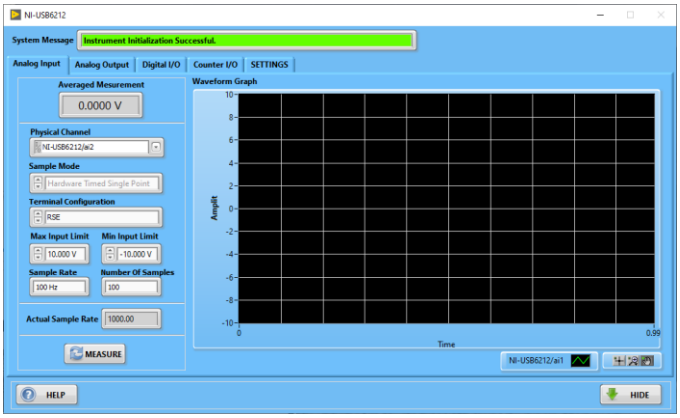
NI-USB6212 SOFT PANEL

USER MANUAL

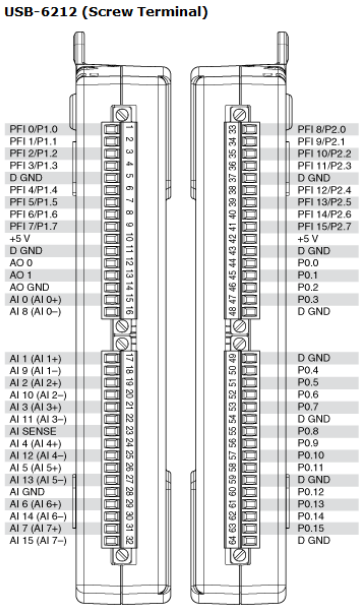
1. INTRODUCTION

This document intends to provide the end-user with guidance on the NI-USB6212 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-USB6212 is the medium class instrument has the 16 16-Bit analog inputs (AI), 2 16-Bit analog outputs (AO), and 32 digital bi-directional lines. The digital lines can be configured to create up to 2 bi-directional counters.

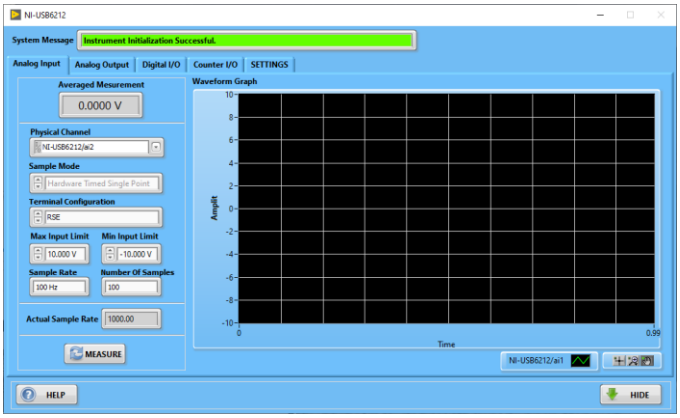
The device pinout presented on the picture below:



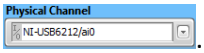
The following sections describe the operation of the NI-USB6212 soft panel where each set of functions represented on the dedicated page.

2 Analog inputs

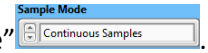
The access to the analog inputs provided on the “Analog Inputs” page:

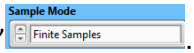


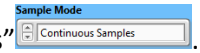
The following steps describe steps to perform the analog measurements.

2.1 Select the “Physical Channel” 

. Please note that the device terminals expose not all listed AI channels. Available channels are 0 to 15.

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” 

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2.3 Select “Terminal Configuration” 

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Where: default = Differential;

RSE = referenced single ended;

NRSE = non-referenced single ended;

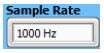
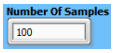
Pseudodifferential = refer to https://knowledge.ni.com/KnowledgeArticleDetails?id=kA00Z0000019YuUSAU&l=en-US

Set the input signal maximum and minimum values 

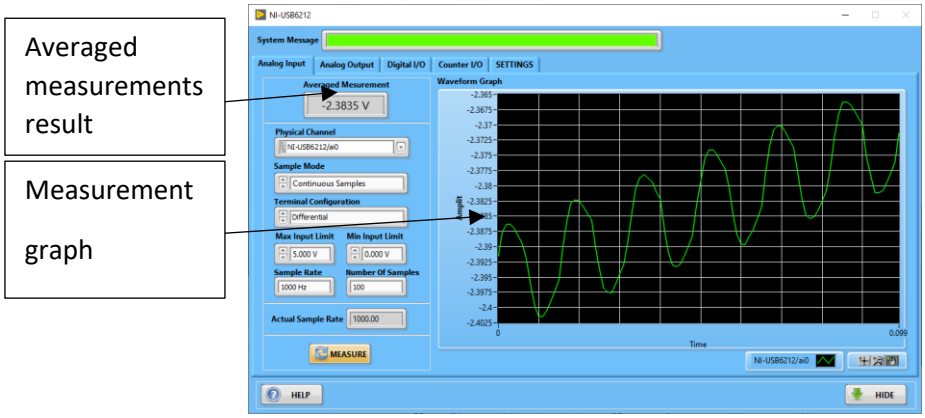
.

This device has auto scaling features and will automatically amplify the input signal. The input range affects the resolution of AI channel. Resolution refers to the voltage of one ADC code. For example, a 16-bit ADC converts analog inputs into one of 65,536 (= 216) codes—that is, one of 65,536 possible digital values. These values are spread fairly evenly across the input range. So, for an input range of -10 V to 10 V, the voltage of each code of a 16-bit ADC is:

$$\frac{10V-(-10V)}{2^{16}} = 305\,\mu V$$

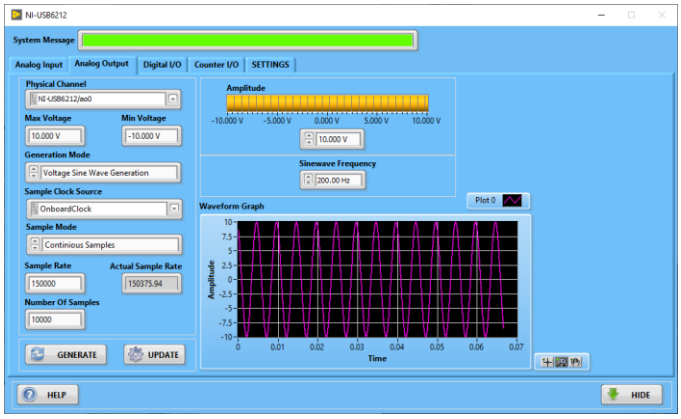
2.4 Set the “Sampling Rate”  and “Number Of Samples”  parameters.

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



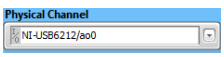
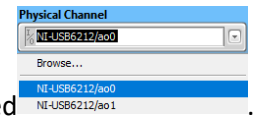
3 Analog Outputs

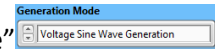
The USB 6212 has two 16-Bits analog output channels. These output channels can operate independently from each other and produce DC voltage, sign waveform, triangle waveform, square waveform, and saw-tooth waveform. The control of the analog output channels located on the “Analog Output” page:

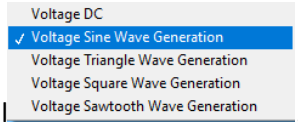


The analog outputs works simultaneously. The application generates the four waveforms with common attributes like the sample clock source, sample mode, sample rate, and number of samples. If there will be need to change one or more of these parameters, while it is running, the user shall select “UPDATE”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

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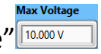
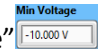
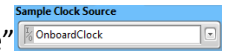
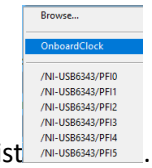
3.3 Select “Max Voltage” 

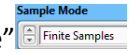
and “Min Voltage” 

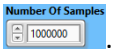
of the output signals. Please, keep in mind, these parameters will apply to all four analog output channels.

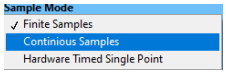
3.4 Select the “Sample Clock Source” 

from the list 

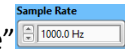
. The simplest selection is the “Onboard Clock”.

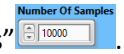
3.5 Select the “Sample Mode” 

to generate specified number of samples 

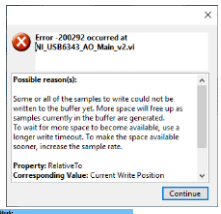
. Or, select 

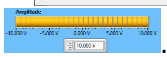
for continuous signal generation.

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:



3.7 Select the “Amplitude” of the signal: 
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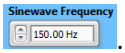
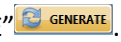
3.8 Select the “Sinewave Frequency” 

. This parameter applicable to the waveforms, not to DC voltage generation.

3.9 Press “GENERATE” 

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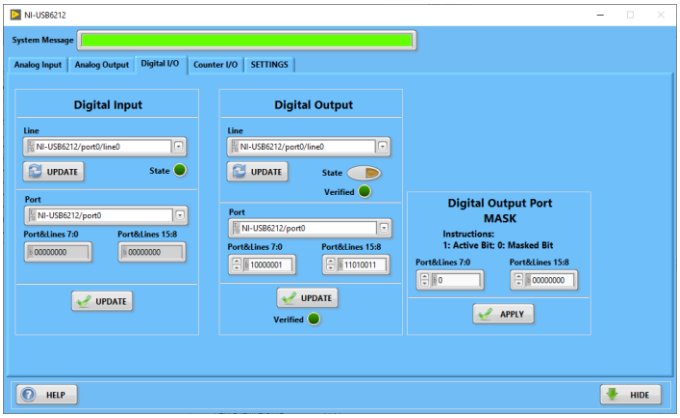
4 Digital Input/Outputs

The USB 6343 device has 48 bi-directional digital lines. These lines can be used individually or compounded in ports:

- Port 0 – 16 Bits
- Ports 1 and 2 – 8-Bits.

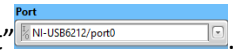
Access to the DIO controls provided on the page “Digital I/O” page:



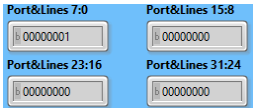
4.1 Digital Input line control

4.1.1 Select digital “Line”  and press “UPDATE”  to read the selected line state:  .

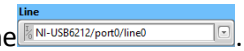
4.2 Digital Input Port control

4.2.1 Select the “Port”  . If the port 0 selected, the four lines will be activated:  If the port 1 or port 2 selected, the only one port indicator will be activated:  .

4.2.2 Press “UPDATE”  button. The port indicators will be updated:

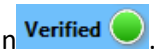


4.3 Digital Output Line control

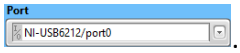
4.3.1 Select the digital output line  .

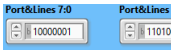
4.3.2 Select the line “State”  .

4.3.3 Press the “UPDATE”  button.

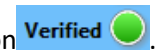
4.3.4 The application performs the selected line verification  .

4.4 Digital Output Port control

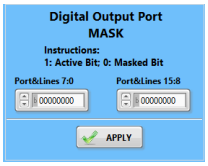
4.4.1 Select digital output “Port”  .

4.4.2 Set the port value:  .

4.4.3 Press the “UPDATE”  button.

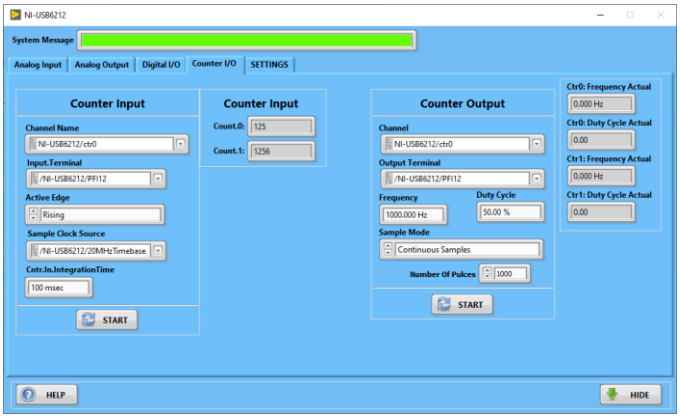
4.4.4 The application performs the selected port verification  .

4.4.5 There is the digital port masking option:



5 Counters Control

The device has two by-directional counters. Their control implemented on the “Counter I/O” page:



5.1 Counter Input Control

5.1.1 Select the “Channel Name” 

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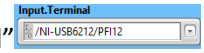
5.1.2 Select the “Input.Terminal” 

. For correct selection of the input terminals for specific counters, please refer to the picture below:

Default NI-DAQmx Counter Terminals

Counter/Timer Signal	Default Pin Number	Signal Name
CTR 0 SRC	33	PFI 8
CTR 0 GATE	34	PFI 9
CTR 0 AUX	35	PFI 10
CTR 0 OUT	38	PFI 12
CTR 0 A	33	PFI 8
CTR 0 Z	34	PFI 9
CTR 0 B	35	PFI 10
CTR 1 SRC	4	PFI 3
CTR 1 GATE	6	PFI 4
CTR 1 AUX	36	PFI 11
CTR 1 OUT	39	PFI 13
CTR 1 A	4	PFI 3
CTR 1 Z	6	PFI 4
CTR 1 B	36	PFI 11
FREQ OUT	40	PFI 14

5.1.3 Select the “Active Edge” 

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5.1.4 Select the “Sample Clock Source” 

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5.1.5 Select the “Cntr.In.IntegrationTime” 

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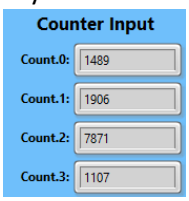
5.1.6 Press the “START” 

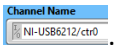
button.

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



5.2 Counter Output Control

The USB 6343 allows using each of four counters to function independently.

5.2.1 Select the output counter “Channel” 

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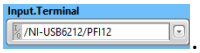
5.2.2 Select the “Output Terminal” 

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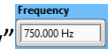
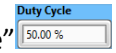
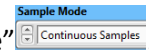
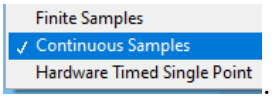
5.2.3 Select the “Frequency” 

and the “Duty Cycle” 

of the output counter.

5.2.4 Select the “Sample Mode” 

. There are selections available 

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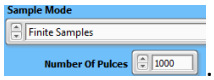
If the “Finite Samples” selected, the counter will generate the specified “Number Of Pulses” 

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5.2.5 Press the “START” 

button to generate the pulse train.

5.2.6 The state of the counters is displayed: