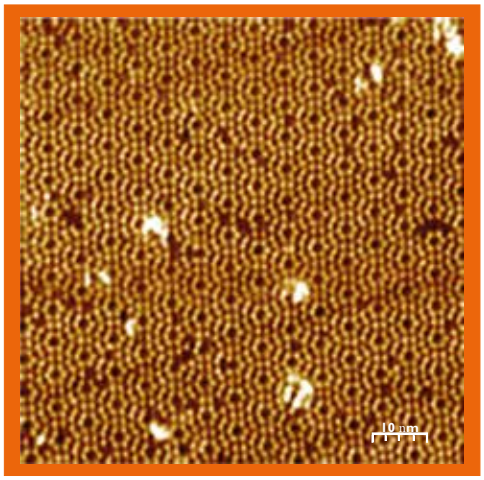
NanoMagnetics Instruments

hpSPM Controller

State of the art FPGA based controller for Scanning Probe Microscopy applications



Technical Specifications

Signal Processing
- State of the Art FPGA Based Controller
- Reconfigurable digital hardware for ultimate performance
- 32 Bit Realtime Processor with 128MB DDR SDRAM
- USB2.0 High Speed Interface, 480Mbps for PC Interface

Imaging Options
- STM / AFM / KPFM / ncAFM etc.

STM Current Range
- G = −1V/nA , 1pA – 1nA Range, < 5fA/√Hz noise floor, no visible line or harmonics

Bias Voltage
- Sample bias ±10V / 16 bit Fast DAC, Digital Modulation for KPFM & STS
- Feedback Loops
- Hardware Implemented 7 Independent Channels of Digital

PID Loops
- Inputs: Any 24/32 Bit digital inputs from PLL etc. or any Analog input (with 24 Bit ADC)
- Outputs: 16 or 24Bit Digital to Analog Converters & 48 its truncated into 24 or 32 Bits Digital Outputs

Digital PLL/Lock-in Amplifier
- 2 Digital Lock in Amps, 32Bit digital output (one is for PLL)
- Frequency Range : 100Hz – 1MHz
- Resolution : 40nHz
- Demodulation Bandwidth: 50Hz – 5kHz
- Input: ±10V, Sampling Rate: 90MHz @ 16Bit resolution
- Output: 32 Bit digital ΔF and Phase / 16 Bit Analog ΔF and Phase
- Constant amplitude feedback or Constant Excitation
- Digital Filter Bandwidths: 10Hz – 3kHz adjustable

ADCs (High Speed)
- 2 Channels of 16 Bit Analog to Digital Converters @ 90MHz;
- ±10V Input range; 1MHz 4th order Butterworth LPF

DACs (High Speed)
- 2 Channels of 16Bit Digital to Analog Converters @ 90MHz; ±10V Output range (One used for Bias Voltage)

Scan DACs (High resolution)
- 4 Channels of 24 Bit Digital to Analog Converters @ 62.5kHz; ±10V Output range (XYZ & SPARE or NSEW)

ADCs (High resolution)
- Simultaneously sampled 16 Channels of True 24Bit Analog to Digital Converters @ 175kHz; ±10V
- Input range; 10kHz 4th order Butterworth LPF

DACs
- 2 Channels of 24 Bit and 12 Channels of 16 Bit Digital to Analog Converters; ±10V Output range
- High Voltage Amplifiers
- 4 Channel Low Noise High Voltage Amplifiers to drive
- Tube Piezo ±200V Swing

Coarse Approach Motor
- Adjustable High Voltage Pulser: ±200V
- Slew Rate : 400V/2µs @ 33nF Capacitive Load
- 19 Channels of Slider Outputs programmable outputs with mechanical relays
- Choice of Slider waveforms: Exponential / t2 / Linear/ Time reversed exponential
- Joystick and Software user interface

Imaging Channels
- Simultaneous Scan of 16 channels 24 bit ADCs and
- Digital Inputs like Δf, Amplitude etc @ 4096x4096 pixels

Power Requirements
- 100/110/220/240 Vac, 50/60 Hz, 400 VA

Workstation
- Top of the range PC Workstation with Windows 8 OS and Dual 27" LCD Display

Dimensions
- 150mm Height x 483mm Width x 520mm Depth

Software & Drivers
- Source code written in C # and DirectX 11 for 64Bit OS LabViewTM drivers for scripting
- Software customization upon request
- Free software upgrades for Lifetime
- Source code may be available with NDA etc.

Note: Specifications are subject to change without any notification Note: Specifications are subject to change without any notification