

High-Speed Cascaded Analog Multiplexing DAC



AT A GLANCE

High-speed, digital-to-analog converter (DAC) prototype for arbitrary signal generation, using cascaded 4:1 analog multiplexing (AMUX). The design offers a cost-efficient solution for high speed signal generation in the lab with real-time potential.

Features

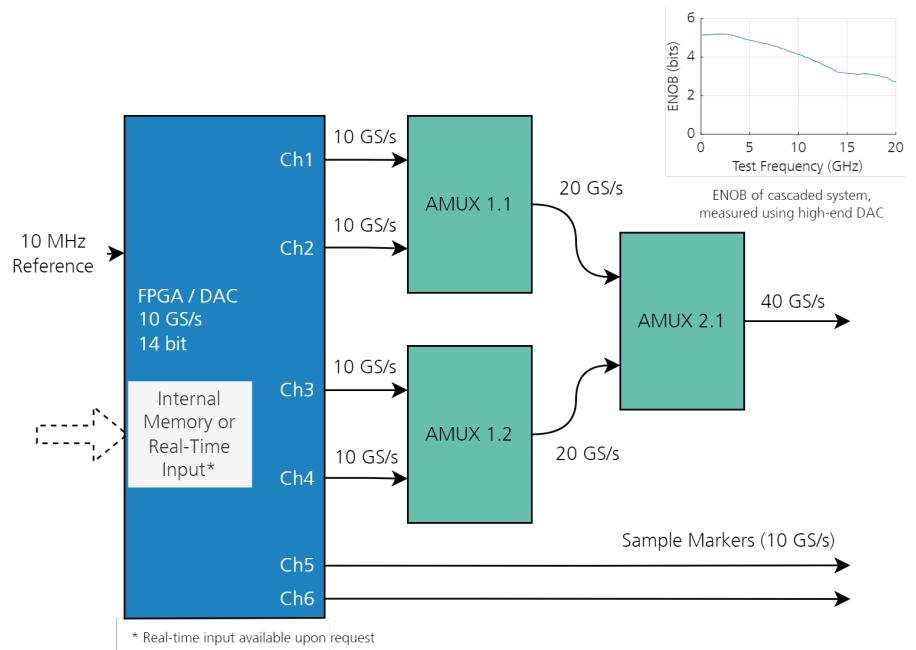
- Patent-pending cascaded SiGe analog multiplexing
- Flexibly multiplies the sample rate of multiple DACs
- Cost-efficient solution
- FPGA-driven inputs
- Real-time potential

Applications

- Arbitrary Waveform Generation (AWG)
- Electrical and optical high-speed measurement experiments
- Evaluation of analog DAC interleaving techniques
- Future: Real-time signal transmission experiments

Technical Background

This high-speed digital-to-analog converter (DAC) prototype uses our patent-pending cascaded analog multiplexing technology and allows multiplying the output bandwidth of any DAC. In this prototype, the outputs of four 10 GS/s, FPGA-driven DACs are interleaved in two stages. However, significant higher speed DACs can be interleaved with the cascaded AMUX approach. The multiplying of the sample rate and analog bandwidth is enabled by custom-designed 2:1 analog multiplexers in SiGe technology. The integrated FPGA-platform, configured as an AWG, provides 32 kS of memory per channel with offline DSP. By adding real-time DSP, the system can be expanded to process and output a real-time datastream. The concept serves as a cost-efficient platform for high-speed analog signal generation and real-time signal transmission in the lab.



System concept, utilizing analog multiplexing

Prototype Details

- Data processing platform:
 - Xilinx RFSoc FPGA
- Signal generation:
 - 4x 10 GS/s, 14 bit on-chip DACs per channel
- Interleaving:
 - 3x Fraunhofer HHI SiGe analog multiplexers (AMUX)
 - Two-stage sample interleaving
 - Clocking using patent-pending technology
- Input:
 - 10 MHz reference clock
- Output:
 - 1x 40 GS/s high-speed
 - 2x 10 GS/s sample markers

Fraunhofer HHI Expertise

Customer-specific modifications by Fraunhofer HHI upon request, e.g.:

- Real-time capability
- 2x400 GBit/s ethernet input
- Real-time DSP
- Up to 4 synchronous channels

We look forward to your request!

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