



SEALEVEL[®]

MILITARY

SYSTEMS

About Sealevel



Sealevel Systems is an American-owned, small business manufacturer of serial communications, digital I/O and ruggedized computers. Located in Upstate SC, our modern 52,000 sq. ft. facility sits on a 17-acre site. To protect electronic components from damage during assembly and test, ESD tile is installed throughout engineering, manufacturing and test areas.

With more than 28 years of experience and over 350 standard products for military, government, and commercial customers, our forte is using in-house engineering expertise to create custom adaptations of our COTS product line for military and government projects.

Sealevel has consistently provided innovative hardware and software products enabling computer connectivity and control to every major U.S. and Allied nations military contractor including Northrop Grumman, Raytheon, BAE, Boeing, L3, General Dynamics, SPAWAR, NAVAIR and SOCOM.

Our commitment to customer satisfaction is demonstrated by our ISO 9001:2008 certification and the industry-leading lifetime warranty that is standard with all Sealevel manufactured I/O products. Sealevel is ITAR registered with the Directorate of Defense Trade Controls (DDTC).

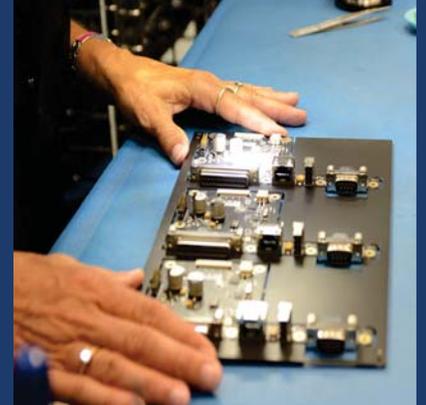
Communications



Computing



Manufacturing



COTS and Full Custom Military Solutions

Tools for Critical Applications

The modern battlefield demands ruggedized equipment that deliver a combat advantage. Sealevel computing and communications solutions are proven effective even in the harshest environments. Choose from an array of COTS products or partner with us to create a custom solution ideally suited to your particular application.

COTS Synchronous Serial

Sealevel offers the widest selection of synchronous serial choices for radio, radar, telemetry and other data intensive applications.

Tactical Radio Adapter

The ACC-188 adapter enables data communications for email, messaging and file transfer on a wide variety of tactical radios.

MIL-STD-1553

Simplify military and avionics applications with our full line of third-party party validated MIL-STD-1553 IP cores, board level products and bus testers.

Rugged Computing

Accelerate your new product introduction with a custom design that exactly meets your specific requirements.

Electronic Design and Manufacturing Services

Whether you need a turnkey design from specification to production, or quality assembly of your own design, Sealevel has the know-how, equipment and experience you can depend on.

COTS Synchronous Serial Solutions

COMMUNICATE WITH CONFIDENCE

Sealevel synchronous serial adapters are trusted for military, aerospace and commercial applications where reliable, high-speed communications are required. Choose from a variety of RS-232 or RS-232/422/485 multi-interface options using the industry-standard Zilog Z85230 Enhanced Serial Communication Controller (ESCC) or the powerful Zilog Z16C32 Integrated Universal Serial Controller (IUSC).

PCIe					
Part Number	Ports	Interface	Controller	Max Speed	Low Profile
5102e	1	RS-232/422/485	Z85230	128K bps	Yes
5103e	1	RS-232	Z85230	128K bps	Yes
5104e	1	RS-232/422/485	Z16C32	10M bps	Yes
5204e	2	RS-232/422/485	Z16C32	10M bps	No
5402e	4	RS-232/422/485	Z85230	128K bps	No

PCI					
Part Number	Ports	Interface	Controller	Max Speed	Low Profile
5102	1	RS-232/422/485	Z85230	128K bps	Yes
5103	1	RS-232	Z85230	128K bps	Yes
5104	1	RS-232/422/485	Z16C32	10M bps	Yes
5402	4	RS-232/422/485	Z85230	128K bps	No



Compact Synchronous Server

We've added synchronous serial capabilities to our rugged Relio solid-state computers. Choose from powerful i7 or i3 dual core processor models, each offering a wealth of standard I/O. Perfect for radar, satellite and other military applications, our compact Relio R2 Sync Server provides

4 synchronous ports, while the 1U Relio R6 Sync Server includes 8. Designed using the Zilog Z85230 ESCC, each synchronous channel is individually configurable for RS-232, RS-422, or RS-485.



Relio systems provide the advantages of COM Express architecture, require low power consumption and operate fanless over a wide 0-50°C temperature range. The systems are easily customized to match specific customer I/O requirements.

CASE STUDY: Synchronous Serial Adapter

Sealevel designed a custom PCIe Mini Card to connect a rugged, military server to radio modems installed in aircraft. The radio modems use a proprietary, synchronous protocol as the host interface with little documentation available and no opportunity for modification.

Key to the implementation is the use of a Field Programmable Gate Array (FPGA) that contains the PCI Express interface IP and the custom synchronous serial control logic. The FPGA is coupled with a multi-protocol transceiver to drive and receive the RS-423 signals and provides Transmit and Receive FIFOs that are custom-sized for the required protocol and data rates, but may be resized for other applications. The FPGA offloads the host processor by sensing the sync pattern and only interrupting the Sealevel-provided driver after a valid frame has been received. The Sealevel PCIe sync serial FPGA architecture is extensible and scalable to serve various custom synchronous serial protocols and applications.



High-Speed Tactical Data Communications

BRING THE POWER OF DIGITAL COMMUNICATIONS TO THE BATTLEFIELD

The ACC-188 synchronous serial radio adapter connects a computer's USB port to a tactical radio to provide critical data communications. A key advantage of the ACC-188 is that it enables interoperability among the various radio brands and models used by the defense community. The adapter is compatible with any tactical radio that has a synchronous data port using MIL-STD-188-184.

The Defense Information Systems Agency (DISA) supplies PDA-184, the application software used with the ACC-188. PDA-184 provides a graphical user interface (GUI) that allows radio users to transmit and receive a variety of data types at much higher speeds than is possible with comparable, proprietary solutions.

The ACC-188 includes a quick disconnect radio cable that allows the adapter to be easily configured for the user's target radio. This feature allows maximum communications capabilities with the smallest footprint, lightest weight and lowest cost possible. Additionally, ACC-188 adapters purchased today will be compatible with future radios simply by adding the appropriate radio cable.



Tactical Radio Communication Adapter With Quick Disconnect Radio Cables



CA499
for AN/PRC-117G

CA498
for an/PRC-117F

CA500
for AN/PRC-152

9065-QD
Tactical Radio Communication Adapter

CA509
for AN/PRC-148



MIL-STD-1553 IP Cores and COTS Adapters

DELIVER HIGH-SPEED DATA WITH ACCURACY — EVERY TIME

MIL-STD-1553 is a widely used serial communications bus for military and avionic applications. Sealevel offers an alternative for implementing 1553 using software IP cores integrated into FPGA devices. IP cores can provide substantial advantages over standard 1553 ICs including:

Reduced Cost

IP core technology including the use-license can deliver more than 50% cost reduction in 1553 node price for moderate quantities.

Easy Ability to Upgrade

Since FPGAs can be reprogrammed, the 1553 functionality can be enhanced, modified or replaced by a new IP core if required.

Small Footprint Saves Board Space

IP cores can fit into FPGAs already included in a design and the analog transceiver is much smaller than a dedicated 1553 IC.

Easy Evaluation

Using tools like ModelSim, the entire functionality can be evaluated and simulated before a single trace is routed for the PCB.

Supports Long Product Life Cycle

IP cores are not FPGA specific and the core can be moved to a different FPGA part in the event of obsolescence or supply chain issues.



MIL-STD-1553 COTS Expansion

PMC

The BRD1553PMC board provides up to eight communications channels compatible with MIL-STD-1553B and MIL-STD-1760. Each channel can be configured independently to work with H009 and WB-194 in conjunction with MIL-STD-1553.



PCI

Choose either 1 or 2 channel MIL-STD-1553 model configurable as Bus Controller (BC), Remote Terminal (RT) and Monitor (MT).



PC/104+

Add two channels of MIL-STD-1553B to the PC/104+ stack. Each channel can be configured independently to work with H009 and WB-194.



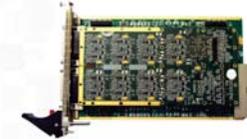
CompactPCI/PXI

The BRD1553cPCI provides up to eight channels of MIL-STD-1553B communications and also includes eight generic I/O pins that can be used as RS-422, RS-485 or ARINC-429 (2 transmit and 2 receive channels).



VME

Add 4 or 8 channels of MIL-STD-1553B to your VME system. Each channel is individually configurable as Bus Controller (BC), Remote Terminal (RT) and Monitor (MT).



Software

All MIL-STD-1553 boards are software compatible with DDC® Enhanced Mini-ACE® components and architecture and are provided with drivers for Microsoft® Windows® and Linux.

* DDC® and Mini-ACE® are registered trademarks of Data Device Corporation, Bohemia, NY, USA.



Rugged Computing

NO COMPROMISE COMPUTING THAT FITS YOUR MISSION

Combine the advantages of COTS and custom with a ruggedized computer solution that exactly matches your application requirements. Built for harsh, mission critical environments, our Computer on Module (COM) based systems provide the benefits of a full custom design while reducing time, costs and risk.

COM systems combine an off-the-shelf processor module containing the functionality common to most systems (processor, memory, graphics, USB, Ethernet, SATA) with a custom carrier board that includes application specific I/O and interface connectors. Choose from a variety of COM form factors and processor options, all offering long-term availability and superior life cycle management.

Eliminate Moving Parts and Internal Cables for Ultimate Reliability

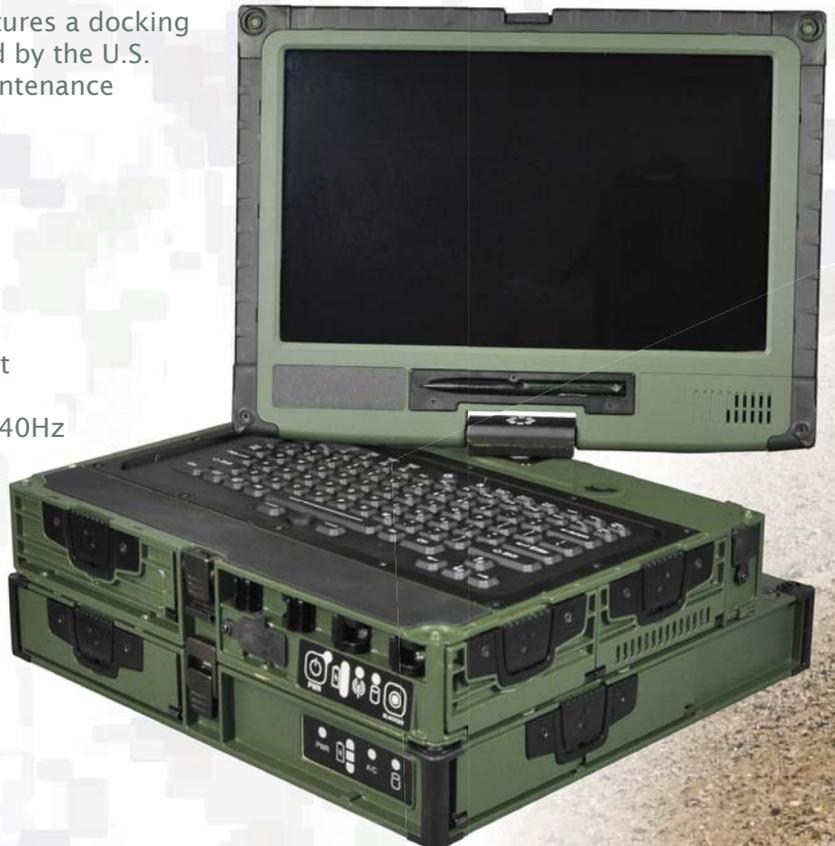
Our rugged systems require no fans or other rotating parts. Your OS and application software run from solid-state disk, eliminating rotating hard drives and resulting in true solid-state operation. Sealevel COM systems also eliminate a common source of failure: internal cables. Perfect for high-vibration applications, COM architecture allows the custom carrier board to be designed to the desired mechanical dimensions with I/O connectors soldered directly to the carrier board providing external access with no internal cables.

CASE STUDY: Military Laptop Docking Station

Sealevel designed and manufactures a docking station for a rugged laptop used by the U.S. military for diagnostics and maintenance of vehicles and aircraft.

Application Requirements

- Optical Drive
- Modem
- Parallel Printer Port
- RS-232 Port
- Replaceable Battery with Smart Charge Circuitry
- 85-264VAC Power Input, 47-440Hz
- Cast Magnesium Enclosure
- MIL-STD for Shock, Vibration, Moisture, EMC, Radiated Emissions, and Safety



Sealevel created the dock design and managed all compliance testing to meet an extensive list of MIL-STDs and other key requirements. Our electrical team designed six PCBs to accommodate the I/O requirements in the mechanical envelope available. The complex mechanical assemblies were created in SolidWorks through a collaborative effort between Sealevel, our customer, and the vendor selected to fabricate the tooling and produce the finished cast magnesium enclosure parts. Once prototypes were available, Sealevel test engineers conducted field and laboratory testing to guarantee compliance with the customer's specifications.



Photo Credit: Master Sgt. Keith Brown, U.S. Air Force

Electronic Design and Manufacturing Services

KNOWLEDGE AND PROCESSES THAT EXPAND YOUR CAPABILITIES

Take advantage of Sealevel's proven expertise designing and manufacturing quality electronic boards and systems. We specialize in high mix, complex printed circuit board design and assembly. System level design, integration and testing are available for one-stop service.

Custom Design Services

Design Specification and Project Management

Successful projects start with clear specifications. Sealevel's experienced project managers will work with you to create a Statement of Work and project schedule, then follow a requirements-based design process to meet all project deliverables.

Electrical Design

Our engineers use advanced schematic capture, layout, routing and modeling tools for error-free designs and fast time-to-market.

Mechanical Design

Advanced 3D modeling enables full turnkey system design with amazing speed and accuracy. Thermal modeling is used to create simulations and predict environmental performance before prototypes are produced.



Software Design

Whether your project requires a custom BSP, microcontroller firmware, driver, API or test utilities, Sealevel's team is adept at solving even the most complex problems. Many of our designs use advanced field programmable gate arrays (FPGAs) to reduce size and cost while increasing flexibility.



Electronic Assembly and Testing

Sealevel's assembly capabilities are optimized for low to medium volume production. State of the art surface mount line, X-ray, BGA and fine pitch repair equipment can reliably handle even the most sophisticated designs.

Printed Circuit Board Assembly

- Real-time Process Feedback and Control Systems
- Defect Tracking and Trending
- Route Verification
- Real-time Process Alarming
- Barcoding and Batch Lot Tracking
- Feeder Verification
- Electrostatic Discharge Controls (ESD)
- Moisture Sensitive Controls (MSD)
- Customer Deviation and ECO controls

Certification/Registrations

- ISO 9001:2008 Registered
- ITAR Registered
- DDTC Registered
- SAM Registered
- RoHS Compliant
- ESDS 2020 Compliant
- IPC-A-610 Workmanship Certified
- IPC-7721 Repair Skill Certified
- J-STD-001 Soldering Certified

System Integration

Choose Sealevel as your full system integration partner. Whether you need a powerful server with extensive storage or a low cost white box, we'll supply a tested system delivered consistently over the life of your project. Computerized build instructions guide technicians through each step in the process and quality documentation is provided with every shipment.



Our integration services also include full software system imaging and installation. We work with our customers to create an approved initial image release that includes OS, hardware drivers, application programs, security settings and anything else specific to the application. Then we manage the image, adding any necessary updates to the OS required for new software releases or security updates.

Supply Chain Management

Sealevel's supply chain management services leverage key vendor relationships to minimize cost and inventory while meeting challenging delivery requirements. Our experienced management works with each customer to create a customized program with optimum cycle time.

Supply Management Services

- Strategic Vendor Models
- Commodity Aligned Procurement
- Supply Kanban
- Vendor Management Inventory (VMI) Programs
- Consigned Materials Strategies
- Bonded Inventory Management Programs
- Life Cycle Strategies
- Counterfeit Parts Avoidance

COMPLIANCE

Product Compliance and Certification

Using a “design for certification” approach, Sealevel can manage the entire process of custom product development certified to many military and commercial standards including:

- MIL-STD-810G
- MIL-STD-464E
- MIL-STD-1472G
- MIL-STD-461F
- MIL-STD-901D
- MIL-STD-167-1
- NEMA, IP and ATEX
- FCC, CE
- UL, CSA
- Class I, Div 1; Class I, Div 2 Hazardous Areas
- Component Derating Process per NASA GSFC Preferred Reliability Practices

We have the test equipment and knowledge to provide screening of prototypes for EMI emissions and susceptibility as well as environmental performance including temperature and rain testing prior to testing at certified labs. This pre-test screening saves the time and cost of official laboratory testing until passing results are proven likely. Sealevel maintains relationships with certified testing laboratories, including Clemson University’s International Center for Automotive Research (CU-ICAR) located near our facility, to make receiving final, official certifications simple.



Environmental Stress Screening (ESS)

For products that require the highest reliability, Environmental Stress Screening (ESS) can accelerate defects that may otherwise not be detected until a field failure occurs. This is done by subjecting the unit under test to rapid thermal cycling and vibration testing that can precipitate latent defects such as cold solder joints, loose fasteners, or poor wire crimps. Defects found during ESS can be addressed rapidly to determine root cause and effect a corrective action to eliminate recurrence and improve the overall quality level of the product.

Once a product is released for production, our extensive manufacturing capabilities provide a trouble-free pipeline to meet delivery demands. Our in-house test equipment includes modern thermal chambers and vibration stations suitable for large volume production orders requiring ESS. Whether your market is military or commercial, Sealevel offers the knowledge and tools to bring the highest level of quality to your next product design.

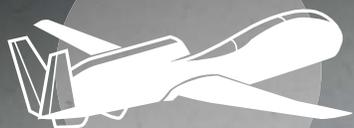
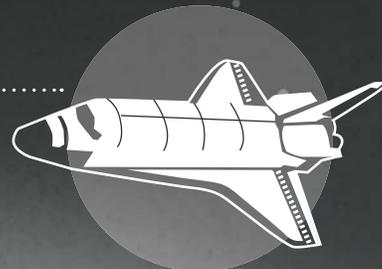


COMMAND and CONTROL in any ENVIRONMENT

Sealevel Systems has been in business since 1986 and produces more than 50,000 PCBs each year from our 52,000-square-foot facility. Our talented team offers electrical, mechanical, software and compliance expertise. The company is ISO 9001 and ITAR Registered.

SPACE

Sealevel Systems created a product, first launched into space in 2000, to monitor the position of the space shuttle's robotic arm.

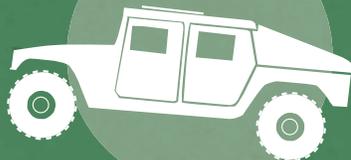


AIR

Sealevel products monitor and control 760 US Military UAVs via ground control systems, data communications systems and surveillance systems.

LAND

Sealevel has supplied 19,000 docking stations for US Army maintenance systems in military aircraft and ground vehicles, as well as more than 60,000 Defense Advanced GPS Receiver programming devices.



HOMELAND

More than 4,700 Sealevel computers are in use by public safety services, including law enforcement, fire departments, EMS and the National Guard.

SEA

100% of US Naval vessels, about 280 total, use Sealevel equipment to connect and monitor navigation systems, data communications and other ship systems.



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