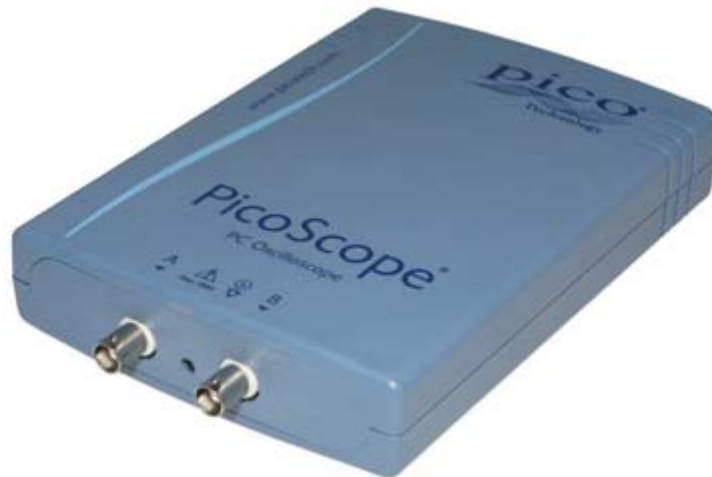




Akulap supports the Picoscope series PS4000 USB measurement interfaces.



This family covers:

- 2-8 channels
- bandwidths 5-20Mhz
- Resolution 12-16bit
- Optional constant current interface IEPE/ICP
- Internal memory: 16-256MB
- Calibrated voltage ranges 50mV-50V
- Streaming interface
- USB bus powered

The IEPE allows connecting sensors like microphones or accelerometers directly.

These USB scopes are shipped with a powerful analysis software. This software covers typical oscilloscope features plus some basic FFT functions.

With Akulap you can combine its advanced DSP functions with the Picoscope series:

This includes:

- Weighting in the time and frequency domain
- Calibration to SPL
- Distortion analysis
- Real time 3D display
- Digital Filter
- Real-time 1/3 octave analyzer
- Long term recording and analysis
- Room and building acoustics
- Psycho acoustics e.g. SONE, Tonality

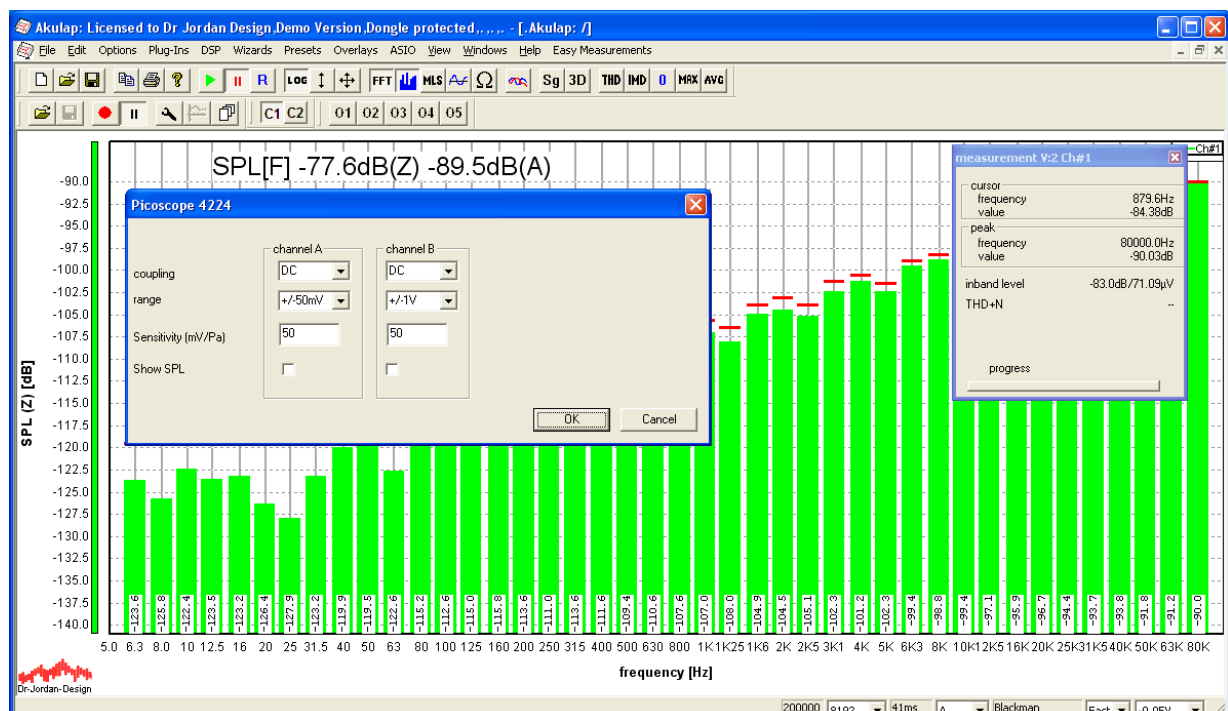
Normally, Akulap uses USB audio interfaces, but using the Picoscope PS4000 offers many advantages:

- constant current interface IEPE/ICP connecting sensors like microphones or accelerometers directly
- Calibrated voltage ranges up to 20V
- Gapless streaming without glitches
- Higher bandwidths up to 1Mhz
- Very linear frequency response
- DC capability

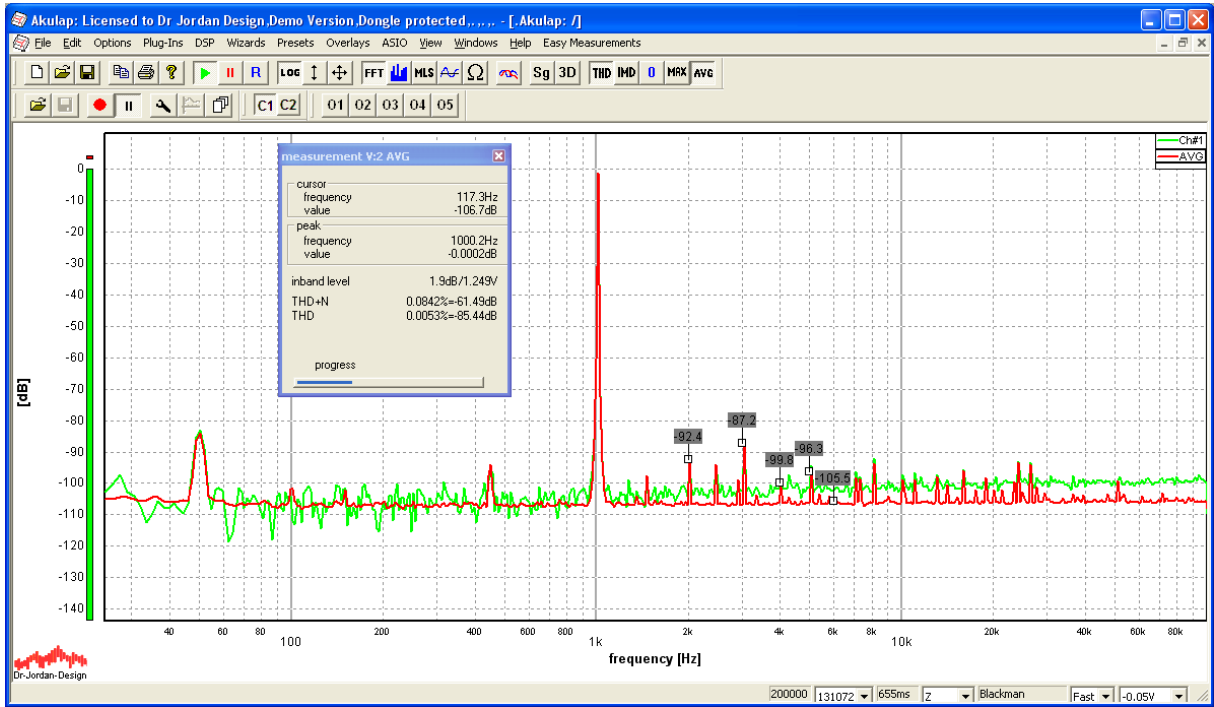
We would like to emphasize the streaming interface with contrast to regular audio interfaces. USB Audio Interfaces use a special isochrone USB transfers. This transfer mode offers potential low latency, but packet losses are common. Picoscopes use different transfer mode, which as has a latency around 100-200ms but prevents packet loss. In conjunction with the large internal memory the Picoscopes run extremely stable, even on PC systems with heavy CPU load. You get either all samples or none.

On the other hand the PS4000 series have some disadvantages compared with audio interfaces. Dynamic is reduced compared to high end audio specialists. If you connect a typical 1/2" ICP measurement microphone with a sensitivity of 50mV/Pa to the PS4224, the noise floor is around 30dB(A), although the noise floor of the microphone is below 15dB(A). The PS4224 lacks of a low noise amplifier.

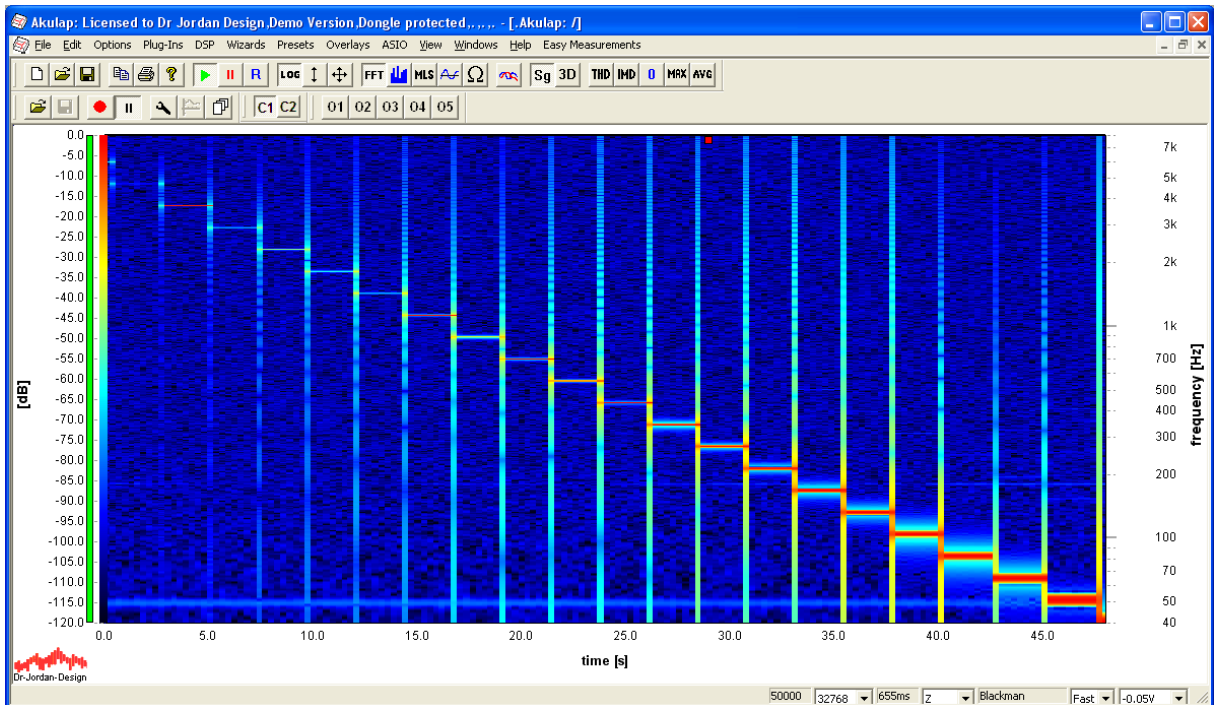
Example Picoscope 4224 with input shortened. Range with max gain.



Input 1kHz 1VRMS Generator Keysight/Agilent U8903A



Spectrogram of a stepped sine sweep. Step size 5s



## Calibration to SPL with display of all important parameters for acoustic measurements

