

SCL's add-on kit for Keysight AFM (nose cone with electronics, 2<sup>nd</sup> pre-amplifier and interface cable)

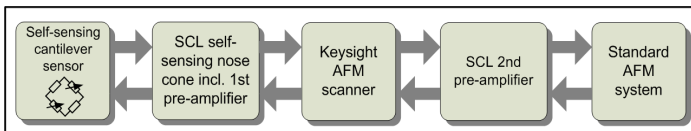
## Description

Our SCL self-sensing add-on kit enables you to work with self-sensing cantilevers on a Keysight 5x00 AFM series. This combines the benefits of a conventional bio AFM with the advantages of a laser free deflection detection using SCL's self-sensing cantilevers. The add-on can be used without changes to the original AFM hardware for imaging in intermittent contact mode. The add-on kit consists of a nose cone with integrated electronics, a 2<sup>nd</sup> stage pre-amplifier, a metal tweezers and an interface cable with micro sub-D connectors. The nose cone contains an adjustable 1<sup>st</sup> stage low noise pre-amplifier and a fixed reference voltage for Wheatstone bridge supply. The supply voltage can be pre-adjusted to 2.048V for high sensitivity measurements or 0.5/1 V for measurements in non-conductive liquids. A cantilever can be excited mechanically by a piezo, which is integrated in the nose cone or thermally by a heater integrated on a SCL PRSA cantilever. The measured deflection signal is amplified (pre-adjustable from 1x to 100x), offset corrected, converted to standard optical signals by the add-on hardware and inputted to your AFM system. The add-on hardware is powered via the available micro sub-D connectors on the AFM system. The whole system is ready for plug-and-play. Simply the nose cone and the 2<sup>nd</sup> stage pre-amplifier have to be connected to your Keysight AFM.

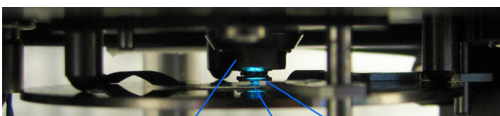
## Specifications

Dimensions (l x w x h)	
nose cone (cylindrical)	D = 10 mm, l = 20 mm
2nd stage pre-amplifier	40 x 40 x 25 mm
Electrical Pre-Amplifier Specifications	
Operation voltage Vs	+/-15 V (from Keysight AFM connector)
Gain, voltage amplification	100x...1000x
Bandwidth	f <sub>3dB</sub> = 2 MHz @ 2mV <sub>pp</sub> sine input signal
external offset voltage range	(Vs-) +0.5 V to (Vs+) -0.5 V
Output impedance	50 Ohm
Input impedance	3 GΩ    6 pF
Wheatstone bridge supply voltage	0.51 V, 1 V or 2.048 V (voltage reference)
Slewrate output stage	27 V/μs
Connectors and cables	
Interface cable	length: 20 cm, micro Sub-D connector

## Hardware block diagram

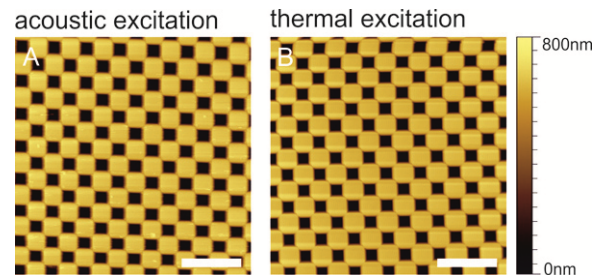


Hardware block diagram of the self-sensing add-on kit

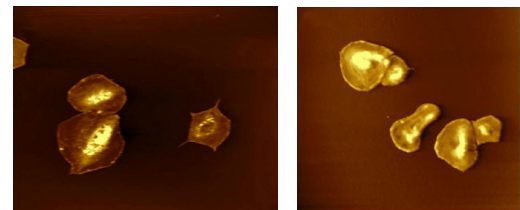


Self-sensing nose cone    Sample    Self Sensing Cantilever

## Example images



Images of a calibration grating recorded with the add-on kit using different excitation modes. The z-noise for a single point image is about 0.21 nm.



Platelets in dry state, physiological buffer and calibration grating in milk

