SEALEVEL®

Delivering Design & Manufacturing Excellence Since 1986

SMART INDUSTRY INNOVATION, IMPLEMENTATION, AND EXPANSION

INNOVATION

Sealevel's hardware and software solutions are rooted in an intentional design foundation. Leveraging emerging technology, we continually refine our engineering and manufacturing techniques to exceed customer expectations and sustain their dominance in manufacturing across industries.
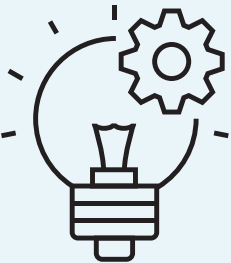
SMART FACTORY

Smart manufacturing is driven by automation, remote monitoring, autonomous robots and vehicles, data collection, and visualization. Sealevel's first-hand experience of the evolution of manufacturing delivers results with all-inclusive solutions to enhance existing systems and realize new capabilities.

AUTOMATION & OEMs

With a commitment to Made in the USA and long-term availability, Sealevel partners with OEMs and industry leaders to meet their specific application needs through our standard product line and custom engineering and manufacturing capabilities.
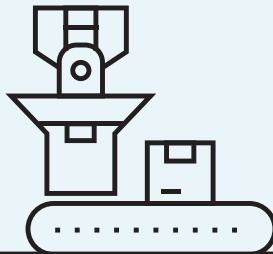
VISION SYSTEMS

As automation and control systems grow to include embedded and machine vision technology, Sealevel's products offer immediate solutions to interface with legacy equipment while connecting newly introduced peripherals.
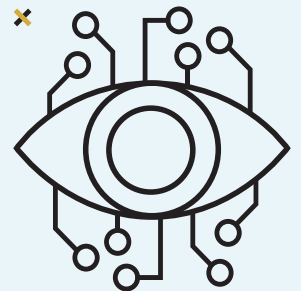
SYSTEM INTEGRATION

Our solutions are designed to enable and expand connectivity and control, making them perfect tools for system integrators. We're proud to work with integrators and companies across industries to improve processes – and communication – by harnessing the power of edge computing and remote monitoring.
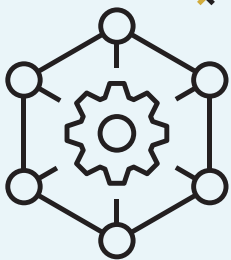
CONTROL

For adding intelligence and control to your system, automation computers from Sealevel are intentionally designed to meet the quality, reliability, and processing power required. For industrial facilities, products are certified for HazLoc operation to withstand extreme environments without diminished performance.
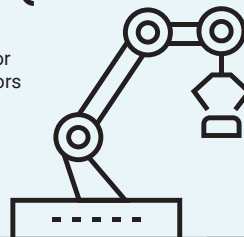
TEST & MEASUREMENT

From test stands for medical equipment to monitoring devices for autonomous vehicle production, Sealevel products offer flexible I/O connectivity and unmatched reliability. Our products are included in test platforms to address a range of analog, digital, and mixed-signal testing needs, allowing you to focus on developing your application rather than developing the test system.

MACHINE LEARNING / AI

Machine learning and AI applications demand powerful processing capabilities to perform advanced algorithms. Sealevel's custom computing solutions rely on progressive computer architectures, including FPGAs, for faster execution and future-proof technology.
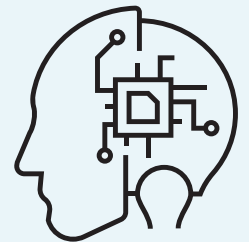
REINVENTING INDUSTRIAL AUTOMATION & CONTROL SINCE 1986

Sealevel Systems, Inc. is an American-owned designer and manufacturer of standard and full custom hardware and software. Our customers range from industry leaders to every major US and Allied nations military contractor including Northrop Grumman, Raytheon, BAE, Boeing, and L3Harris.

Sealevel delivers proven, integration-ready products and customized solutions for advanced systems, achieved by leveraging over 35 years of engineering and manufacturi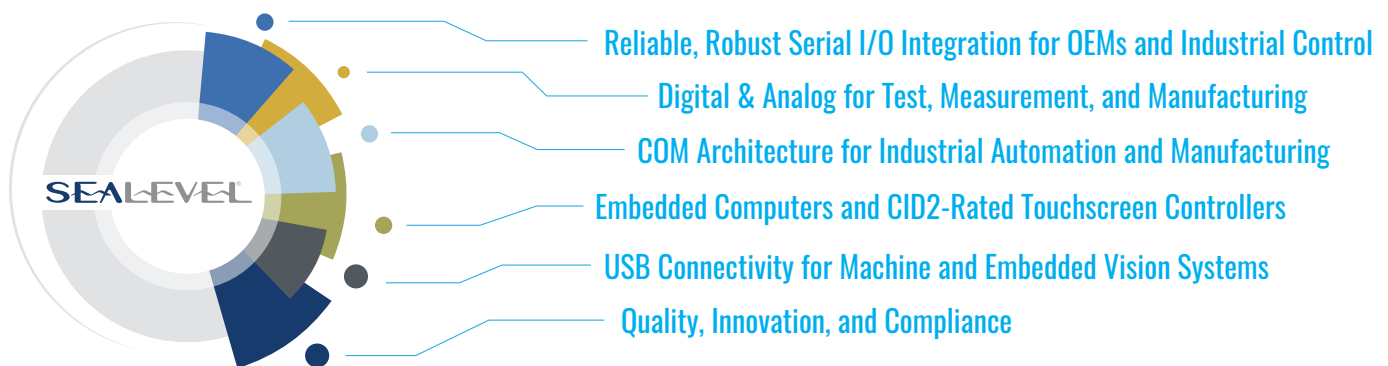ng experience. From test and measurement to manufacturing automation to complete system control, Sealevel's team delivers unparalleled performance while meeting industry-specific certifications and requirements.

Sealevel's 52,000-square-foot facility sits on a 17-acre site in Liberty, SC. 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.

- Reliable, Robust Serial I/O Integration for OEMs and Industrial Control
- Digital & Analog for Test, Measurement, and Manufacturing
- COM Architecture for Industrial Automation and Manufacturing
- Embedded Computers and CID2-Rated Touchscreen Controllers
- USB Connectivity for Machine and Embedded Vision Systems
- Quality, Innovation, and Compliance

Sealevel's companywide standards and certifications include:

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

Sealevel is a member of these associations to support, educate, and interact with leaders across the industry:

Intel® Partner Alliance
Intel® Solutions Marketplace
OpExChange
PC/104 Consortium
PCI-SIG
PICMG
South Carolina Manufacturing Extension Program (SCMEP)

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.

RELIABLE, ROBUST SERIAL I/O INTEGRATION FOR OEMS & INDUSTRIAL CONTROL

Sealevel offers the widest selection of asynchronous and synchronous serial solutions for data intensive applications. Our serial adapters are trusted for factory and process automation, smart manufacturing, industrial, 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.

Ethernet Serial Servers
SeaLINK® Ethernet serial servers offer the easiest way to connect RS-232, RS-422, and RS-485 serial devices to your Ethernet network. All SeaLINK devices use industry-standard TCP/IP protocol enabling any host to access serial ports as virtual COM ports. Designed using a powerful embedded microprocessor, SeaLINK products are able to communicate over multiple ports at sustained data rates up to 230Kbps. Sealevel industrial Ethernet serial servers support custom baud rates and 9-bit protocol and are housed in rugged enclosures for reliable performance in manufacturing and industrial environments.

PCIe Asynchronous Serial Adapters
Sealevel PCI Express serial boards utilize 120-byte FIFOs for maximum reliability in data-intensive applications. Software developed for standard PCI boards will also work with Sealevel PCI Express boards, simplifying your transition to this next-generation PCI bus. Sealevel PCIe serial boards are configurable for RS-232, RS-422, and RS-485 electrical interfaces. These PCIe serial boards are fully compatible with X2, X4, X8, X16, and X32 PCI Express slots.

PCI Asynchronous Serial Adapters
Sealevel's PCI bus serial boards offer the widest choice of I/O connectivity available. Products include RS-232, RS-422, and RS-485 PCI serial solutions. Our PCI boards are available with a wide range of accessories to make installation easy. Sealevel low profile Universal Bus PCI boards are designed for many newer computers that lack standard height PCI slots.

PCIe Synchronous Serial Adapters
Sealevel PCIe X1 synchronous serial cards are fully compatible with X2, X4, X8, X16, and X32 PCI Express slots. Software developed for standard PCI adapters will also work with Sealevel PCIe synchronous serial adapters, simplifying your transition to this next-generation PCI bus. Our synchronous serial adapters are an ideal solution for applications including DDS (digital data service), intelligent and flexible manufacturing, process automation, military applications, banking communications, building automation, and other specialized applications.

PCI Synchronous Serial Adapters
Critical commercial, military, robotics, industrial, vision, and process automation applications use synchronous communication when high-speed data transfer is required. All Sealevel synchronous serial products are engineered with strict attention to timing to achieve the most reliable, high-speed communication possible. Choose from a variety of RS-232/422/485 multi-interface products that support HDLC/SDLC and other protocols.

Case Study: High Vibration Tolerance & Compatibility for OEM Controllers

Sealevel partners with the largest OEM (original equipment manufacturer) of carpet finishing machinery in the world. Their equipment tufts various types of yarn into a primary backing and then applies secondary backing to produce finished carpet. The end users of these systems are carpet manufacturers across the globe. They use our customer's machines to produce carpet for a wide range of customers, including commercial, hospitality, and residential markets.

The tufting and carpet finishing machines the company sells generate large capital expenditures for customers. When customers purchase these machines, they need reassurance that the machinery will operate reliably as a long-term investment. Additionally, carpet factories are industrial environments and systems are subject to high vibration from surrounding machinery. Ruggedization of all electrical components is a high priority.
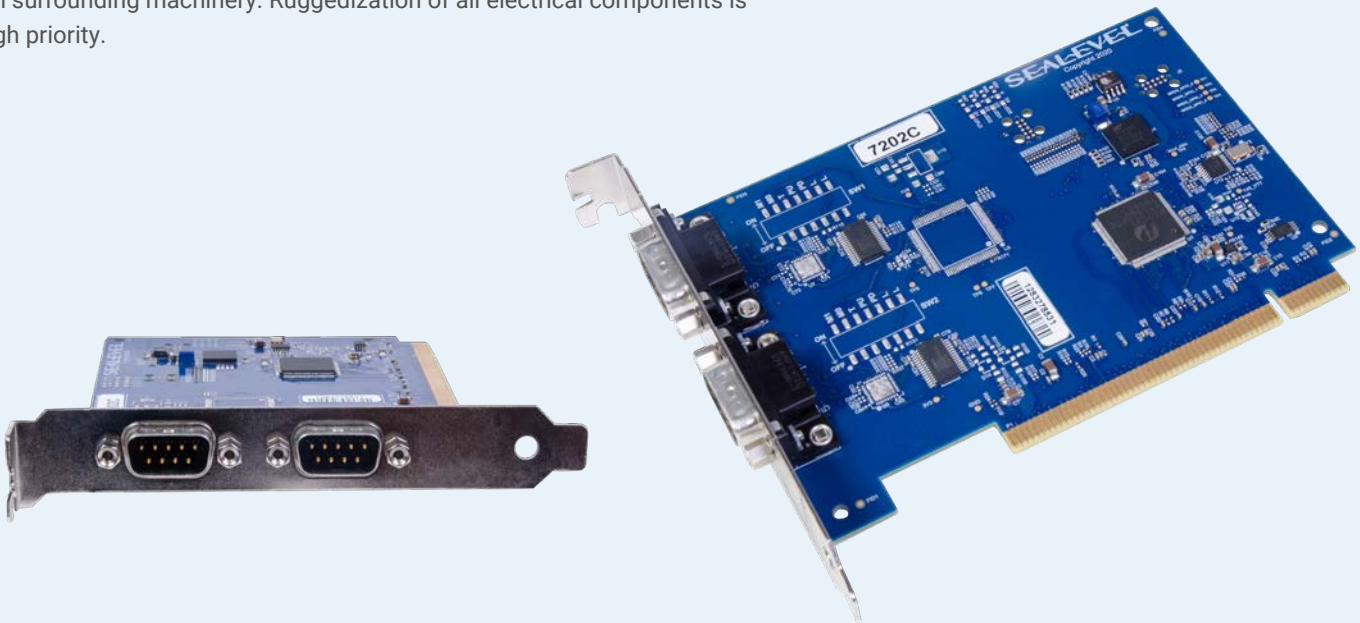
Sealevel's Solution

The company began implementing Sealevel's I/O in their systems in the 1990s, beginning with ISA cards. They have migrated to PCI in response to upgraded controller technology. Since then, they have used a combination of Sealevel serial and digital I/O for controlling yarn delivery, cutting, proximity monitoring, and tufting. Today, they rely primarily on Sealevel's 7202 PCI serial interface. The high vibration tolerance, wide operating temperature range, and long-term availability guarantee have encouraged company-wide adoption of this serial solution. Compatible with a wide range of peripherals, the 7202 also includes SeaCOM software for easy installation and operation.

Featured Product: 7202 2-Port RS-232 Serial Interface

- (2) RS-232 serial ports
- Data rates to 460.8K bps
- All modem control signals implemented
- 16C850 buffered UARTs with 128-byte FIFOs
- (2) DB-9M connectors
- 0°C to 70°C operating temperature range

DIGITAL & ANALOG FOR TEST, MEASUREMENT, AND MANUFACTURING

Sealevel digital and analog I/O products enable you to monitor — and control — real-world signals. Whether you need to monitor just a few inputs on a smart manufacturing line, or need to create a distributed control network for a fleet of autonomous robots across facilities worldwide, our digital and analog I/O products can meet the challenge. Select from field-proven optically isolated inputs, Reed and Form C relay outputs, TTL interfaces to solid-state relays, and A/D and D/A functionality.

SeaI/O 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 and monitoring network.

Ethernet & PoE Adapters

Sealevel's eI/O Ethernet and PoE I/O adapters are cost-effective and allow remote monitoring of analog and digital I/O from anywhere on an Ethernet network. I/O options include optically isolated inputs, Reed, Form C, and solid-state relay outputs, and analog to digital inputs. Sealevel's SeaI/O Ethernet modules are also compatible with 10/100 Base-T Ethernet. For new technology builds, as well as retrofitting legacy equipment, these devices provide reliable control and monitoring across autonomous infrastructure.

Case Study: Complete I/O Support for Manufacturing & Final Product Testing

Sealevel collaborates with a global leader that develops and manufactures safety products for professionals and facilities. One of their systems is specifically designed for gas detection in fire safety, mining, and building manufacturing applications. These systems require extensive manufacturing line testing as well as final product testing. While tests vary for different parts of the system, primary tests include performance, accuracy, and timing of the sensors.

Due to the critical performance requirements, the company demands consistent, high-reliability products that can be applied to a wide variety of use cases.

Sealevel's Solution

After initially selecting and deploying Seal/O data acquisition modules, this manufacturer standardized on Sealevel products for all internal test platforms. Analog inputs on the eI/O 170E, Seal/O 470E, and Seal/O 570E are used to test sensors by taking measurements. During test, the sensors are deployed in a controlled environment to determine if the readings are accurate. The digital outputs on the eI/O and Seal/O DAQ devices are used to actuate the test cycles. The inputs then conduct status information back to the host.

Sealevel's wide range of products and consistent production quality successfully support the entire test cycle, ensuring finished systems are fully and accurately tested before deployment.

Featured Product: eI/O 170E Multifunction I/O Adapter
- Control and monitor (8) 12-bit analog inputs, (2) optically isolated digital inputs and (2) solid-state relay outputs via any 10/100 Base-T Ethernet connection
- (8) single-ended or (4) differential A/D inputs that are software configurable for 0-5V, 0-10V, +/-5V, and +/-10V ranges

Featured Product: Seal/O 470E DAQ Module
- (8) differential or (16) single-ended 12-bit inputs and (2) 12-bit D/A output channels
- A/D inputs are software selectable for 0-5V, 0-10V, +/-5V, and +/-10V ranges and each channel can be configured via hardware for measuring 4-20mA current loop
- (8) optically isolated inputs rated for 5-30VDC and feature 300V external isolation
- (8) open-collector outputs can sink up to 580mA

Featured Product: Seal/O 570E DAQ Module
- (8) single-ended 16-bit analog inputs, (8) optically isolated inputs, and (8) Form C relay outputs
- A/D inputs are independently software-selectable for +/- 5V or +/- 15V ranges and feature high input impedance
- (8) optically isolated inputs rated for 5-30VDC
- Form C relays are configurable as normally-open or normally-closed

COM ARCHITECTURE FOR INDUSTRIAL AUTOMATION & MANUFACTURING

COM modules install on a carrier board that provides the application-specific I/O and external connectors. Utilizing a COM architecture provides the freedom to exactly match the system I/O and mechanical requirements while providing an easy upgrade path for the core processing functions, extending the lifecycle of the system. This flexibility makes COM-based systems perfect for industrial automation and smart manufacturing applications.

Fast Time to Market
The COM module provides the high-speed computing functions common to most applications including the CPU, memory, graphics, Ethernet and USB communications, SSD interface, and expansion buses. This improves time to market as engineering resources can be dedicated to designing the technology required for the specific application.

Scalability & Long-Term Availability
The carrier board can be designed to enable interchangeability of the COM module and easily change or upgrade the CPU functionality as needed in the future without the need to redesign the entire system.

Additionally, COM modules are available with an up to 15-year lifecycle guarantee – allowing installations to exceed natural lifecycles.

Rugged & Industrial System Design
Sealevel specializes in rugged hardware designed to withstand environmental challenges including hazardous locations, shock & vibration, and temperature extremes. With COM architecture, the connectors are mounted directly to the carrier board, eliminating cable connections and enabling maximum reliability. COM modules are available with a -40°C to 85°C operating temperature range, allowing for fanless operation.

Case Study: Portable Tester for Automotive Manufacturing

A leading supplier to the automotive manufacturing industry was planning a next-generation portable device that provides a variety of testing and programming functions on the assembly line. To minimize size and power consumption, and accelerate time to market and reduce risks, they chose the COM architecture recommended by Sealevel.

Sealevel's Solution

Sealevel engineers worked with our customer to finalize the specifications for the carrier. Onboard I/O included three CAN and two USB 2.0 ports, multiple wireless interfaces, an mSATA SSD, and an externally accessible MicroSD socket. In addition to providing the electrical functionality, layout of the carrier was also very important since the electronics needed to fit in a small space within a plastic enclosure that was already defined. There was also a time crunch as volume production of the finished product had to coincide with the opening of several new manufacturing plants. Sealevel's team delivered working prototypes in only eight weeks from the beginning of the project, meeting the deadline and exceeding the customer's expectations.

However, Sealevel's contribution to the success of the project did not end with the carrier board. Early in the vendor selection process, our customer visited Sealevel and was so impressed with our facilities, equipment, procedures, and people that they asked for our help to design and manufacture six additional supporting circuit boards used in their product as well as an external docking station for the portable device. The customer also entrusted the final assembly and testing of the product to Sealevel, and we now ship directly to their end customers worldwide.

Featured Product: COM-Based Automotive Tester
- COM architecture
- (3) CAN and (2) USB ports
- Multiple wireless interfaces including Bluetooth
- mSATA SSD
- Ultracapacitor energy storage
- Externally accessible MicroSD socket

EMBEDDED COMPUTERS AND CID2-RATED TOUCHSCREEN CONTROLLERS

Designed for factory automation, process control, OEM, and a wide variety of industrial 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.

Achieve computing, I/O and HMI requirements with Sealevel rugged HazPAC® and SeaPAC® touch panel PCs. Our fanless, industrial panel PC systems are designed to operate over wide operating temperature ranges for unmatched reliability; these hazardous area computers also maintain NEMA 4/IP64 protection from sprayed liquids. Certified by ATEX, IECEx and for Class I, Division 2, our touch panel controllers deliver unmatched reliability and versatility in the most extreme environments for heavy industrial processes, mining, factory, and manufacturing automation applications.

Resilient, Reliable Design for HazLoc
Sealevel's solid-state computing systems are designed without fans for improved reliability and long-term field deployment. Through extensive thermal modeling – and prototype testing – Sealevel's computers are designed with certification in mind to meet and exceed temperature requirements. Sealevel's rugged touch panel controllers have NEMA 4/IP64 protection from sprayed liquids including rain, snow, splashes, hose downs, and other pressurized water streams. With its Class I, Division 2 rating, the HazPAC 10 is also approved for locations where flammable liquids or gases are handled and processed.

Intense I/O & Future Proof Design
Intentionally designed to meet the demands of automation and control applications, our industrial computers and controllers enable maximum performance in embedded systems. Standard I/O includes Ethernet, serial, USB and digital interfaces, and mPCIE expansion slots. Our COM-based designs allow for potential upgrades, future-proofing the hardware.

Secure Software for the Edge
Compatible with Microsoft Windows and Linux, our computing solutions provide the fastest time to market and flexibility for customer-specific software. Sealevel SeaCOM and SeaMAX hardware drivers are included to support system I/O. Serial application code samples assist with custom application development and complete support documentation expedites configuration.

Case Study: CID2 Computing for Heat Tracing & Liquid Detection in Manufacturing
Sealevel partners with a customer that specializes in the design and manufacture of heat tracing and leak detection equipment for industrial, commercial, and residential applications. The company's main focuses are the petrochemical and oil & gas industries, but they make products for a wide array of commercial and residential heat tracing applications as well. Sealevel has designed and manufactured multiple generations of rugged touchscreens for the customer that meet the extreme requirements for hazardous location certification, IP protection, impact resistance, and wide operating temperature range.

Sealevel's Solution
Sealevel's engineering team overcame the thermal challenge by designing a COM-based HMI capable of operation between -40°C and 60°C without heaters or fans. The system includes a machined front bezel that maintains NEMA 4/IP64 standards for protection from liquids. Designed for Windows 10® IoT Embedded, and supported in Linux® as well, the system delivers powerful Intel® processing combined with a bright, LCD, five-wire resistive touchscreen. The touchscreen integrates a glass surface that is waterproof, and impervious to flames, chemicals, solvents, and stylus use for maximum abrasion and scratch resistance. Since the partnership originated, Sealevel has now designed and manufactured multiple generations of rugged touchscreens for the customer.

Featured Product: HazPAC 10® Rugged Panel PC
- Certified by ATEX, IECEx, and for Class I, Division 2 (Groups A, B, C, D, T4)
- Intel Atom E3845 quad-core processor
- Designed for Windows 10® IoT Embedded with support for Linux®
- Durable 5-wire glass resistive touchscreen interface
- (2) Isolated 2-wire RS-422/485 ports
- (2) Non-isolated 3-wire RS-232 ports
- (3) Gigabit Ethernet ports
- (4) USB 2.0 ports
- (4) Open collector digital outputs
- -40°C to 60°C operating temperature range

USB CONNECTIVITY FOR MACHINE & EMBEDDED VISION SYSTEMS

As manufacturing automation advances, the need for compatible expansion and communication devices increases. And with the incorporation of machine vision and embedded vision systems, the emphasis on reliability is at an all-time high. Sealevel's USB serial adapters and USB 3.1 hubs are backward-compatible with legacy technology while achieving the fastest speeds available.

USB Serial Adapters

From one to sixteen ports, SeaLINK® USB serial adapters allow for quick integration with RS-232, RS-422, and RS-485 peripherals – invaluable for receiving intelligence from autonomous drones and underwater remotely operated vehicles (ROVs) as well as other communication and vision systems. Unlike traditional UART-based products, SeaLINK USB serial adapters use a state-machine architecture that reduces host processor overhead for faster, more reliable communications in critical environments. Sealevel offers the largest selection of USB serial adapters available, many featuring high-retention USB connectors to prevent loss of connectivity.

Rugged USB 3.1 Hubs

Sealevel industrial USB hubs are designed for rugged applications requiring wide operating temperature range and long-term availability. Choose hubs with charging downstream ports that are perfect for charging batteries or powering high-current USB peripherals. Hubs are available with up to 7 ports and up to USB 3.1 speeds and are backward-compatible to support legacy hardware. Optically isolated hubs protect computers from damaging surges, spikes, and ground loops commonly found in industrial and OEM applications.

Case Study: Supporting Vision Systems for Virtual Testing

Sealevel partners with a leading provider of embedded computing solutions for Advanced Driver Assistance Systems (ADAS). The customer provides technology systems specifically for testing in virtual environments. Common feature testing includes automatic emergency braking, collision warnings, lane departure warnings, blind spot warning, and adaptive cruise control.

As the United States and European Union now require ADAS technology on all new cars, the customer's product needs have increased dramatically.

Initially, the customer relied primarily on our SeaI/O 450U and 430U digital acquisition devices. However, as the number of peripherals integrated into the virtual test environment expanded, they required more – and faster – USB integration.
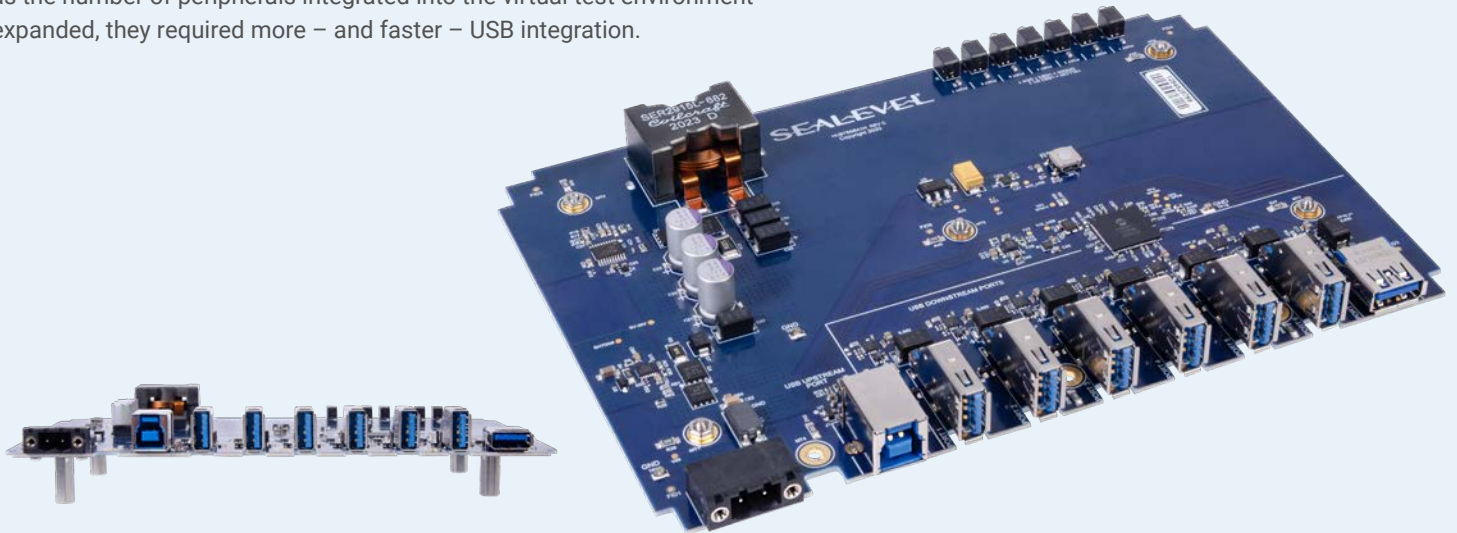
Sealevel's Solution

Sealevel's team recommended the Embedded Rugged SuperSpeed 7-Port USB 3.1 Hub. After an initial evaluation, the customer standardized on the USB 3.1 Hub from Sealevel across their test platforms. This solution enables backward compatibility while allowing the customer to incorporate newer, faster technology simultaneously. Intentionally designed to meet the advanced requirements for connecting a variety of USB peripherals at once while achieving SuperSpeed operation, the USB 3.1 Hub enables the customer to realize multiple goals.

Featured Product: Embedded Rugged SuperSpeed 7-Port USB 3.1 Hub
- USB 3.1 compliant, providing up to 5 Gb/s data rate to the host
- Supports SuperSpeed (5Gbps), high-speed (480Mbps), full-speed (12Mbps) and low-speed (1.5Mbps) operation
- One CDP supplies up to 2.4A while the other six supply 1500mA each
- USB Battery Charging Specification BCv1.2 compliant
- Wide operating temperature of -40°C to 85°C
- ESD, overvoltage, and overcurrent protection

QUALITY FOCUSED OPERATIONS FROM START TO SHIP

Sealevel's team of over 90 employees spans our engineering, manufacturing, and business departments. Our fully integrated staff is committed to customer satisfaction as demonstrated by our ISO 9001:2015 certification and rigorous quality processes. Every employee stands behind our first-in-industry lifetime warranty on I/O and the long-term availability of all products, beyond the life of your mission.

Dedicated Hardware & Software Engineering Resources
Sealevel is the leading designer and manufacturer of industrial computers, Ethernet serial servers, USB serial, PCI Express and PCI bus cards, and software for critical communications. We partner with OEMs and industry leaders to meet their specific application needs through our complete standard product line and custom design and manufacturing capabilities. We offer over 350 standard products in a wide variety of configurations and have successfully designed and deployed over 90,000 embedded computers since 2004.

Areas of Expertise
- COM Baseboard Design including COM Express® Type 6, 7, and 10, SMARC®, and Qseven
- x86 Architecture
- RISC Single Board Computer Design
- PCIe/104
- 8, 16, and 32-bit Microcontroller-Based CPUs
- Serial I/O – Asynchronous or Synchronous
- 10 Gigabit Ethernet
- USB 3.2, 2.0, 1.1, 1.0
- MIL-STD-1553
- High Density/BGA
- PCB Layout
- Thermal Modeling
- Functional Density
- SWaP
- Device Drivers for Windows, Windows Embedded and Linux
- Embedded Firmware
- Microprocessor Control
- PLC Process Control

Manufacturing

All product design and assembly take place at our ISO 9001:2015 registered manufacturing facility, located in the United States of America. These processes are subject to our rigorous quality standards to meet our high-reliability guarantee for critical communications electronics. Our state-of-the art Surface Mount Technology (SMT) line consists of an Automated Screen Printer with 2D Inspection, four High Speed SMT pick and place machines, a Ten Zone Forced Convection Reflow Oven, and a 5-Camera Automated Optical Inspection system. Following initial build, our in-house team of J-STD-001 and IPC-A-610 certified technicians completes through hole soldering.

Areas of Expertise
- High Speed Surface Mount Technology (SMT)
- Printed Circuit Board (PCB) Assembly
- Through Hole Assembly
- Board Level Assembly
- Box Build Assembly
- Automated Screen Printing with 2D Inspection
- Automated Optical Inspection
- Closed-Loop Inline Aqueous Cleaning
- Automated Conformal Coating
- Multi-Angle Transmissive X-Ray
- Vibration & Thermal Screening

Design – and Test – for Certification

Sealevel's "design for certification" approach to engineering and manufacturing ensures that our compliance, test and certification engineers are involved beginning with initial concepts. Every custom embedded computer and industrial I/O design is refined to meet safety, security and environmental requirements. Sealevel's in-house Compliance & Test engineers complete in-house evaluations utilizing our multi-angle transmissive x-ray, 2-axis vibration table, and multiple thermal chambers. This pre-certification analysis, validation, and test methodology reduces time to market as well as costs for our customers.

Areas of Expertise
- 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

MADE
IN THE USA