HSDAQ LabVIEW toolkit

1. Introduction

HSDAQ LabVIEW toolkit is developed for accessing the ICP DAS high-speed data acquisition devices. It provides an easy-to-use interface and simplifies the programming process. The HSDAQ LabVIEW toolkit provides an HSDAQ.llb with basic sub-VIs for controlling the HSDAQ devices, and several demo programs to demonstrate how to use the sub-Vis.

The Recommended system requirements for HSDAQ LabVIEW toolkit are:

- 32-bit/64-bit Windows 7, Windows 8.1, Windows 10
- LabVIEW 2010 or later
- 1 GHz or faster 32-bit (x86) or 64-bit (x64) processor (Win 7)
- 2 GB RAM (32-bit) or 4 GB RAM (64-bit) (Win 7)
- Network: connections with fewer switches between the PC and the HSDAQ device(s) can improve AI acquisition performance. It is recommended to connect the PC and the HSDAQ device(s) to the same switch/hub.

PC   Switch/Hub   HSDAQ device
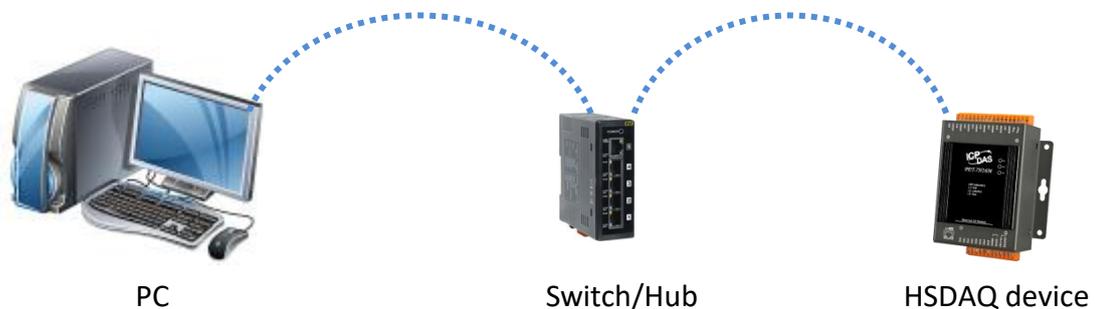
Demo: Functional Testing

Step1: input the **IP address** for the HSDAQ device

Step2: run the demo. It opens a connection to the device and displays the AI parameters on the device.

Step3: input the AI parameters and click on the **Set** button to set the new parameters.

Step4: click on the **Get** button to read the current settings on the device.

Click on the **Start Scan** button to send start scan command. The start scan indicator becomes on to indicate the command is run.

If the **device handle** is not greater than 0, the connection may fail. Make sure the device is powered-on and Ethernet is available for both the PC and the device.
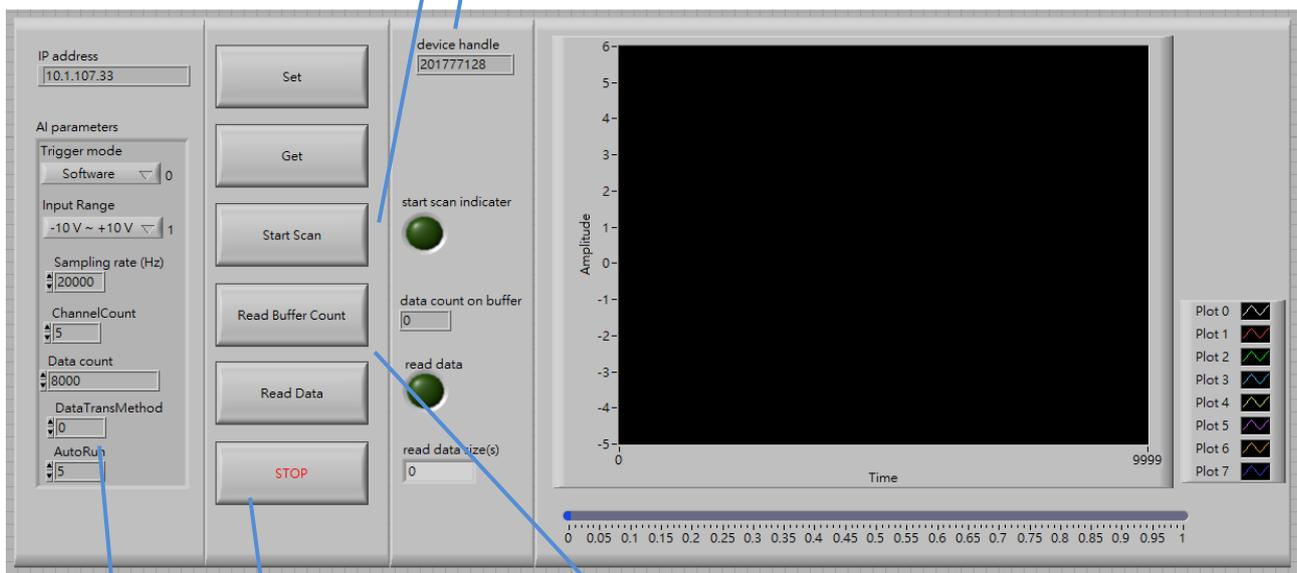
Exits the program

Sets the **Data count** greater than 0

Clicks on **Read Buffer Count** to read data count on buffer. If the value is equal to **Data count**, the read buffer indicator becomes on and you can click on **Read Data** to see the data displayed on waveform chart.

Demo: AI float_multiple_channel_n_sample_mode
AI_float_multiple_channel_n_sample_mode_2_module
AI_intiger_multiple_channel_n_sample_mode

Step1: input the **IP address** for the HSDAQ device

Step2: run the demo. It opens a connection to the device and displays the AI parameters on the device.

Step3: input the AI parameters and click on the **Set** button to set the correct parameters. After running the setting command, the AI parameters will be read again from the device and displayed on the same field. For n sample mode, the Data count needs be greater than 0.

Step4: click on the **Start Scan** button to start the data acquisition process, and wait the data displayed on waveform chart.

Step5: click on the **STOP** button to exit the program.

Sets the Data count greater than 0 in n sample mode DAQ process.

Numerical data display

Demo: **AI_float_multiple_channel_continuous_mode**
AI_float_multiple_channel_continuous_mode_2_module
AI_integer_multiple_channel_continuous_mode

Step1: input the *IP address* for the HSDAQ device

Step2: run the demo. It opens a connection to the device and displays the AI parameters on the device.

Step3: input the AI parameters and click on the *Set* button to set the correct parameters. After running the setting command, the AI parameters will be read again from the device and displayed on the same field. For continuous mode, the Data count needs be equal to 0.

Step4: click on the *Start Scan* button to start the data acquisition process, and wait the data displayed on waveform chart.

Step5: click on the *Stop Scan* button to stop the process.

Step6: click on the *STOP* button to exit the program.

The demo is for continuous mode and multiple channels AI data acquisition for HSDAQ device (in float format).
Continuous mode is available for software trigger mode and sampling rate <= 30KHz, or external clock trigger mode.
Therefore only software or external click trigger can be select, Channel count needs be more than 1,
Data count needs be 0, and Sampling rate needs be less than 30KHz.

1. Input the IP address for the HSDAQ device.
2. Run the demo
3. Input the AI parameters and then press Set button.
4. Press Start Scan button and wait the AI data displayed

Wait Data

IP address
10.1.107.33

Set   Start Scan   Stop Scan   STOP

AI parameters

Trigger mode
Software

Input range
-5 V ~ +5 V

Sampling rate (Hz)
0

Channel count
2

Data count
0

Data transfer method
0

Auto run
0

device handle
0

milliseconds to wait
50

data count on buffer
0

Amplitude

10–
8–
6–
4–
2–
0–
-2–
-4–
-6–

9999

Plot 0
Plot 1
Plot 2
Plot 3
Plot 4
Plot 5
Plot 6
Plot 7

Adjusts the time interval for reading data from buffer according to the system performance. 10 ~ 100 ms is recommended.

output array
0
0

0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

Sets the Data count equal to 0 in continuous mode DAQ process.

Numerical data display

Demo: AI_DIO

Step1: input the *IP address* for the HSDAQ device

Step2: run the demo. It opens a connection to the device and displays the AI parameters on the device.

Step3: click on the *Read 8-channel AI* to read data of all AI channels or specify the channel number and click on the *Read 1-channel AI* to read the data.

Step4: click on the *Read DIO* button to read the DO and DI status.

Step5: Set the DO status and then click on the *Write 4-channel DO* or *Write 1-channel DO* to control the DO channels.

Step6: click on the *STOP* button to exit the program.

2. Sub-VIs

2.1. HS_Device_Create.vi

Creates a connection to an HSDAQ device. The IP address, command port and data port need be in line with the settings on the device. Command port 9999 and data port 10010 are default settings for the device. If the connection is open successfully, the device handle returned will be greater than 0.
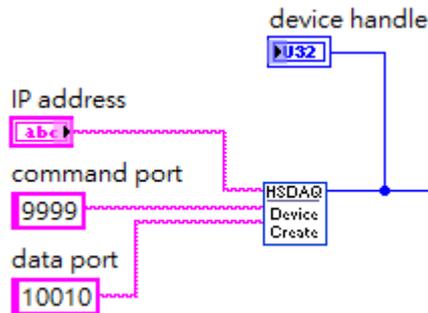
2.2. HS_GetAIScanParameters.vi

Gets parameters for AI scan from the device.

Trigger mode
- 0: Software trigger
- 1: External clock trigger
- 2: Post trigger
- 3: Pre trigger

Input range
- 0: -5 V ~ + 5 V
- 1: -10 V ~ +10 V

Sampling rate (Hz)
- 0 ~ 200 KHz

Channel count: 1 ~ 8

Data count
- 0: Continuous mode ($1 \leq freq \leq 30$ KHz)
- N: N sample mode ($1 \leq freq \leq 200$KHz)
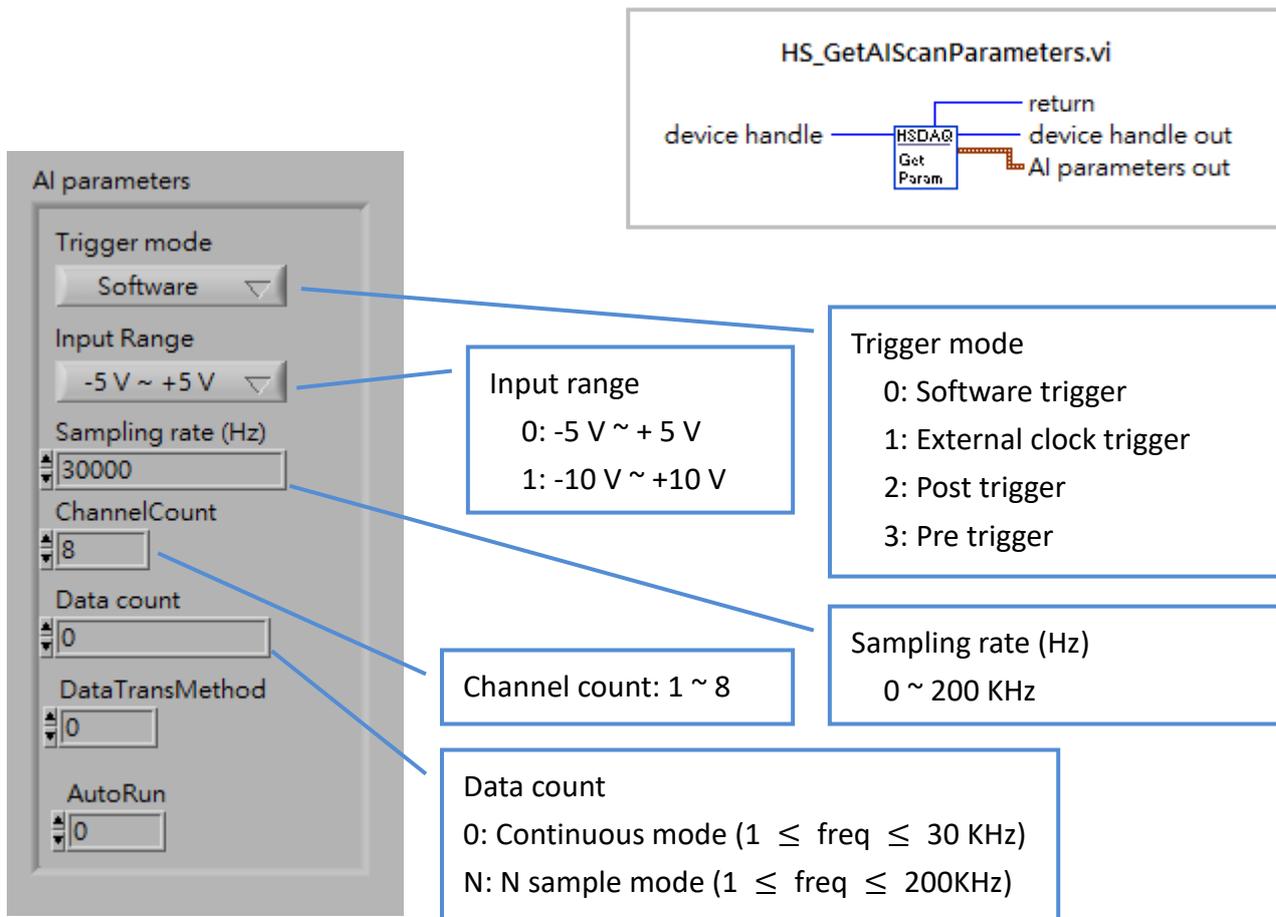
2.3. HS_SetAIScanParameters.vi

Sets parameters for AI scan for the device.

AI parameters

Trigger mode
Software

Input Range
-5 V ~ +5 V

Sampling rate (Hz)
30000

ChannelCount
8

Data count
0

DataTransMethod
0

AutoRun
0

Trigger mode
0: Software trigger
1: External clock trigger
2: Post trigger
3: Pre trigger

Input range
0: -5 V ~ + 5 V
1: -10 V ~ +10 V

Sampling rate (Hz)
0 ~ 200 KHz

Channel count: 1 ~ 8

Data count
0: Continuous mode (1 $\leq$ freq $\leq$ 30 KHz)
N: N sample mode (1 $\leq$ freq $\leq$ 200KHz)

HS_SetAIScanParameters.vi

device handle ——— HSDAQ Set Param ——— return
AI parameters ——— device handle out

2.4. HS_StartAIScan.vi

Sends start AI scan command to the device.

HS_StartAIScan.vi

device handle ——— HSDAQ Start AI Scan ——— return
device handle out
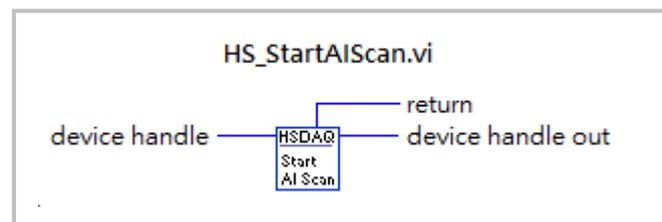
2.5. HS_GetAIBufferStatus.vi

After sending start AI scan command to the device, use this function to read the data count which is transferred to the buffer on the PC side. If the data count is greater than or equal to the target value, use **HS_GetAIBuffer.vi** or **HS_GetAIBufferHex.vi** to obtain data

HS_GetAIBufferStatus.vi

device handle ——— HSDAQ Buffer Status ——— return
device handle out
buffer status
data count on buffer
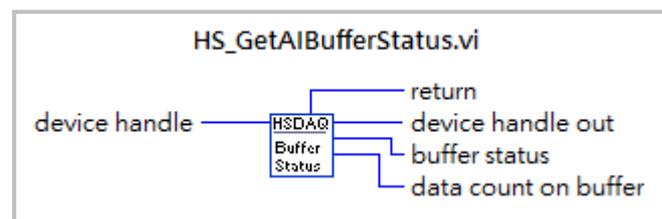
2.6. HS_GetAIBuffer.vi

Gets data from buffer in float format.

HS_GetAIBuffer.vi

device handle ——— [HSDAQ Get AI Float] ——— return / device handle out / data
size
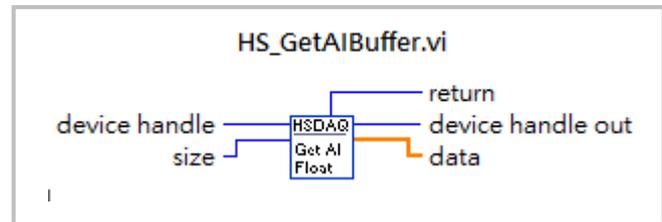
2.7. HS_GetAIBufferHex.vi

Gets data from buffer in integer format (raw data).

HS_GetAIBufferHex.vi

device handle ——— [HSDAQ Get AI Hex] ——— return / device handle out / data
size
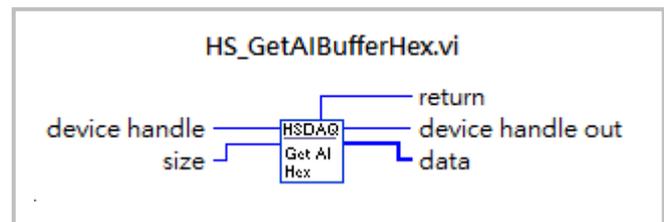
2.8. HS_StopAIScan.vi

Sends stop AI scan command to the device. It is used in continuous mode to stop the AI process or used to stop abnormal AI scan process.

HS_StopAIScan.vi

device handle ——— [HSDAQ Stop AI Scan] ——— return / device handle out
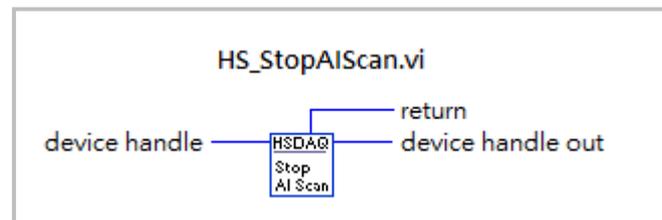
2.9. HS_Device_Release.vi

It is used to close the connection between the PC and the device at the end of the program.

HS_Device_Release.vi

device handle ——— [HSDAQ Device Release] ——— return / device handle out
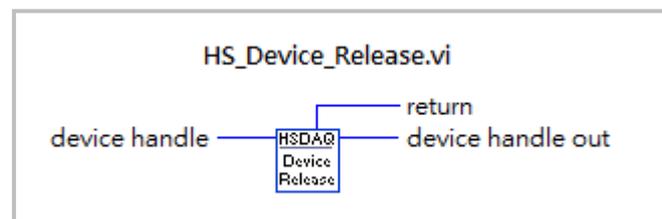
2.10. HS_ReadAI.vi

Gets one AI data from a specified channel on a HSDAQ device in float format.
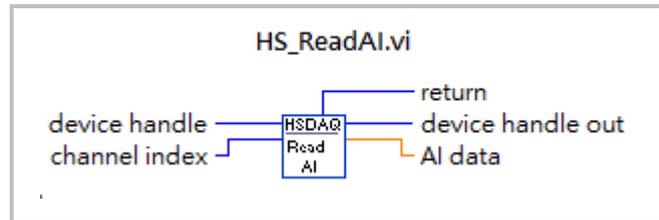
2.11. HS_ReadAIAll.vi

Gets data from every channel buffer on a HSDAQ device in float format.
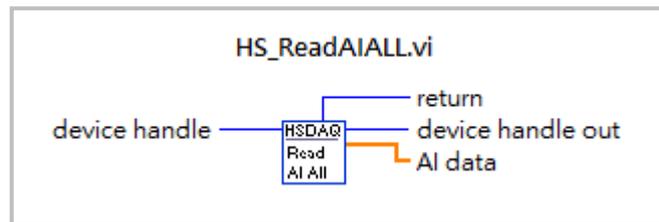
2.12. HS_ReadDIO.vi

Gets DIs and DOs status on a HSDAQ device.
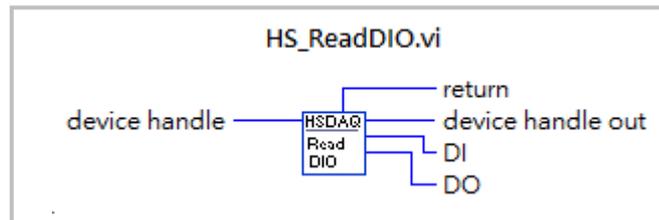
2.13. HS_WriteDOBit.vi

Sends command to control the status of a specified DO channel on a HSDAQ device.
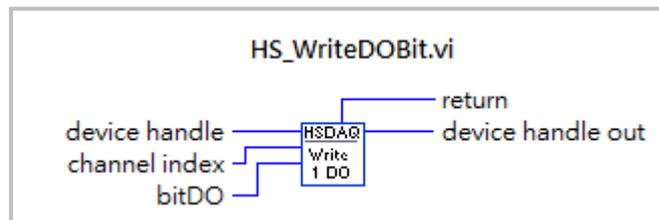
2.14. HS_WriteDO.vi

Sends command to control the status of all DO channels on a HSDAQ device.