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

Sunnyvale, California — September 13, 2021 — Diamond Systems, a global provider for compact, rugged, I/O-rich embedded computing solutions, has introduced **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, designed for rugged applications.

2 in 1 SBC + data acquisition

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

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 +85ºC industrial operating temperature range
- 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.

- All components are rated and/or tested to ensure reliable -40 to +85ºC 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

Autocalibration increases accuracy over time and temperature swings. Another benefit is that the process can be done as often as desired because no physical access is required.

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

Media Resources
Saturn webpage on Diamond Systems web site:
http://www.diamondsystems.com/products/saturn

Availability

Saturn will be available to ship by October 2021.

For more information, please visit the Saturn webpage above or contact the Diamond's sales team: sales@diamondsystems.com.

About Diamond Systems

Diamond provides rugged, highly integrated embedded computing solutions such as carrier boards and systems for NVIDIA Jetson modules; single-board computers (SBCs); ultra-compact and 10G Ethernet switches, an extensive line of expansion modules for analog and digital I/O, solid-state disk, and power supply functions.

For further information, please visit http://www.diamondsystems.com.

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