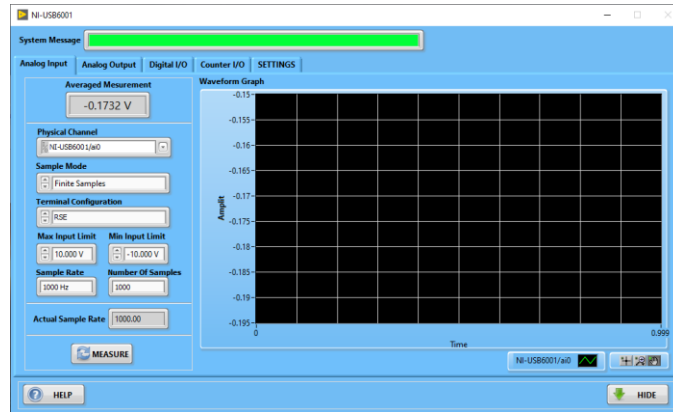


# NI-USB6001 SOFT PANEL

## USER MANUAL

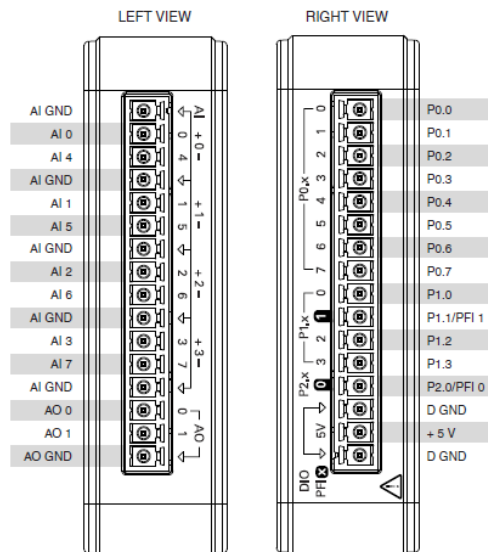
### 1. INTRODUCTION

This document intends to provide the end-user with guidance on the NI-USB6001 soft panel application:



This device does not have user interface. Because of this, the soft panel is the only way to operate this device manually. The NI-USB6001 is the lowest class instrument has the 8 14-Bit analog inputs (AI), 2 14-Bit analog outputs (AO), and 13 digital bi-directional lines, and 1 32-bit input counter. The device pinout presented on the picture below:

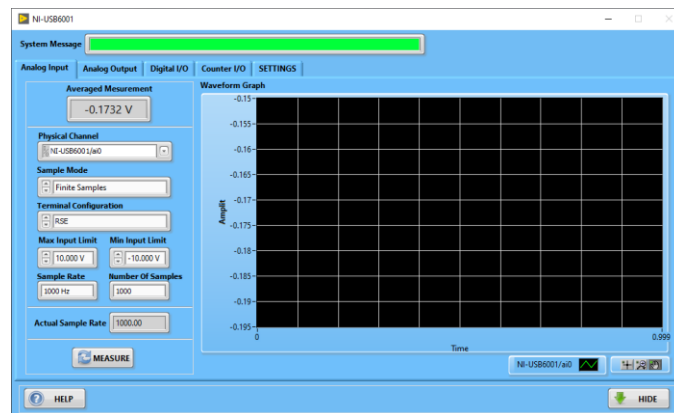
### Device Pinout



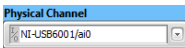
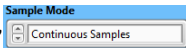
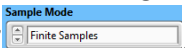
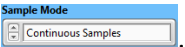
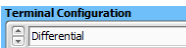
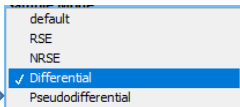
The following sections describe the operation of the NI-USB6001 soft panel where each set of functions represented on the dedicated page.

## 2 Analog inputs

The access to the analog inputs provided on the “Analog Inputs” page:



The following steps describe steps to perform the analog measurements.

- 2.1 Select the “Physical Channel” . Please note that the device terminals expose not all listed AI channels. Available channels are 0 to 7.
- 2.2 Select the “Sample Mode” . To perform the averaged measurement of the specified number of samples, select “Finite Samples” . To perform continuous measurements, select “Continuous Samples” .
- 2.3 Select “Terminal Configuration”  .



Where: default = Differential;

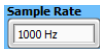

RSE = referenced single ended;


NRSE = non-referenced single ended;

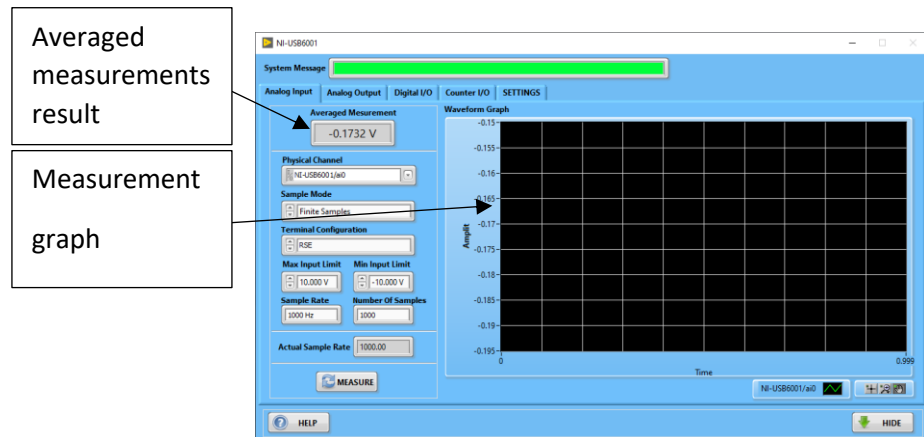
Pseudodifferential = refer to

<https://knowledge.ni.com/KnowledgeArticleDetails?id=kA00Z0000019YuUSAU&l=en-US>

Set the input signal maximum and minimum values  .

- 2.4 Set the “Sampling Rate”  and “Number Of Samples”  parameters.

2.5 Press “MEASURE” button . The picture below illustrates the measurements:



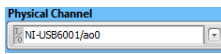
### 3 Analog Outputs

The USB 6001 has two 14-Bits analog output channels. These output channels can operate independently from each other and produce DC voltage and/or sign waveform. The control of the analog output channels located on the “Analog Output” page:





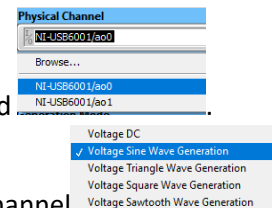
The analog outputs works simultaneously. The application generates the two waveforms with common attributes like the sample clock source, sample mode, sample rate, and number of samples. If there will be need to change one or more of these parameters, while it is running, the user shall select “UPDATE” option.

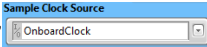
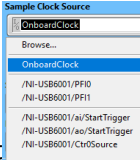
The following are steps to set up analog outputs.

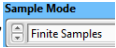
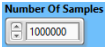
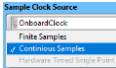
3.1 Select the “Physical Channel”  to be configured

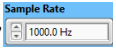
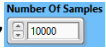
3.2 Select the “Generation Mode”  of the selected channel

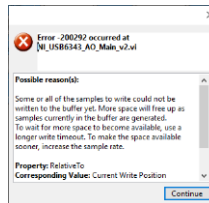
3.3 Select “Max Voltage”  and “Min Voltage”  of the output signals. Please, keep in mind, these parameters will apply to both analog output channels.



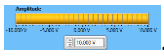
3.4 Select the “Sample Clock Source”  from the list . The simplest selection is the “Onboard Clock”.

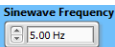
3.5 Select the “Sample Mode”  to generate specified number of samples . Or, select  for continuous signal generation.

3.6 Select the “Sample Rate”  and the “Number Of Samples” . The correct combination of the sample rate and the number of samples is extremely important for and wrong combination will generate error:



NOTE: the sine wave frequency is limited to 5 Hz and the sample rate correspondingly to 5000 samples per second.

3.7 Select the “Amplitude” of the signal: .

3.8 Select the “Sinewave Frequency” . This parameter applicable to the waveforms, not to DC voltage generation.

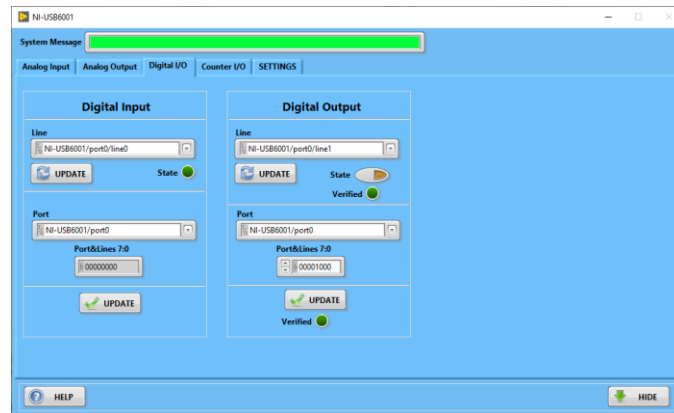
3.9 Press “GENERATE” .

## 4 Digital Input/Outputs

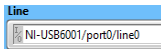


The USB 6001 device has 13 bi-directional digital lines. These lines can be used individually or compounded in ports:

- Port 0 – 8 Bits
- Port 1 – 4 Bits
- Port 2 – 2 Bits.

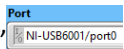

Access to the DIO controls provided on the page “Digital I/O” page:

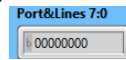


#### 4.1 Digital Input line control

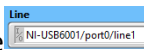


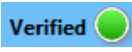
- 4.1.1 Select digital "Line"  and press "UPDATE"  to read the selected line state: .

#### 4.2 Digital Input Port control

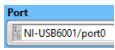
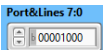

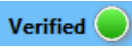
- 4.2.1 Select the "Port" .
- 4.2.2 Press "UPDATE"  button. The port indicators will be updated:



#### 4.3 Digital Output Line control

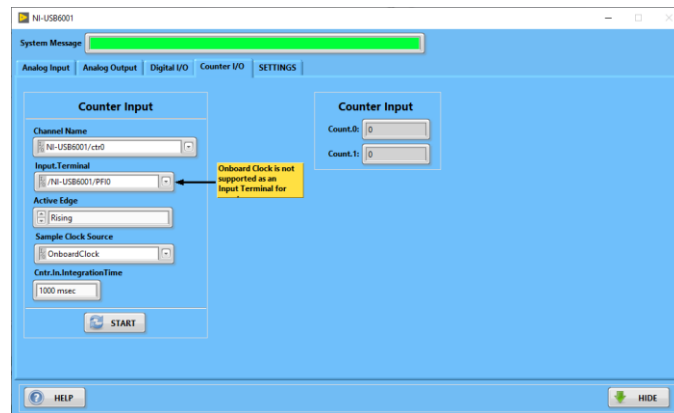
- 4.3.1 Select the digital output line .
- 4.3.2 Select the line "State" .
- 4.3.3 Press the "UPDATE"  button.
- 4.3.4 The application performs the selected line verification .

#### 4.4 Digital Output Port control

- 4.4.1 Select digital output "Port" .
- 4.4.2 Set the port value: .
- 4.4.3 Press the "UPDATE"  button.
- 4.4.4 The application performs the selected port verification .

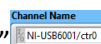
## 5 Counter Control

The device has one input counter. Their control implemented on the “Counter I/O” page:

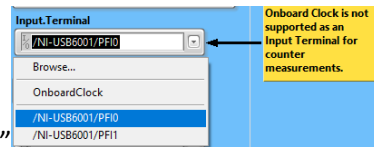


### 5.1 Counter Input Control

5.1.1 Select the “Channel Name”



5.1.2 Select the “Input.Terminal”



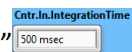
5.1.3 Select the “Active Edge”



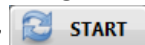
5.1.4 Select the “Sample Clock Source”



5.1.5 Select the “Cntr.In.IntegrationTime”



5.1.6 Press the “START” button.



5.1.7 The results of each counter will be displayed on the “Counter Input” displays:

