



AV ACQUISITION 2000

DUALCHANNEL DATA ACQUISITION
MODULE

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USER MANUAL

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1. Introduction

AV ACQUISITION 2000 (AVA 2000) is a universal, portable data acquisition module, which allows to record electrical signals with sampling frequency up to 96 kHz and resolution of 16 or 24 bits.

Due to compact size and small weight, robust design, very good operational parameters, as well as simple handling, the device is perfectly suited for measurements conducted both in the lab and in the field.

The AVA 2000 module features unique input circuits, which allow to select the type of connection:

- » DC, for measurements with constant voltage, or variable with constant component,
- » AC, allowing to eliminate the constant component,
- » IEPE, for measurements using various types of sensors made in the IEPE standard, such as accelerometers, microphones, etc.

The device is powered up, and communicates with computer through USB port. The installation of the module does not require any additional drivers – after connecting to a computer, the operating system installs the necessary drivers automatically.

2. Technical data

Parameters	Value
Number of channels	2
Input connectors	BNC
Input type	DC, AC, IEPE
Input impedance	AC: 220 k Ω DC: 220 Ω IEPE: 110 k Ω
IEPE	24V DC/2,4 mA
Crosstalk	1 kHz sinusoid: < -120 dB 10 kHz sinusoid: < -90 dB 20 kHz sinusoid: < -86 dB
Input voltage range	$\pm 10V$ (gain 1x)
THD	typically: -88dB max: -70 dB (at $F_s = 48$ kHz, input signal: 1 kHz sinusoid)
SNR	92 dB
A/C converter	multi bit Delta-Sigma 16 bit (optionally 24 bit)

Sampling frequency	44.1 kHz, 48 kHz (16 bit, 24 bit) 96 kHz (only for 16 bit)
Anti-aliasing filter	digital decimation
Anti-aliasing filter gain	0-0.39 F: ± 0.1 dB 0.55-0.63 F: 75 dB 0.1425 F: 0.25 dB 0.45 F: 3 dB 0.5 F: 17.5 dB
Communication interface	USB
Power supply	USB port
Power consumption	approx. 300 mA
Dimensions	60 x 100 x 30 mm
Weight	250 g
Operational temperature	0°C – 70°C

3. Description of elements of AVA 2001 module

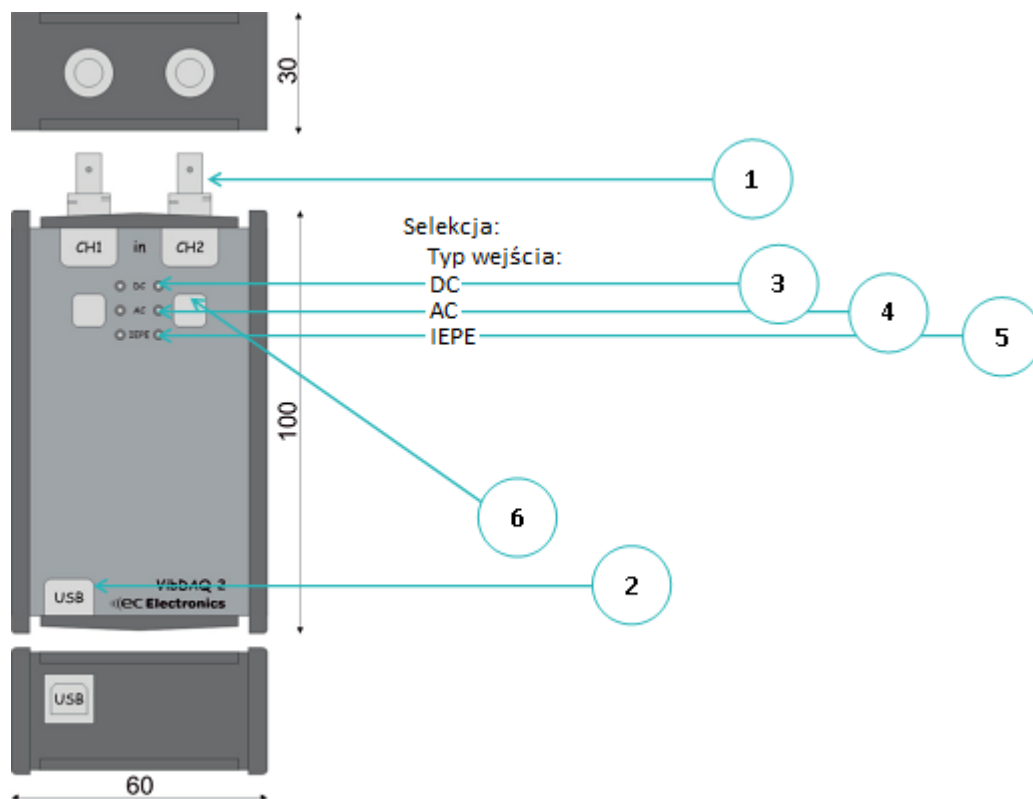


Figure 3.1 // The view of AVA 2001 module

1	BNC input connector	
2	USB connector	
3		DC
4	Diodes signalling operational mode	AC
5		IEPE
6	Operational mode selection button	

4. Installation in Windows 7

After connecting AVA 2000 to computer's USB port, the operating system will detect the new hardware and install necessary drivers automatically (Figure 4.1). After the installation process, the new device will appear in the Device Manager, in the „Sound, video and game controllers“ group , under “VibDAQ” name (Figure 4.2).



Figure 4.1 // Drivers installation

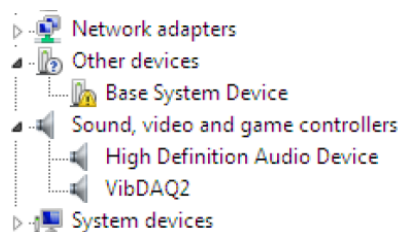


Figure 4.2 // AVA 2000 (old name: VibDAQ2) in Device Manager

The next step is to set the volume level properly. It should be done by right click on the speaker icon on the Windows taskbar. From the menu that showed up, choose Recording devices (Figure 4.3) option, then, from the Sound window, choose AVA 2000 (VibDAQ2) device (Figure 4.4) and click Properties button.

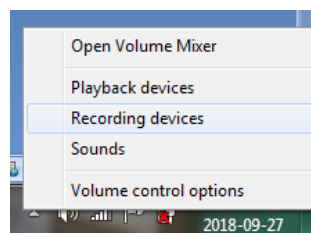


Figure 4.3 // Selection of device type

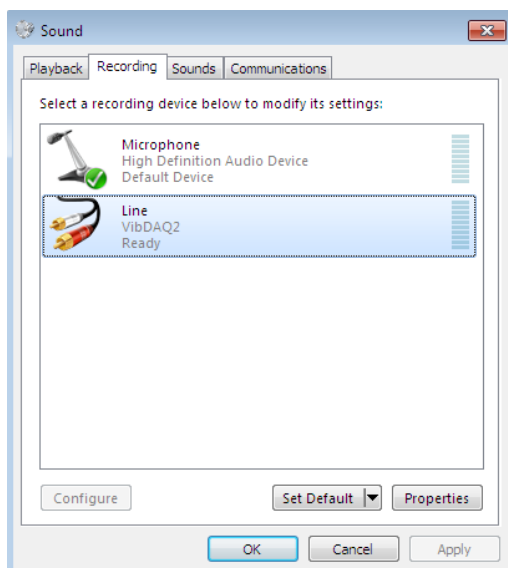


Figure 4.4 // Selection of recording device window

In the Properties window (Figure 4.5), on the Levels tab, it is necessary to set maximum volume level and centered balance by clicking on the Balance button and setting maximum value (100) for both channels (Figure 4.6).

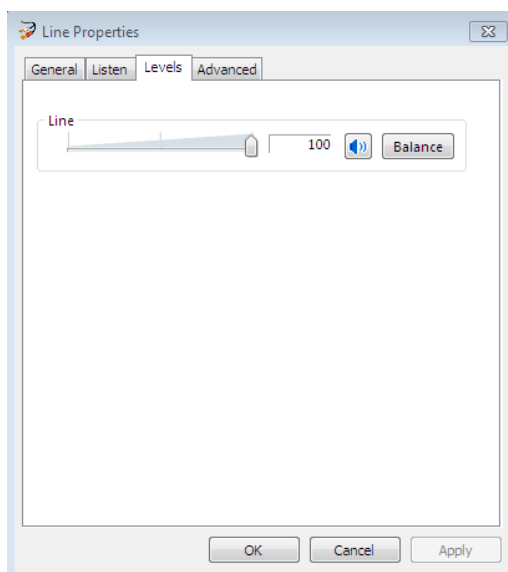


Figure 4.5 //Recording level settings

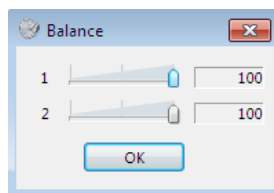


Figure 4.6 //Balance window

Skipping this step may cause the measurement results to be underestimated.

When the above steps are done, the AVA 2000 module is ready to work.

5. Installation in Windows 10

After connecting AVA 2000 to computer's USB port, the operating system will detect the new hardware and install necessary drivers automatically (Figure 5.1). After the installation process, the new device will appear in the Device Manager, in the „Sound, video and game controllers“ group , under “VibDAQ2” name (Figure 5.2).

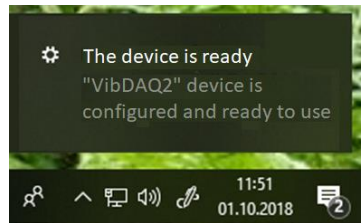


Figure 5.1 // Drivers installation

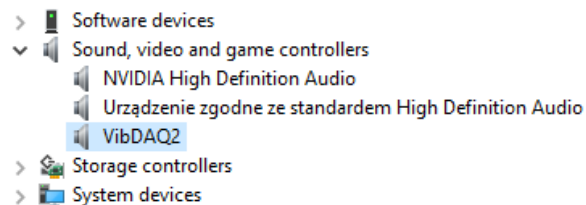


Figure 5.2 // AVA 2000 (old name: VibDAQ2) in Device Manager

The next step is to set the volume level properly. It should be done by right click on the speaker icon on the Windows taskbar. From the menu that showed up, choose Open Sound settings (Figure 5.3) option, then, from the Sound window, choose AVA 2000 (VibDAQ2) device (Figure 5.4) and click on Device properties.

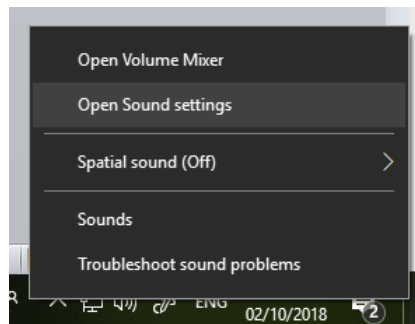


Figure 5.3 // Selection of device type

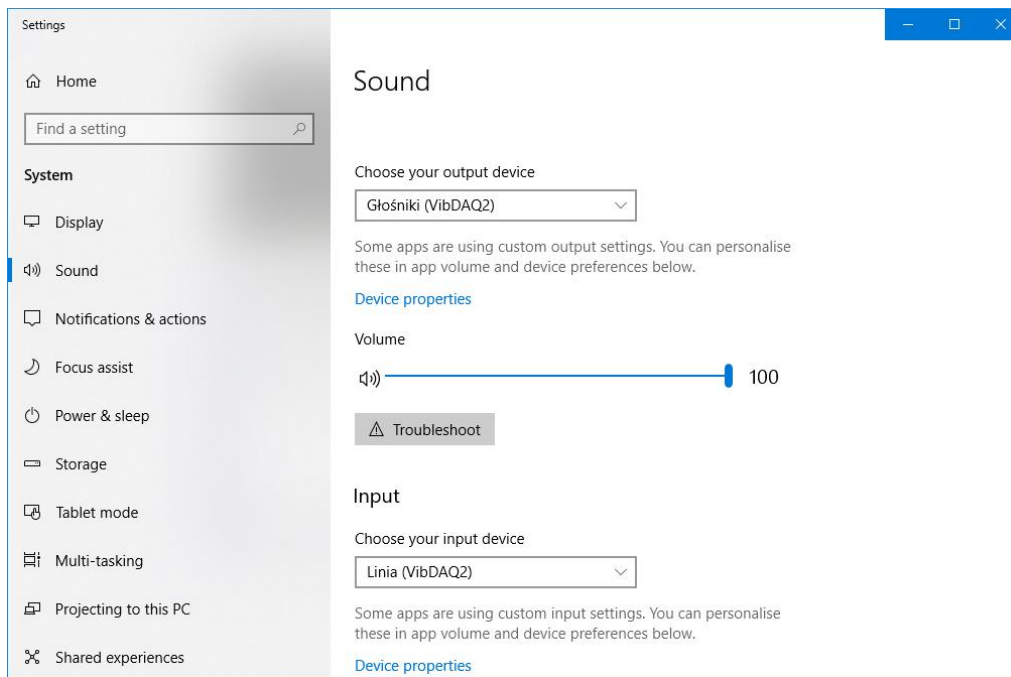


Figure 5.4 // Selection of recording device window

In the Properties window (Figure 5.5), on the Levels tab, it is necessary to set maximum volume level and centered balance by clicking on the Balance button and setting maximum value (100) for both channels (Figure 5.6).

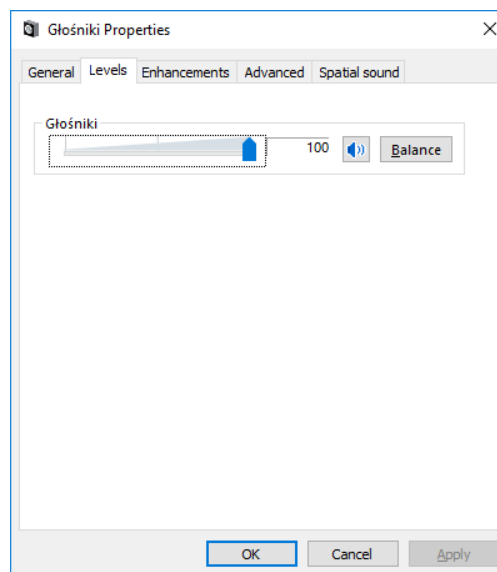


Figure 5.5 //Recording level settings

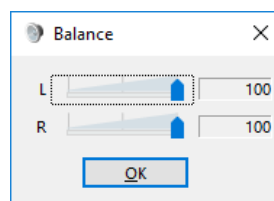


Figure 5.6 //Balance window

Skipping this step may cause the measurement results to be underestimated.

When the above steps are done, the AVA 2000 module is ready to work.

6. Using the AVA 2000 module in DasyLAB

Below a step by step procedure of creating a simple project in the DasyLAB software (which can be used to visualize measured signals) is described.

DasyLAB does not require any additional drivers to work with the AVA 2001 module – it is visible right after launching the software. To perform measurements in the DasyLAB software, connect the AVA 2000 module to the computer, select the maximum recording volume level (Figure 4.5), and run the DasyLAB software.

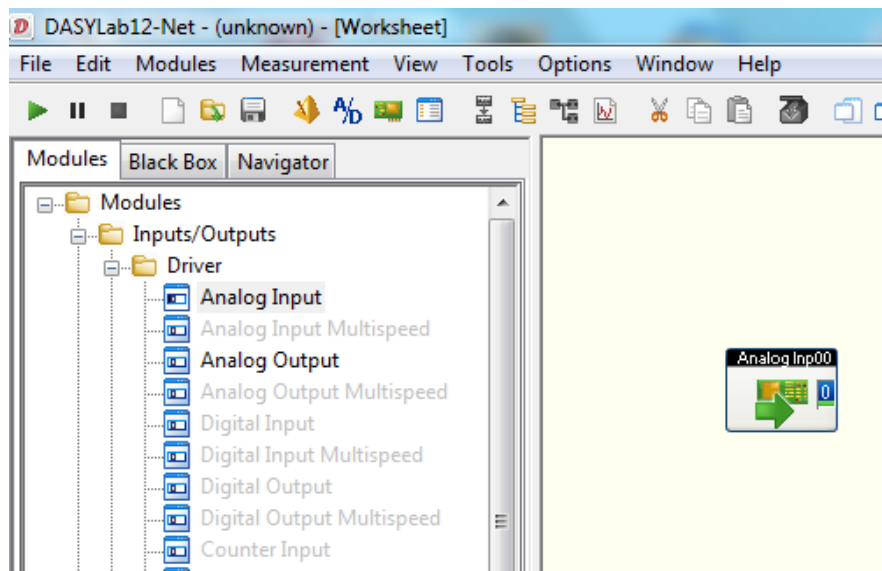


Figure 6.1 // Selecting input module

Figure 6.1 presents a part of DasyLAB software's main window. Before using the AVA 2000 module, it is necessary to properly configure the driver and the sampling parameters. To do that click on the Measurement menu and then on the Select Driver option.

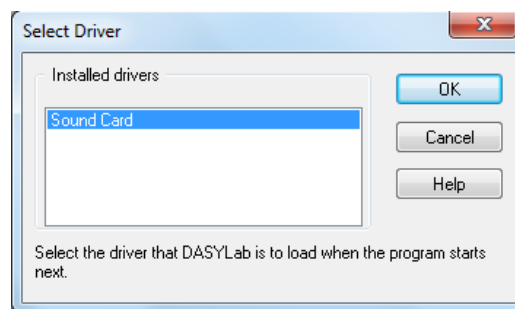


Figure 6.2 // Select Driver window

The next step is to choose Sound Card option from the Select Driver window that showed up (Figure 6.2) and then, on the Sound Card: Measurement Device Settings window (Measurement → Hardware Driver → Setup) choose AVA 2000 device and check options as shown in the Figure 6.3.

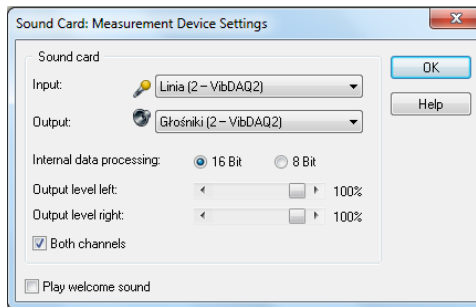


Figure 6.3 // Measurement Device Settings window

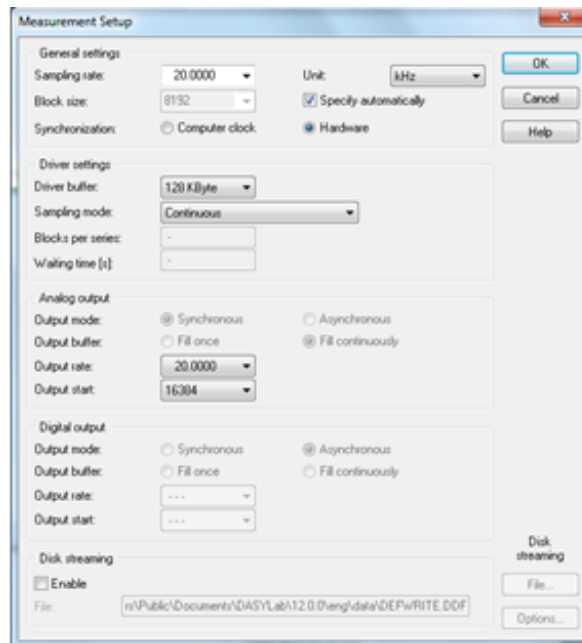


Figure 6.4 // Measurement setup window

The last stage of configuration is selecting the sampling parameters. It can be done in the Measurement Setup window (Measurement → Measurement Setup → Driver) shown on Figure 6.4. In the Sampling rate field it is possible to input or choose desired sampling frequency. **The maximal sampling frequency of the AVA 2000 module available in DasyLAB software is 48 kHz.**

After completing described above procedure, it is possible to create a project and start the measurements.

To do that, open Modules menu from the DasyLAB main bar, choose options: Inputs/Outputs → Driver and then drag the Analog Input module onto the software working area (Figure 6.1). By default only one input channel is active. After double clicking on the Analog Input module icon, the Analog Input configuration window will appear. It allows to activate the second channel, select measurement range and change channel names (Figure 6.5).

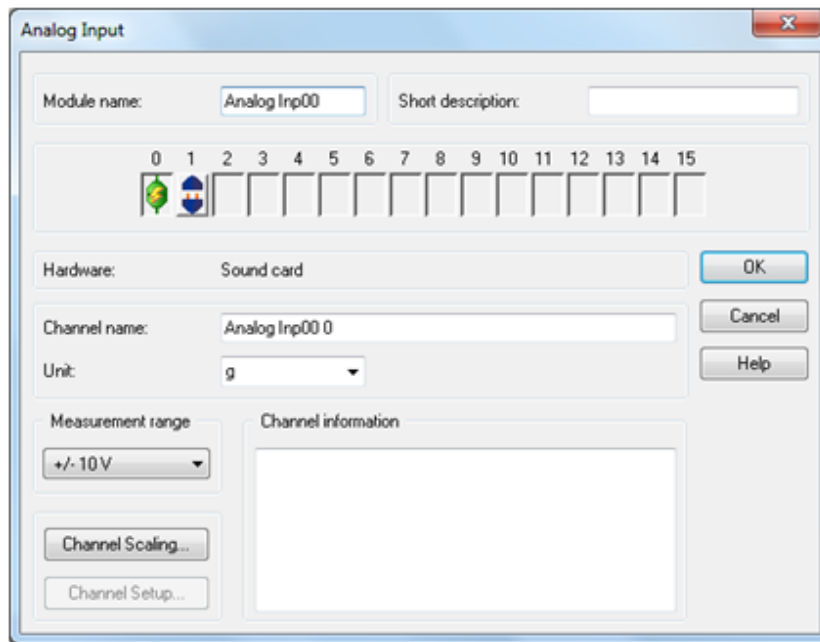


Figure 6.5 // Analog Input window

In the Analog Input window there is a possibility to configure following parameters:

- » Change the name of module (Module name field) and add its description (Short description field),
- » Enable/disable input channels. Available input channels are labelled with the socket and connector icon. Figure 6.5 shows the situation when channel 0 is enable (symbol of lightning on connected socket and connector), while channel 1 is disabled (symbol of disconnected socket and connector). It is possible to enable channel 1 by double clicking on corresponding to it socket and connector icon, after that icon will change. To disabled the channel, icon has to be double click again,
- » Change name (Channel name field), unit (might be choose from drop down list or simply entered from the keyboard) and measurement range (drop down list) of each channel. The measurement range for the AVA 2000 module is $\pm 10V$. There is also a possibility to enter a short comment in the Channel information field,
- » Scale the measurement results. Clicking on the Channel Scaling button opens Scaling window (Figure 6.6). Selecting Use scaling function checkbox allows to scale the measurement results, thanks what the module displays the measured value in proper units instead of the voltage in [V]. The Sensor unit field allows to enter required unit symbol. Below it there is a section used to define the scaling function: in an example shown in Figure 6.6 input voltage of 0 [V] is equivalent to acceleration of 0 [g], while voltage of 1 [V] is equivalent to acceleration of 10 [g]. The change of the scaling is confirmed by clicking the OK button.

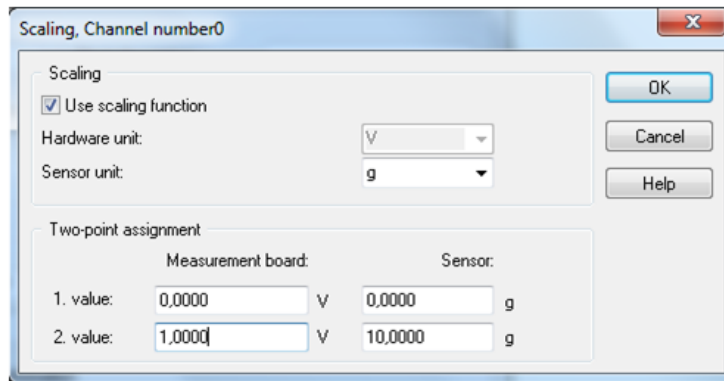


Figure 6.6 // Scaling, Channel number window

All above settings refer to the channel, which icon (connected socket and connector) is highlighted in green. To change another channel settings, user has to click on its icon (icon will change into green).

When the above steps are done, the module is ready to work.

Further signal processing depends on requirements of individual application. One of the simplest methods of visualization in DASYLAB is displaying the time signal. Block, which is proper to do that, is available in the Modules menu: Modules → Display → Y/t Chart. After dragging it onto software working area, the signal from the AVA 2000 module can be connected to it, and then the project can be started (green triangle symbol on DASYLAB's toolbar). Figure 6.7 presents the program's window when a simple project is running. The Y/t Chart00 window shows the time signal from a microphone connected to the AVA 2000 module's second channel input.

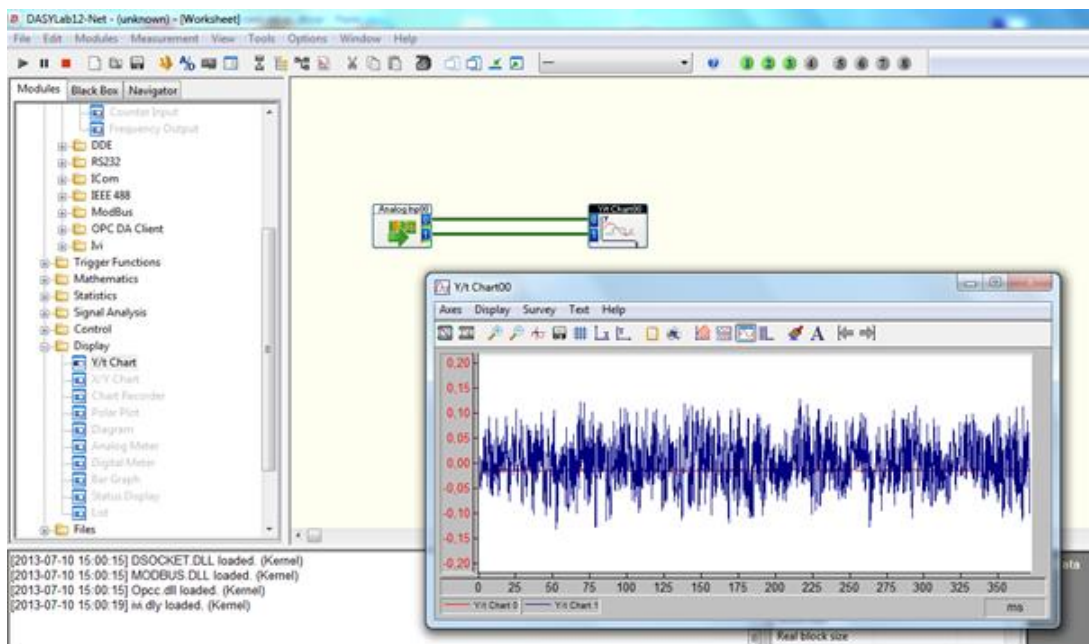


Figure 6.7 // Block diagram of an example project

7. Using the AVA 2000 module in LabVIEW

Access to the AVA 2000 module in the LabVIEW software is possible through the Sound Input Read.vi subprogram.

Figure 7.1 presents a diagram of the Continuous Sound Input.vi virtual device, available as an example program in LabVIEW. Three blocks in this program are important:

- » Sound Input Configure.vi
- » Sound Input Read.vi
- » Sound Input Clear.vi

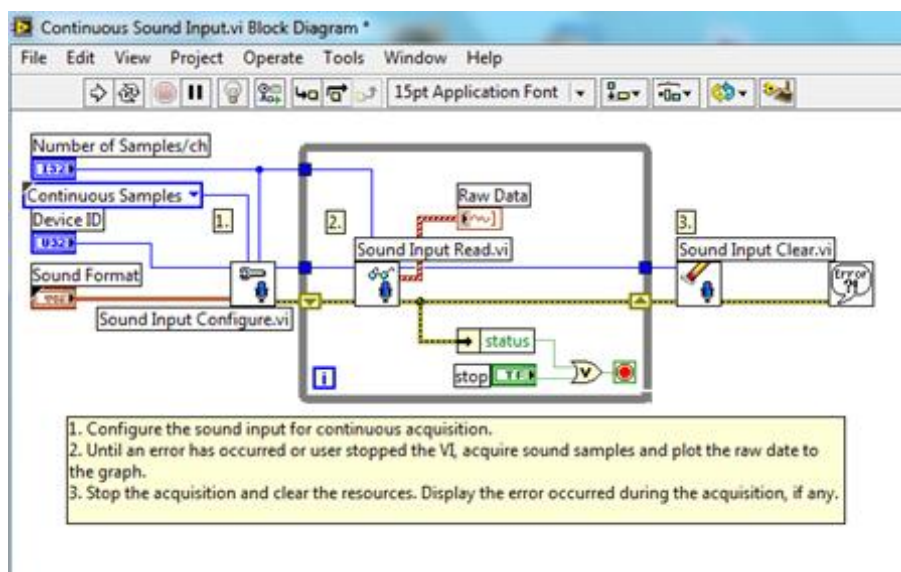


Figure 7.1 // Block diagram of the Continuous Sound Input.vi project

The Sound Input Configure block configures the sound card in use – in this case the AVA 2000 module. The parameters which are transferred to the Sound Input Configure block: the number of samples per channel, device ID and the Sound Format, which carries the information about sampling frequency, resolution and the number of channels.

The device ID should be selected according to the computer's configuration. Usually the built-in sound card is visible under number 0 and AVA 2000 under number 1.

The Sound Input Read block is used to data reading. The parameters transferred to it: Task ID from the Sound Input Configure block and the number of samples per channel. The output data, in a form of audio data table for each channel, is transferred to the Raw Data time signal window. The audio data, returned by the block, take values from the range between -1 and 1, regardless of the gain level selected on the AVA 2000 module. This fact should be taken into account while creating your own programs.

Outside of the DO..LOOP loop there is the Sound Input Clear block, which task is to release the resources. This is where the Task ID parameter is transferred form the Sound Input Read block.

Figure 7.2 presents the panel view of the Continuous Sound Input.vi program.

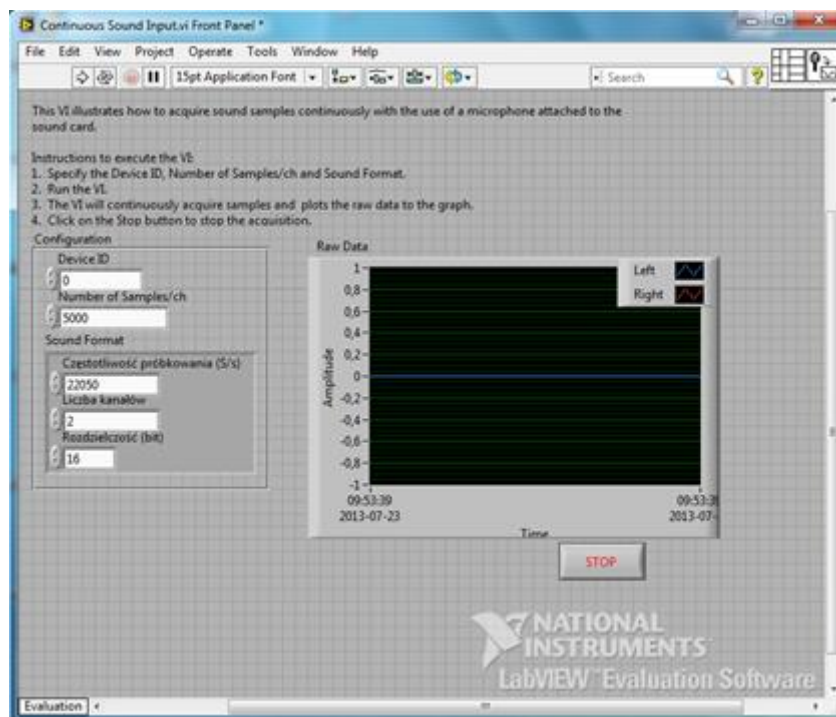


Figure 7.2 // Panel of the Continuous Sound Input.vi project

8. Recycling

8.1. Hazardous Materials

AVA 2000 system does not use any hazardous materials outlined by RoHS. These regulations confirm that lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ether, or other battery related materials are limited to no more than trace amounts.



8.2. Recycling Facilities

Podczas wycofywania z eksploatacji urządzeń, minimalizuj wpływ wytwarzanych odpadów. W celu uzyskania aktualnych informacji dotyczących właściwego zbierania i recyklingu materiałów należy skontaktować się z lokalną administracją zarządzającą procesami usuwania odpadów.