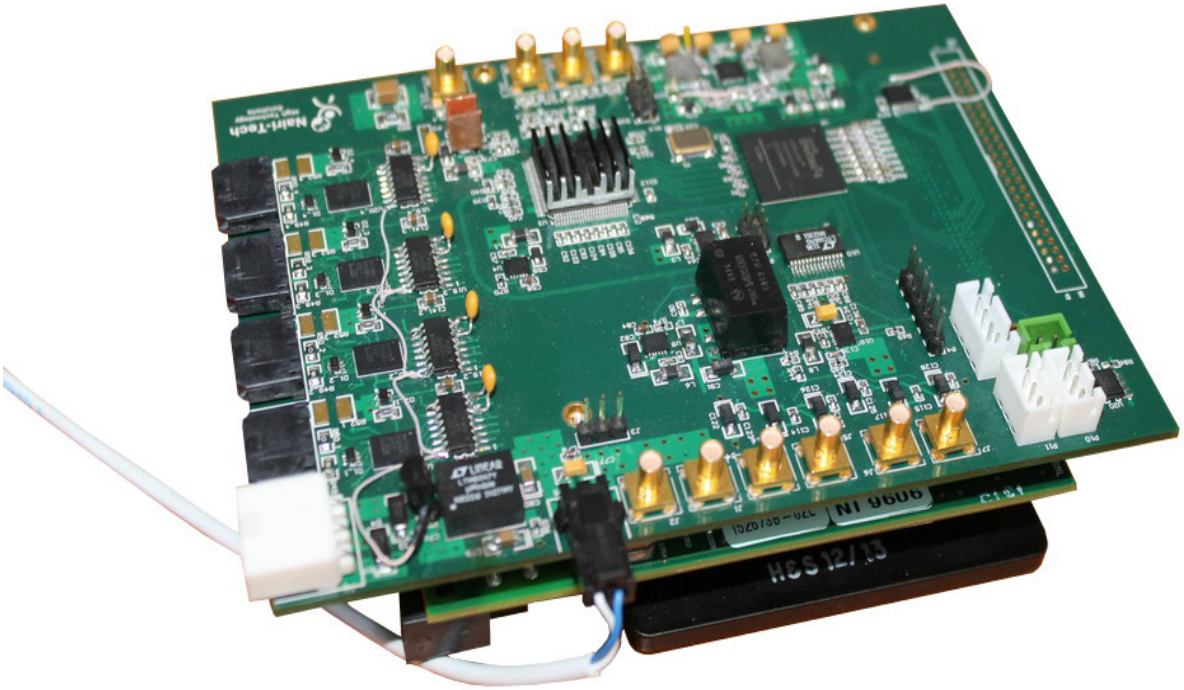
Ultrasonic Digital Signal Processing Board

Overview

The designed board is dedicated for generation ultrasound signal and processing the reflected signals. The board has high performance FPGA for signal preprocessing, low noise reconfigurable ADC with built-in low noise and variable gain amplifiers, high voltage generator with amplitude up to ±100 V – 2 A, 4 channel 12 DAC with update rate up to 21 MHz.



Features

- Control of generation and acquisition parameters by means of FPGA
- Variable amplification gain up to 30 dB
- Variable attenuation from 0 dB to 42 dB
- Time gain compensation
- Full electrical isolation up to 3 kV between high voltage and analog processing parts
- Independently power control of separate parts of the board for decreasing power consumption

Technical Specifications

Generation Frequency	up to 5 MHz
Generation Channels Quantity	4
Acquisition Channels Quantity	4
DAC Channels Quantity	4
Chanel-to-Channel Isolation	70 dB
Sampling Rate	up to 40 MHz
ADC Resolution	14 bit
Powering from Battery	12 V

NI sbRIO-9606 single board controller by National Instruments was used as a secondary processing board. The single board controller has CPU with frequency 400 MHz, FPGA and real-time operation system for high speed data processing.

System Features

- Ethernet interface for communication with PC
- Flash memory for data storing
- USB connector and SD slot for extending memory by connecting external storage device
- Reconfigurable digital input/outputs for additional sensors connections such us micro-electromechanical sensors (MEMS), GPS sensor, etc.
- Low-voltage powering which allows to power the boards from battery 12 V
- Possibility of digital signal processing by using LabVIEW FPGA instrumentations such as digital filters, FFT, averaging, digital down conversion, down sampling, etc.

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