

Sealevel delivers precision engineering design, system integration, and comprehensive testing. And, yes, unmatched manufacturing. Whether you need a standard product, turnkey design from concept to production, or quality assembly, talk to the team that's more than a manufacturer.

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