Ridgetop Group Inc
ENGINEERING INNOVATION

Ridgetop Group was founded in 2000 to develop innovative products for mission-critical systems operating in harsh environments.

An AS9100C and ISO9001:2008 certified company, Ridgetop provides solutions for optimized integrated subsystems and systems for aerospace, industrial, automotive, and energy applications.

What Defines Ridgetop?

Engineering Innovation

Whether your systems require advanced prognostic solutions or innovations to manage semiconductor yield ramp, Ridgetop offers high-quality, original solutions. Our staff members hail from leading firms such as Honeywell, IBM, and Texas Instruments, and devise solutions with "engineering innovation" at the heart of our company's goals.

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Semiconductor and Precision Instruments (SPI) Division

Ridgetop, based in Tucson, Arizona, is a highly specialized provider of custom analog test structures and process verification tools that support application-specific integrated circuit (ASIC) designers and semiconductor manufacturers. Our products provide many advantages, including fast and accurate access to process variation across die or wafer, improved IC design for manufacturability, monitoring of process drifts, and verification of specific model parameters that are critical to a design.

Ridgetop's experience base covers IC designs across a broad range of technology nodes on various silicon processes for environmental conditions that range from mild to severe. Our staff members have impressive credentials and experience from leading firms such as IBM, Bell Labs, Honeywell, and Burr-Brown (now Texas Instruments).

Precision Instruments
Ridgetop's Q-Star products supply a complete line of affordable precision current measurement modules and IP for IC characterization testing, and ProChek™ targets process qualification and reliability characterization concerns of deep submicron nanotechnology CMOS processes.

ProChek systems provide a powerful combination of test IP, productivity-enhancing software, and a compact yet flexible benchtop test system to bring you process qualification or reliability characterization information more quickly and cost-effectively than any previous system.

InstaCell™ IP Library
Ridgetop provides high-performance IP to enable customers to achieve outstanding performance in ASICs and other ICs. This IP comprises our InstaCell™ Analog/Mixed-Signal IP Library. Many of these library blocks are silicon-proven. We have successfully fabricated IP for TSMC, IBM, AMI, X-Fab, and other fabrication processes at different technology nodes. Available blocks include a wide range of ADCs, DACs, bandgap voltage references, comparators and op-amps.
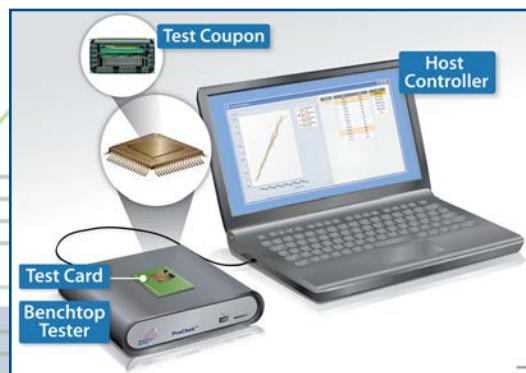
Radiation-Hardened Products and Design Services
Radiation causes performance degradation in integrated circuits through accelerated aging. The impact can cause leakage and threshold voltage shifts in ICs that can cause system failure. To mitigate these problems, Ridgetop has extensive experience in the design of radiation-hardened components for critical applications. Many of our IP blocks in the library have been specifically designed for radiation tolerance and other harsh applications where reliability is a critical requirement. Call to discuss your specific requirements.
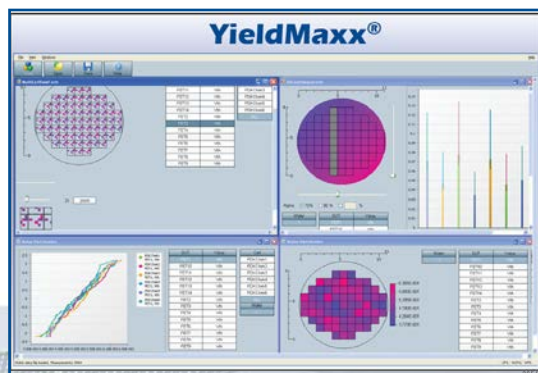
Independent Die-Level Fab Process Monitoring Tools
Ridgetop has introduced a line of products for its nanoDFM™ family. PDKChek® is a library of die-level process monitors that measure process mismatch for parameters like V_T, I_{ON}, ΔC, and ΔR. As opposed to traditional process monitors that are embedded in the scribe lines, these monitors are built onto the fabricated ASIC itself, thus they are available as part of the packaged silicon and can be used whenever the customer (not the foundry) wants. This can be especially useful to help clarify whether a yield problem is due to design or to fabrication issues.

Ridgetop also offers YieldMaxx®, a flexible software tool for visualization of PDKChek results. YieldMaxx can display I-V curves showing the performance of individual PDKChek-instrumented die, or provide wafer maps to illustrate the impact of parameter mismatch across an individual wafer or a wafer lot.

ProChek semiconductor process reliability characterization and qualification system

Yieldmaxx user interface

Advanced Diagnostics and Prognostics (ADP) Division

Ridgetop Europe is a leading supplier of precision current measurement products. Ridgetop Europe offers design-for-test (DFT) and test-related services as well as electronic and PCB design and engineering services supporting prototype development and small series production.

Combined, Ridgetop Group and Ridgetop Europe have an installed base of over 90 different customers worldwide, including a deployment of more than 750 instruments.

Ridgetop is a leader in the prognostic health management (PHM) and advanced diagnostics field, with a number of patents. This body of knowledge and applied expertise includes the following significant technologies: (1) Sentinel Network™ prognostics analysis platform; (2) prognostic-enabling of military power supplies; (3) prognostic-enabling of electromechanical actuator (EMA) components; (4) prognostic-enabling of electrohydrostatic actuator (EHA) components and integration framework; (5) state-of-health (SoH) algorithms; and (6) remaining useful life (RUL) algorithms such as ARULE™. This leveraging allows Ridgetop to focus on integration of, rather than design and development of, electronic and mechanical prognostic technologies, SoH technologies, and RUL technologies into a PHM approach that applies advanced diagnostic and prognostic algorithms to legacy radar systems, controls, and vehicles operated under harsh or off-design conditions.

Based on extracted degradation signatures, these solutions can be applied to ICs using nanoscale, in-situ monitors that employ advanced eigenvalue extraction methods; and

Sentinel Network monitoring devices for condition-based maintenance (CBM) in IT Lab

finally to the system level using algorithmic approaches. A user-friendly Sentinel Network interface collects and analyzes the data.

Detection of Impending Faults

Ridgetop pioneered the introduction of advanced tools to prognostic-enable critical electronic modules and chips. Comprising three key elements, Ridgetop has introduced innovative detection technologies (Sentinel Silicon™, SJ BIST™, and RingDown™) to transmit monitored fault signatures for collection and analysis on our advanced Sentinel Network platform. With the built-in flexibility to mix, match, and configure, Ridgetop's products provide its customers with the state-of-the-art technology needed to calculate SoH and RUL estimates.

These products, in addition to predicting impending failures, help reduce troublesome and costly CND (could not duplicate) or NTF (no trouble found) maintenance codes in fielded systems. Overall, these tools reduce the lifecycle cost of critical systems.

Ridgetop has forged a path of technical leadership in the emerging field of electronic prognostics and health management. With solutions spanning the IC level to the system level, Ridgetop's patented technologies provide much-needed solutions for detection of impending fault or failure conditions in electronic modules. Ridgetop's innovative designs have been applied in complex aerospace, automotive and semiconductor applications, where performance and quality are essential.
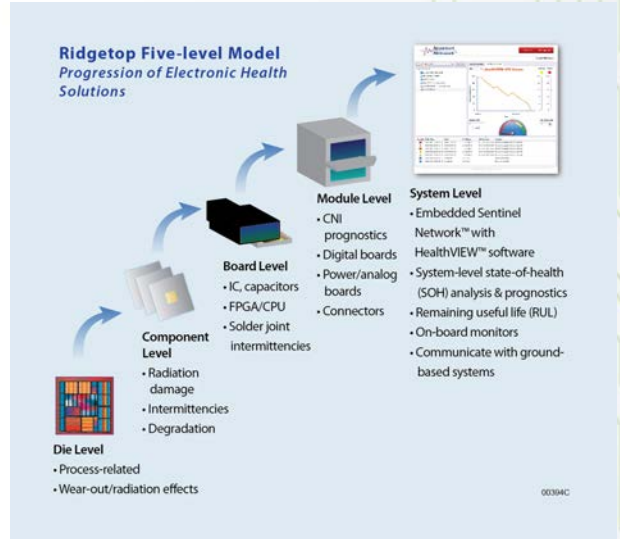

Sentinel Network analysis user interface

Ridgetop Prognostics & Design Services

● Ridgetop Prognostics

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Ridgetop Five-level Model
Progression of Electronic Health Solutions

System Level
- Embedded Sentinel Network™ with HealthVIEW™ software
- System-level state-of-health (SOH) analysis & prognostics
- Remaining useful life (RUL)
- On-board monitors
- Communicate with ground-based systems

Module Level
- CNI prognostics
- Digital boards
- Power/analog boards
- Connectors

Board Level
- IC, capacitors
- FPGA/CPU
- Solder joint intermittencies

Component Level
- Radiation damage
- Intermittencies
- Degradation

Die Level
- Process-related
- Wear-out/radiation effects

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Design Services

Ridgetop Group has a staff of highly experienced engineers and the tools to provide design services for critical IC and PCB-based designs. For application-specific ICs (ASICs), these designs can include analog, digital, mixed-signal, and gate array designs of varying process nodes of 0.5 μ down to 28 nm. Recent designs have included radiation-hardened (rad-hard) high-speed ADCs, DACs, and precision, in-situ test structures. The designs include complex devices incorporating signal conditioning, on-board memory, and many other stages. Board-level designs have included laser rangefinder instruments, data memory modules for commercial aircraft, and subsea electronics. Certification to FAA DO-178B and DO-254 is also available.

Ridgetop engineer designing ICs in Cadence®

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Worldwide Locations

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