Programming Interface

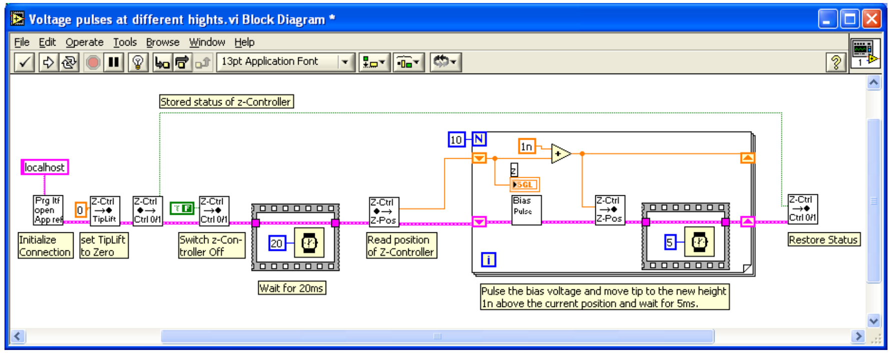
NANONIS SPM CONTROL SYSTEM

Nanonis provides an extensive LabVIEW programming interface for its SPM Control System. The interface allows the user to quickly implement his own applications and scripts to remote control the Nanonis system. Key advantages of the programming interface are:

- **No limitation in scope:** Nanonis provides a real programming interface and not a scripting language. The advantage is that the user has full access to all features LabVIEW provides (graphs, database access, convenient data handling, GPIB/RS232/USB access to other instruments,…) and is not limited by the features that the scripting engine provides or does not provide.
- **Full development environment:** The user can benefit from the full LabVIEW programming environment and debugging features. Programs can be traced step-by-step, variables inspected and run-time behavior tested.
- **User interface:** Using LabVIEW the user can immediately design an appealing graphical user interface coming with his routine.
- **Offline development:** The development and testing of user routines can be done “offline” without the need to be connected to a production system. It can even be done without a license or real-time hardware. All exported routines are also available from the STM Simulator which can be downloaded free of charge.
- **Ease of use and quick prototyping:** LabVIEW’s ease of use makes it possible to quickly develop your own custom routines without an extensive knowledge a programming language.

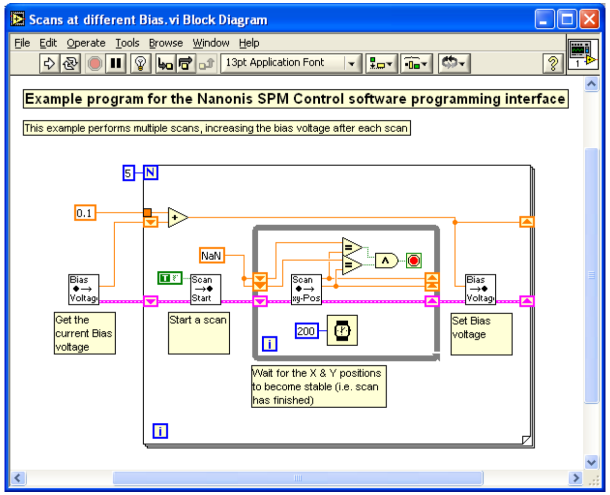
The programming interface comes with a range of example routines which can serve as starting points for new developments. To illustrate the possibilities Fig.1 shows an example program where a series of bias pulses is fired at increasing tip heights. In Fig.2 the sample is scanned at five different bias voltages.

The examples provided here show of course only a small fraction of the routines available to the user. It is possible to set all kinds of parameters from within the programming framework, have callback routines or trigger events.



Pulse the bias voltage and move tip to the new height 1n above the current position and wait for 5ms.

Figure 1: Example script to do voltage pulses at 10 different heights above the sample.



Example program for the Nanonis SPM Control software programming interface

This example performs multiple scans, increasing the bias voltage after each scan

Wait for the X & Y positions to become stable (i.e. scan has finished)

Figure 2: Example script to scan the same image at five different bias voltages. Interesting about this example is the polling mechanism to find out whether the scan has finished. Other methods to achieve the same results would be to set the Boolean input of the “Scan Start” VI to false or use a callback routine that is called after the scan.

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