PAUL SCHERRER INSTITUT
PSI

THE OSCILLOSCOPE ON A CHIP

Problem – Challenge

The Domino-Ring-Sampler Version 4 (DRS4) is a unique chip capable of measuring eight differ¬ential input signals simultaneously with up to five billion samples per second and a resolution of almost 12 bits. This DRS4 together with a standard personal computer and a suitable application software constitutes a complete and powerful oscilloscope at about 10% percent of the cost of a state-of-the-art commercial oscilloscope.

This unique technique represents a low-cost solution for many laboratory and industrial appli¬cations. However, the biggest benefits in terms of "return on investment" and "operational costs" will be realised in applications where hundreds or even thousands of signals have to be measured simultaneously.

Solution

- Single 2.5 V power supply
- Sampling speed 200 MSPS to 5 GSPS
- 8 + 1 channels with each 1024 storage cells
- Cascading of channels or chips allows a deeper sampling depth
- Differential inputs with 950 MHz bandwidth
- Transparent mode for integrated triggering
- Simultaneous reading and writing
- Multiplexed or parallel analogue outputs
- Low power: 140 mW typical at 2 GSPS
- High SNR: 69 dB after offset correction

Patent pending

Applications

- Low-cost Digital Oscilloscopes
- Hand-held Measuring Devices
- Medical Applications (PET Scanner)
- Particle Physics Experiments

Installation at the Paul Scherrer Institute equivalent to 750 Oscilloscopes.