

**New SATURN rugged SBC
with E3940 CPU
and data acquisition**



**SATURN
Rugged Apollo Lake x5-E3940 SBC with Data
Acquisition and PCIe/104 Expansion**

Saturn combines a feature-rich Atom-class processor-based SBC with a professional-quality industrial analog and digital data acquisition subsystem and flexible I/O expansion in a single board measuring 4.0 x 4.5 inches. A comprehensive suite of rugged features makes Saturn a perfect fit for rugged and harsh environment applications.



Visit the product web page here:

<http://www.diamondsystems.com/products/saturn>

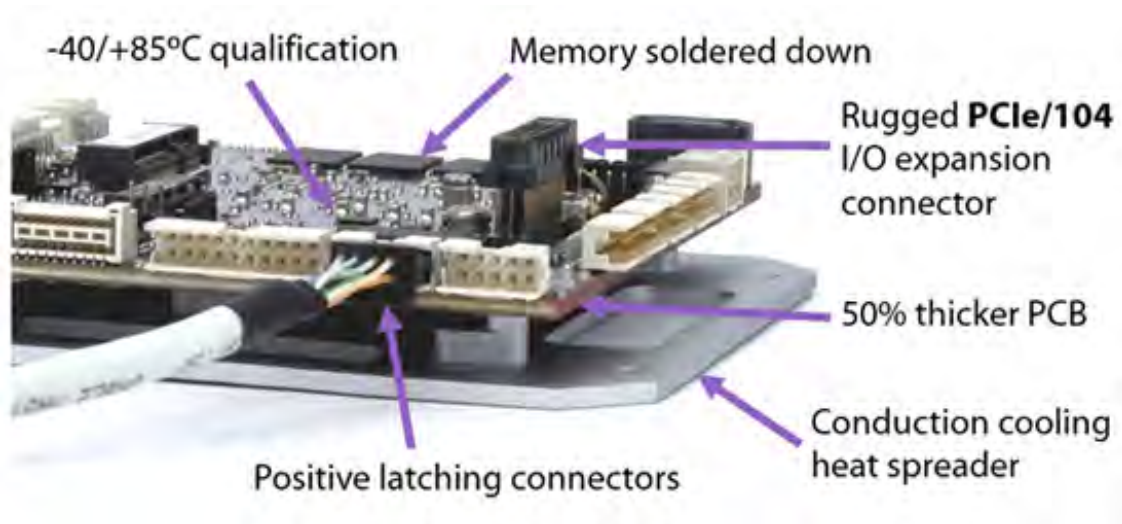
Saturn includes the following key features and functionality:

- Intel "Apollo Lake" x5-E3940 1.6GHz (burstable 1.8GHz) quad-core processor with 15-year lifecycle
- Rugged Design with:
 - 4GB non-ECC or 8GB ECC RAM soldered down
 - Thicker PCB and latching connectors increase resistance to shock and vibration
 - Bottom side heat spreader with integrated thermal pad provides efficient cooling and convenient mounting
 - Full -40 to +85°C industrial operating temperature range

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- Integrated professional-quality analog and digital data acquisition subsystem with software support
- Highly expandable with:
 - PCIe/104 OneBank I/O expansion connector with 4 PCIe x1 and 2 USB 2.0 connections
 - Minicard expansion socket for versatile low-cost I/O
 - M.2 2242 SATA socket supports up to 1TB flashdisk

Saturn was designed from the ground up with a comprehensive set of features to meet the challenges of rugged environments and applications:

- Memory is **soldered** down to avoid problems that can occur with commercial style SODIMM type memory modules
- The 50% thicker PCB increases rigidity and improves reliability of fine pitch and high-ball-count BGA solder joints
- All I/O connectors are latching for increased ruggedness
- A bottom-side heat spreader provides more efficient cooling than a traditional heat sink. Processor and memory chips are both thermally connected to the heat spreader. The exterior surface features recessed thermal pads for improved thermal connectivity to the system enclosure.
- ECC RAM option on 8GB RAM models
- All components are rated and/or tested to ensure reliable -40 to +85°C operation



Saturn has an **integrated professional quality data acquisition system** with autocalibration and Universal Driver programming support, making it Diamond Systems' newest 2-in-1 single board computer containing the CPU + I/O and DAQ subsystem on a single board. This 2-in-1 design reduce cost, save space, and decreases weight.

- 16 single-ended / 8 differential analog inputs
- 16-bit A/D resolution
- 250KHz maximum A/D sample rate
- 4 16-bit single-ended analog outputs
- 24 digital I/O, 3.3V logic / 5V tolerant inputs

Saturn's data acquisition circuit features autocalibration, which maintains best accuracy of the A/D and D/A circuits regardless of time and temperature swings. Using the supplied Universal Driver software library, the circuit can be quickly calibrated to within +/-2LSB accuracy at any time, relative to the on-board precision reference voltage circuit.

Saturn utilizes the OneBank cost effective, compact PCIe expansion connector to allow its use with hundreds of I/O expansion boards from Diamond Systems and other embedded systems vendors around the world. It benefits the customer by enabling them to design a rugged custom-tailored system based on off-the-shelf components to create a perfect fit solution. Saturn includes M.2 2242 SATA socket supports up to 1TB flashdisk. Saturn also includes minicard expansion socket with PCIe and USB support for versatile low-cost I/O.

Board support packages are available for Windows 10 64-bit and Linux 64-bit operating systems. Saturn is available in 4 models to meet various application needs.

Model	RAM	Data Acquisition
SAT-E3940-4GA	4GB non-ECC	Analog + digital I/O
SAT-E3940-4GD	4GB non-ECC	Digital I/O
SAT-E3940-8GEA	8GB ECC	Analog + digital I/O
SAT-E3940-8GED	8GB ECC	Digital I/O

Diamond Systems is the pioneer of small form factor, rugged x86 SBCs with integrated data acquisition. Our products are used around the world in military, medical, industrial, and transportation applications where small size, ruggedness, I/O, and long lifetime are requirements.



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