

## Tektronix Upgrades Entry-Level Oscilloscope with Xilinx SoCs



Xilinx® Zynq®-7000S Delivers Advanced Features in Flexible, Future-Proof Solution

### AT A GLANCE:

For more than 70 years, Tektronix has been at the forefront of the digital age by delivering innovative, precise, and easy-to-use test, measurement, and monitoring solutions to industry. The company's oscilloscopes allow users to measure the signal integrity of high-speed data busses or the voltage and current in a power supply. An oscilloscope is an indispensable tool for engineers across a diverse set of industries from automotive and aerospace to telecommunications and consumer electronics.

**Industry:** Electronics Manufacturing  
**Head Office:** Beaverton, Oregon, USA  
**Established:** 1946  
**Website:** <http://www.tektronix.com>



Figure 1 – Tektronix TBS1000C Oscilloscope.

### CHALLENGE:

Tektronix wanted to update its entry-level TBS1000 oscilloscope family that is targeted at customers such as educational establishments, small labs and makers. It was seeking a flexible solution that would enable them to develop the product quickly at a cost-effective price point. The company investigated several options, ultimately choosing a state-of-the-art, adaptive system-on-chip (SoC) device from Xilinx.

### SOLUTION:

Tektronix chose Xilinx's Zynq-7000S SoC based on its superior performance and rich feature set. The SoC approach has enabled Tektronix to provide a modern set of software and acquisition features in a reduced timeframe, and at a price and performance level that is appropriate for an entry-level oscilloscope.

### RESULTS:

Using the Zynq-7000S device, Tektronix has been able to change the TBS1000C user interface to match its other products. The Zynq-7000S SoC has increased record length by 8X and the waveform capture rate by 10X, achieving advanced software and acquisition features while reducing time-to-market.

**CHALLENGE:**

Tektronix has been the industry leader in scientific oscilloscopes for more than 70 years. Oscilloscopes are indispensable tools for anyone designing, manufacturing, or repairing electronic equipment. They are considered the “eyes of engineers,” allowing them to view a vast array of analog and digital signals in both time and RF domains.

Oscilloscopes are used for many different tasks, including looking at the signal integrity of high-speed data busses or examining the voltage and current in a power supply. When combined with different types of sensors, they can also be used to measure many types of non-electrical phenomena, including sound, mechanical stress, pressure, light, vibration, and heat.

Tektronix wanted to update its entry-level TBS1000 oscilloscope family that is targeted at customers such as educational institutions, small labs and makers. It was seeking a flexible solution that would enable the company to develop the product quickly at a cost-effective price point. Beyond price, Tektronix was also looking for a long-term supplier. Its oscilloscope products are supported in the market for a very long time—typically 10 to 20 years—so it wanted a partner whose products are just as durable. Additionally, the company wanted a solution that would allow updates in the field to meet changing customer needs.

**SOLUTION:**

After evaluating several offerings, Tektronix selected Xilinx’s Zynq-7000S SoC for its design. The SoC approach has enabled Tektronix to provide a modern set of software and acquisition features in a reduced timeframe and at a price and performance level that is appropriate for an entry-level oscilloscope.

Zynq-7000S devices feature a single-core Arm® Cortex®-A9 processor coupled with 28nm Artix®-7 based programmable logic, representing the lowest cost entry point to the scalable Zynq-7000 platform. The integration delivers high throughput between the programmable logic and processing system, providing a huge performance and cost advantage by sharing external memory (DRAM). Figure 2. Xilinx Zynq-7000s block diagram.

- DSP48 blocks are used to filter out spectrum anomalies caused by data-converter and also compensate for degradation caused by probes.
- High-performance logic enables implementation of advanced triggering on the digitized data to facilitate accurate capture of data of interest in an automated fashion, thereby increasing productivity and accuracy.
- High-Speed IOs provide slew rate control which enables implementation of runt trigger mode which is a new feature enabled in the scope.

In addition to unmatched performance, Xilinx provided excellent technical support to Tektronix’s engineering teams. “Our local field application engineer was on site for our initial power-on and debug, and Xilinx provided tool training, logic, and PCB design reviews as part of our partnership,” said Joshua O’Brien, system architect of the Technology Solutions Organization at Tektronix. “Any questions beyond the knowledge of our local FAE were addressed by specialists at Xilinx,” he added.

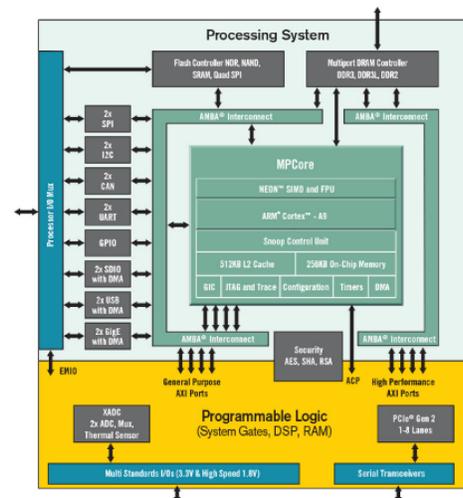


Figure 2 – Xilinx Zynq-7000s block diagram.

Andrew Tedd, senior manager of product marketing for Entry Scopes at Tektronix Portfolio Solutions added: “Xilinx provides devices with strong features along with tools, training, and support to make use of them. The longevity of Xilinx products is also a key to Tektronix success.”

## RESULTS:

The selection of the Xilinx Zynq-7000S for the Tektronix TBS1000C has enabled the following improvements:

- The ability to switch to a new user interface, aligning the TBS1000C with other Tektronix oscilloscopes
- The record length (number of samples that are used to make a complete waveform record) has been increased from 2,500 points to 20,000 points
- The waveform capture rate has been increased from 500 waveforms-per-second to 5,000 waveforms-per-second
- A new runt trigger mode has been added which is useful for the analysis of digital signals.

## ADDITIONAL RESOURCES:

[Learn More About Xilinx Zynq-7000S SoC](#)

[Learn More About Tektronix TBS1000C Oscilloscope](#)

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