

The DAMC-DS5014DR: A High-Speed and High-Performance RFSoc-Based Platform for Diverse Scientific Applications

Thursday 12 December 2024 09:30 (15 minutes)

Integrating high-speed ADCs, DACs, and an advanced field-programmable gate array (FPGA) onto a single chip, utilizing Radio Frequency System-on-Chip (RFSoc) technology, creates a powerful and flexible platform for complex high-frequency instrumentation and real-time signal processing. This work will introduce the RFSoc-based MicroTCA.4 high-speed digitizer, the DAMC-DS5014DR, that offers significant flexibility, performance, and system integration advantages. The DS5014DR, equipped with eight channels of 5 GSPS ADCs and eight channels of 9.89 GSPS DACs, supports applications such as high-energy particle physics (HEP), superconducting detectors, astronomy, quantum computing, particle accelerators, beamforming, satellite payloads, and high-speed data converter analysis. This work will discuss the DS5014DR's hardware and firmware capabilities and review various applications, demonstrating the adaptability and potential of RFSoc technology to advance research and development across multiple domains.

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