



Siglent Technologies Breaks Technology Bottleneck with Kintex™ and Vivado™

AMD Kintex UltraScale+™ FPGA helps Siglent's SDS6000 Pro oscilloscope balance cost, performance and power, while Vivado design suite shortens time-to-market.

AT A GLANCE:

Shenzhen Siglent Technologies Co., Ltd. (Siglent) is an emerging R&D-driven high-tech company that focuses on developing and innovating general electronic test and measurement instruments, including digital oscilloscopes, waveform and signal generators, spectrum analyzers, and vector network analyzers. The company has subsidiaries and offices in the U.S., Germany, and China, providing products and services to more than 80 countries and regions.

Industry: Test & Measurement

Location: Shenzhen, China

<https://www.siglent.com>

SUMMARY:

Oscilloscopes are one of the most frequently used, general-purpose instruments in the electronics industry. They help engineers track, capture, and analyze electronic signals and play a critical role in test and measurement.

The rapid growth of such high-tech markets as 5G wireless, semiconductors, renewable energy, and artificial intelligence have introduced new testing and measurement requirements, particularly for high-bandwidth, high-precision, and small-signal measurements. Traditional 8-bit oscilloscopes can no longer meet these requirements, and a lack of suitable measurement instruments in the market is creating an increasingly prominent bottleneck.

Siglent addressed these challenges in the development of its SDS6000 Pro oscilloscope using AMD's Kintex® UltraScale+ FPGA, which solved for cost, performance, and power issues, and the Vivado design suite, which helped the company bring its product to market quickly.



Figure 1. Siglent's newest SDS6000 Pro oscilloscopes use AMD's Kintex UltraScale+ technology to optimize, performance, cost, and power.

CHALLENGE:

As a leading supplier of innovative oscilloscopes, Siglent took on the mission to break the performance bottleneck of existing oscilloscope products by leveraging advanced silicon platforms to double the 1GHz bandwidth and 5GSa/s sampling rate of previous-generation products while maintaining the same form factor. These pressing requirements challenged product performance, integration, power, and thermal management.

In addition, Siglent had to address digital signal processing to ensure that it could enable faster display refreshing and handle advanced processing algorithms such as jitter and eye diagram analysis, power analysis—all of which were complex undertakings.

SOLUTION:

AMD's flexible and adaptable device platforms have powered and supported Siglent's technological innovations for many years. To meet new market demands with its innovative SDS6000 Pro oscilloscope, Siglent chose AMD's Kintex UltraScale+ FPGA.

After extensive studies, Siglent concluded that AMD's UltraScale+ devices struck the perfect balance between device performance, resources, power, and cost to fully meet the company's design needs.

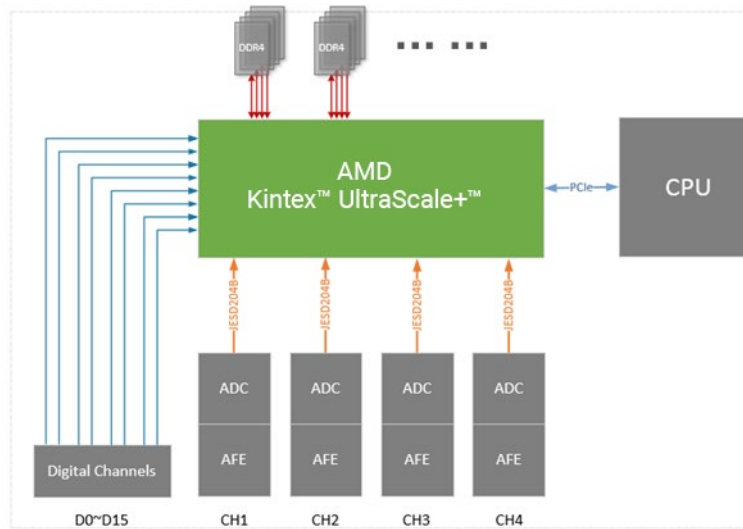


Figure 2. SDS6000 Pro oscilloscope block diagram showing the role of the Kintex UltraScale+ FPGA

The Kintex UltraScale+ FPGA family features high-speed SerDes that enable data connections to a high-sampling-rate ADC, significantly streamlining PCB design and reducing silicon footprint. A large number of integrated block RAMs and UltraRAMs have replaced multiple external QDR SRAMs used in traditional designs, saving I/O resources and PCB real estate.

The device's high-speed processing clock and extensive DSP resources enable high-bandwidth, real-time digital signal processing, complex filtering, and high-speed FFT for digital oscilloscopes. And, also thanks to the Kintex device, the company was also able to achieve a reduction in power and thermal management.

AMD's Vivado design suite provides ideal iteration compatibility and diverse, AXI-bus interface-based IP resources, greatly accelerating development cycles and reducing complexity for Siglent. Vivado's integrated logical analyzer and easy-to-use virtual input/output tools improved debugging efficiency for Siglent's development team, and its integrated hardware server enabled developers in Shenzhen and Chengdu to remotely debug the same hardware, providing considerable project flexibility.

RESULTS:

Siglent announced its newest generation of SDS6000 Pro series oscilloscopes featuring 2GHz bandwidth and 12-bit resolution in September 2020, becoming the world's third oscilloscope vendor, after Tektronix and LeCroy from the U.S., to provide similar features.

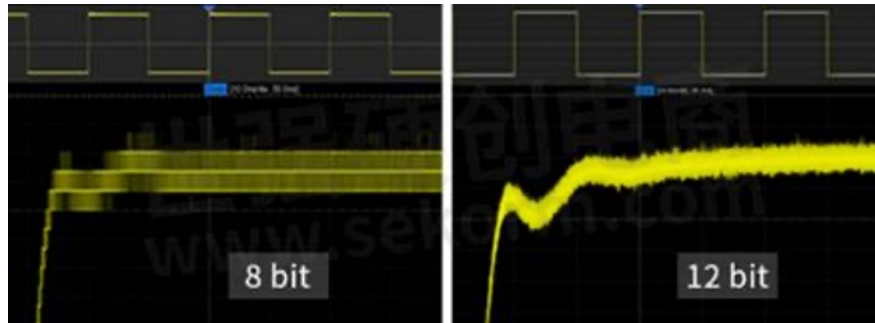


Figure 3. Siglent's SDS6000 Pro oscilloscope demonstrates high measurement accuracy.

With the same form factor and similar power consumption as the previous generation, the new SDS6000 Pro offers twice the performance, processing bandwidth, and sampling rate. When compared with traditional 8-bit resolution oscilloscopes, measurement accuracy is improved by 4,000 times.

As China's first high-bandwidth, high-resolution digital oscilloscope with a bandwidth of 2GHz and 12-bit resolution, the SDS6000 Pro has opened up more possibilities for high-speed, small-signal measurement and application design.

ADDITIONAL RESOURCES:

[Learn more about AMD Kintex UltraScale+ FPGAs](#)

[Learn more about AMD Vivado design suite](#)

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