

SpectraPLUS-SC Impact Hammer test example setup

This example uses a SpectraDAQ-200 data acquisition module and has an impact hammer connected to the left input channel and an accelerometer connected to the right input channel.

The <Options>Processing Settings> menu brings up the main setup dialog box. The following screen shots are an example of typical settings.

The sampling rate is low because we are generally only concerned with low frequencies.

A Force smoothing window is used for the force sensor in the impact hammer and an Exponential smoothing window for the accelerometer channel.

Processing Settings

Settings | Scaling - Left | Scaling - Right | Calibration - Left | Calibration - Right | Triggering | Run Control | I/O Device

Frequency Range and Resolution

Sampling Rate (Hz) 4000

Decimation Ratio 1

FFT size (samples) 4096

Spectral Line Resolution (Hz) 0.977 Hz

Frequency Limit 2000.000 Hz

Apply low pass filter when decimating

Smoothing Window

Left Force Right Exponential

FFT Overlap (Post Processing Mode only)

Percentage 75

Time Resolution 1024.00 (msecs)

Input Signal Overload

Enable Overload Detection Exclude Overloaded Data From Processor

Sampling Format

8 Bit Mono (left)

16 Bit Stereo

24 Bit

Dual Channel Options (Stereo only)

Independent Scaling and Calibration

Complex Transfer (R/L) and Coherence

Cross Channel Delay

Delay Channel Left Right

Delay Time (msec) 0.000

Averaging Settings

Mode Free Run (blocks)

Type Exponential

Speed/Blocks 4

Help Defaults Cancel OK

Calibration setup for the impact hammer that is connected to the left input channel

The screenshot shows the 'Processing Settings' dialog box with the 'Calibration - Left' tab selected. The 'Calibration Method' section has 'Directly to Transducer Sensitivity' selected. The 'Transducer Sensitivity Parameters' section has 'Force (N)' selected for 'Transducer Type' and '12.5' entered for 'Sensitivity (mV/N)'. The 'Channel Name (plot title)' section has 'Impact Hammer' for the 'Left' channel and 'Accelerometer' for the 'Right' channel. A red arrow points from the 'Sensitivity' field to a text box at the bottom of the dialog.

Processing Settings

FFT Settings | Scaling - Left | Scaling - Right | Calibration - Left | Calibration - Right | Triggering | Run Control | I/O Device

Calibration Method

Enable Calibration External Reference Signal Internal Hardware Calibration Directly to Transducer Sensitivity

Requires SpectraDAQ-200 hardware

Transducer Sensitivity Parameters

Transducer Type: Force (N)

Sensitivity (mV/N): 12.5

Digital Signal Levels

Measure Reference Signal...

Measure from Wave File...

Measured Levels (Percent Full Scale)

Left: 100.0000

Right: 100.0000

Convert Acceleration to: N/A

Display Units and Labels

Linear: Force (N) ms

Log: Force (N dB) ms

Display Spectrum As: RMS

Channel Name (plot title)

Left: Impact Hammer

Right: Accelerometer

Calibration File

Load Calibration from file... Save Calibration to file...

Calibration Procedure

Enter the sensitivity listed on the calibration datasheet for your specific impact hammer

Help Defaults Cancel OK

Calibration setup for the accelerometer that is connected to the right input channel

The screenshot shows the 'Processing Settings' dialog box with the 'Calibration - Right' tab selected. The 'Calibration Method' section has three radio buttons: 'Enable Calibration' (checked), 'External Reference Signal', and 'Directly to Transducer Sensitivity' (highlighted with a red box). Below this, the 'Transducer Sensitivity Parameters' section has a 'Transducer Type' dropdown set to 'Accelerometer (G)' and a 'Sensitivity (mV/G)' text box containing '99.5', both highlighted with a red box. A red arrow points from the 'Sensitivity' box to the 'Calibration Procedure' section at the bottom. The 'Digital Signal Levels' section has 'Measured Levels (Percent Full Scale)' for 'Left' and 'Right' both set to '100.0000'. The 'Channel Name (plot title)' section has 'Left' set to 'Impact Hammer' and 'Right' set to 'Accelerometer', both highlighted with a red box. The 'Calibration File' section has 'Load Calibration from file...' and 'Save Calibration to file...' buttons. The 'Calibration Procedure' section contains a text box with the instruction: 'Enter the sensitivity for your specific accelerometer'. At the bottom are 'Help', 'Defaults', 'Cancel', and 'OK' buttons.

Processing Settings

FFT Settings | Scaling - Left | Scaling - Right | Calibration - Left | Calibration - Right | Triggering | Run Control | I/O Device

Calibration Method

Enable Calibration External Reference Signal Internal Hardware Calibration Directly to Transducer Sensitivity

Requires SpectraDAQ-200 hardware

Transducer Sensitivity Parameters

Transducer Type: Accelerometer (G)

Sensitivity (mV/G): 99.5

Digital Signal Levels

Measure Reference Signal...

Measure from Wave File...

Measured Levels (Percent Full Scale)

Left: 100.0000

Right: 100.0000

Convert Acceleration to: None

Display Units and Labels

Linear: Acceleration (G) rms

Log: Acceleration (G dB) rms

Display Spectrum As: RMS

Channel Name (plot title)

Left: Impact Hammer

Right: Accelerometer

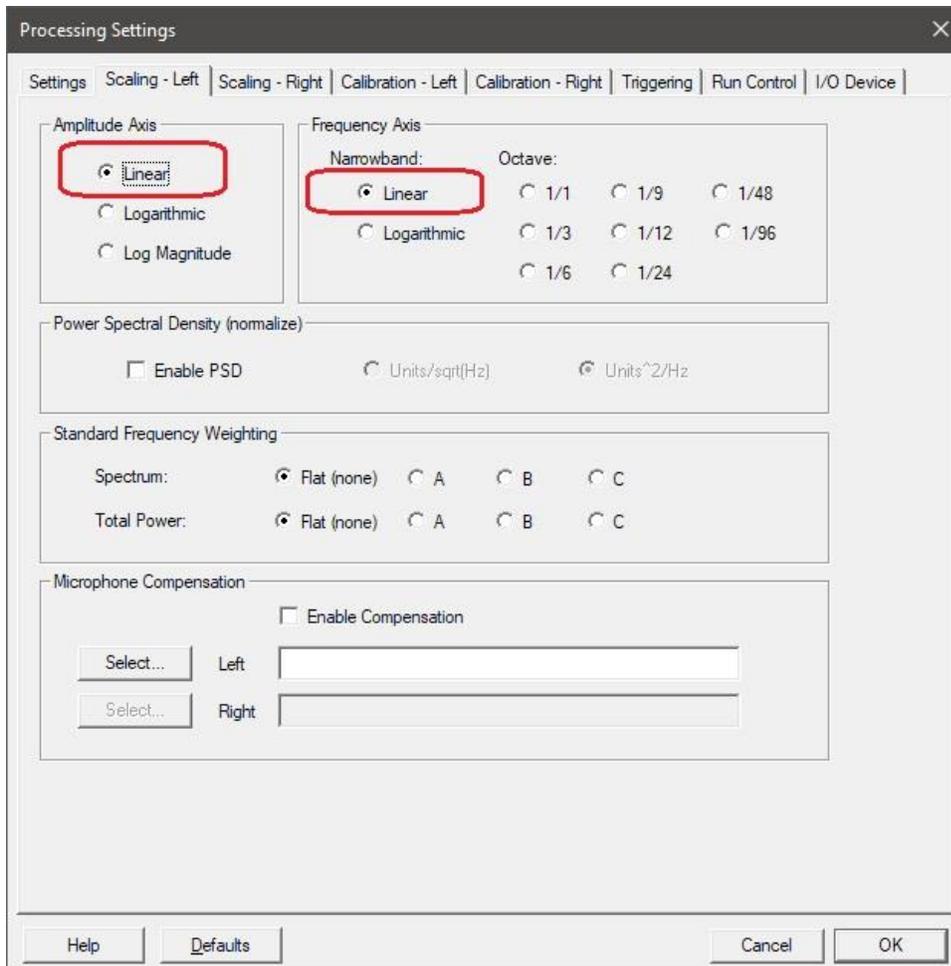
Calibration File

Load Calibration from file... Save Calibration to file...

Calibration Procedure

Enter the sensitivity for your specific accelerometer

Help Defaults Cancel OK



The Right channel is scaling is also set to Linear/Linear

Processing Settings

FFT Settings | Scaling - Left | Scaling - Right | Calibration - Left | Calibration - Right | **Triggering** | Run Control | I/O Device

Enable Triggering

Trigger Mode: Ream and wait for the next trigger

Trigger Channel: Left

Trigger Type: Level Trigger

Trigger Polarity: Positive

Threshold *: 10.00 Pascals **Adjust as needed for your test**

Trigger Delay: (Enter as positive value)

Milliseconds: 20.000

Percent of FFT size: 25.000

Delay Type: Pre Trigger Delay

Prompt User to Accept/Reject Trigger Waveform **Enable to preview the impact waveform**

Start signal generator on initial trigger event (generator must be open - MME mode only)

* Tip: You can quickly set the threshold by right clicking on the Time Series plot

Help Defaults Cancel OK

Triggering is necessary so that the measurement is performed only on the impact and acceleration data. Otherwise the results are meaningless.

The screen shot below shows the transfer function between the Accelerometer and the Impact Hammer (Acceleration (G) vs Force (N)). The Coherence is displayed on the lower plot.



The transfer function these two channels produces a plot of Accelerance (acceleration/force)

It is also possible to convert the acceleration to Velocity or Displacement using the "Convert Acceleration To" list box on the Calibration dialog box. This produces the following plots:

Mobility = velocity / force

Compliance = displacement / force