PET-7H16M/PET-7H24M/PET-AR400

Standard API User Manual

Version 1.0.7, July 2023

Service and usage information for

PET-7H16M

PET-7H24M

PET-AR400

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Edited by Anna Huang

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About this Manual

This manual is intended for software developers who want to integrate the functionality of standard PET-7H16M / PET-7H24M / PET-AR400 family into their applications.
The information in this manual is subject to change without notice.

Supported Models

This manual supports the following modes.

PET-7H16M	8-channel Analog Input 4-channel Digital Output 4-channel Digital Input 1-channel 32-bit high-speed or 4-channel 32-bit low-speed counter
PET-7H24M	4-channel Analog Input 4-channel Digital Output 3-channel Digital Input 1-channel Encoder
PET-AR400	4-channel Accelerometer (IEPE) Inputs

Related Resources

The related resources can be accessed from the Download Center that can be found via the icon link at the top-right of the product page.

- **PET-7H16M** https://www.icpdas.com/tw/product/PET-7H16M
- **PET-7H24M** https://www.icpdas.com/tw/product/PET-7H24M
- **PET-AR400** https://www.icpdas.com/tw/product/PET-AR400

Download Center

Product Names and Style Conventions Used in this Manual

- PET-7H16M, PET-7H24M, and PET-AR400 are collectively referred to as "HSDAQ models" in this document.
- The following describes the variable description of the parameter conventions used in this manual.

  [in] set a parameter value
  [out] return a value from a function parameter

Revision History

This chapter provides revision history information to this document.

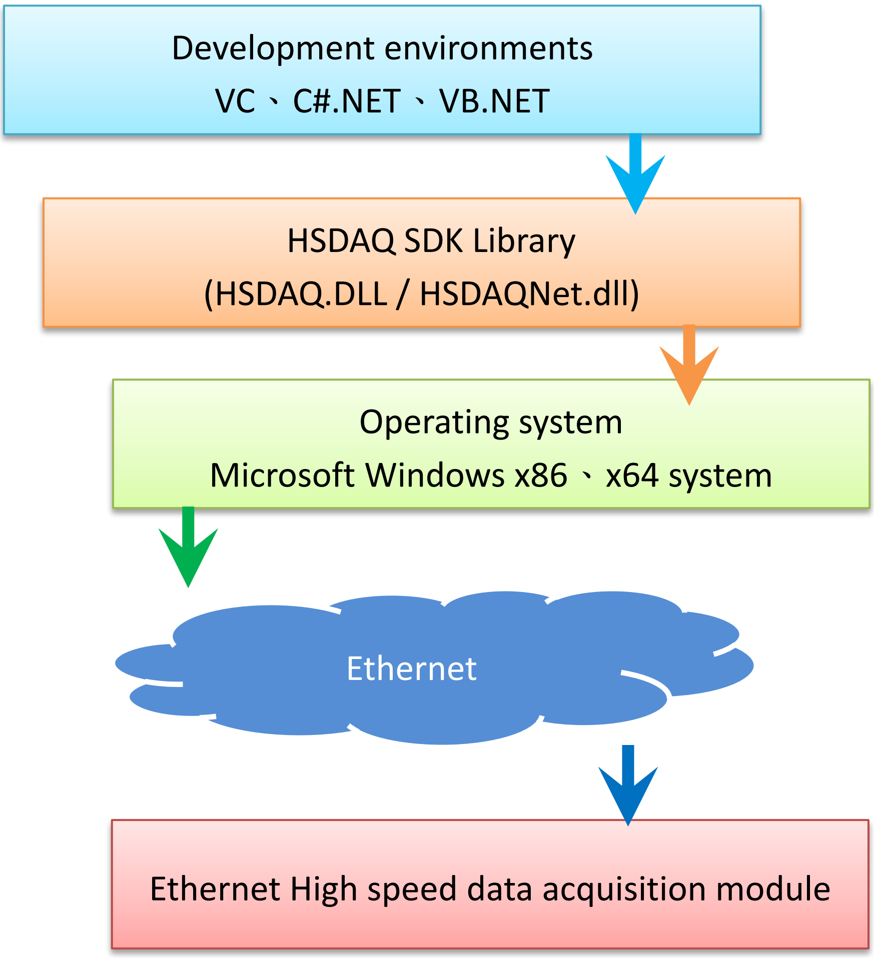
The table below shows the revision history:

Revision	Date	Description
1.0.1	January 2019	Initial issue
1.0.2	February 2019	Add API function call process chart for data logger
1.0.3	Sep. 2019	Add API functions for counters and synchronous Input data acquisition
1.0.6	Sep. 2020	Add support for PET-7H24M Add digital filter API function for PET-7H16M
1.0.7	July 2023	Add support for PET-AR400

1. Getting Started

1.1. Introduction to the HSDAQ SDK

HSDAQ SDK library are software development kits that contain header files, libraries, documentation and tools required to develop applications for High-speed data acquisition module series.


Development environments
VC 、C#.NET 、VB.NET
HSDAQ SDK Library
(HSDAQ.DLL / HSDAQNet.dll)
Operating system
Microsoft Windows x86 、x64 system
Ethernet
Ethernet High speed data acquisition module

1.1.1. System Requirements

Prior to installing the HSDAQ SDK, ensure that your PC meets the following minimum system requirements for installation and operation.

The HSDAQ library supports the following platform:

32-bit (x86)	Windows 7 32-bit Windows 8 32-bit Windows 10 32-bit
64-bit (x64)	Windows 7 64-bit Windows 8 64-bit Windows 10 64-bit

The requirements below are the minimum system requirements necessary to use the HSDAQ SDK library in its full extent.

Operating System	Microsoft Windows 7 or later (32-bit or 64-bit Windows OS)
Processor	1.4GHz or higher
Memory (RAM)	2GB or more
Hard Disk	50 MB or more (If there is a requirement for a data logger, the disk storage space can be increased according to the size of the stored data.)
Video	Support for Super VGA graphics
Others	Ethernet port/NIC (Network Interface Card) – 100 Mbps or 1 Gbps

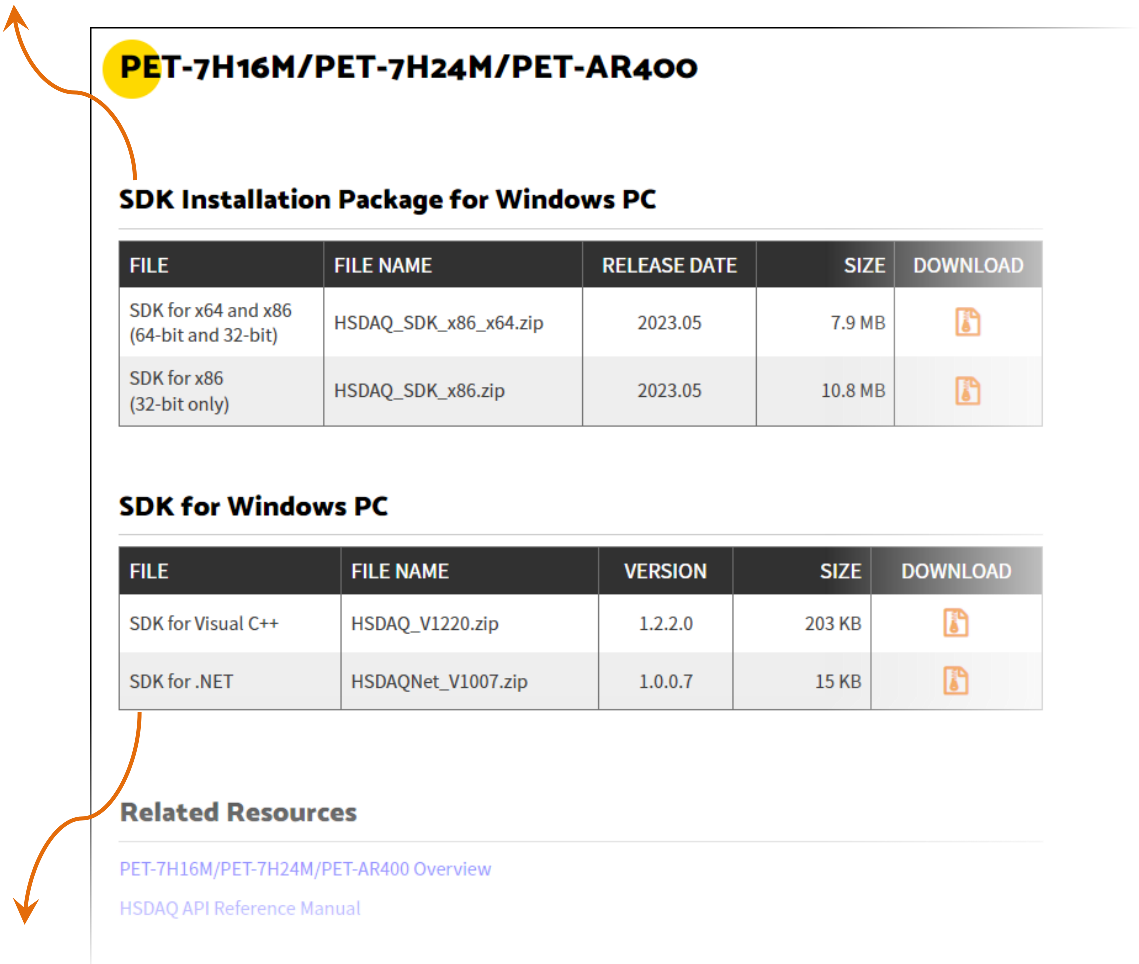
1.1.2. HSDAQ SDK Installation

The latest version of the HSDAQ SDK can be obtained from:

http://www.icpdas.com/en/download/show.php?num=2326

HSDAQ SDK Installation Packages for Operating Systems

The HSDAQ SDK Installation packages are divided according to the supported operating system. The installation package must be installed before installing any software components.



PET-7H16M/PET-7H24M/PET-AR400

SDK Installation Package for Windows PC

FILE	FILE NAME	RELEASE DATE	SIZE	DOWNLOAD
SDK for x64 and x86 (64-bit and 32-bit)	HSDAQ_SDK_x86_x64.zip	2023.05	7.9 MB	
SDK for x86 (32-bit only)	HSDAQ_SDK_x86.zip	2023.05	10.8 MB	

SDK for Windows PC

FILE	FILE NAME	VERSION	SIZE	DOWNLOAD
SDK for Visual C++	HSDAQ_V1220.zip	1.2.2.0	203 KB	
SDK for .NET	HSDAQNet_V1007.zip	1.0.0.7	15 KB	

Related Resources

PET-7H16M/PET-7H24M/PET-AR400 Overview

HSDAQ API Reference Manual

HSDAQ SDK Packages for Programming Languages

The HSDAQ components are packaged according to the supported programming language. The table below shows the HSDAQ components and their supported programming language.

Package Name	File Name	Programming Language
HSDAQ_Vnnnn.zip	HSDAQ.dll HSDAQ.lib HSDAQ.h	VC++
HSDAQNet_Vnnnn.zip	HSDAQNet.dll	VC#, VB.NET

1.2. Deploying the HSDAQ SDK

The HSDAQ SDK provides a complete solution to integrate with HSDAQ models and it's compatible with Visual C#, Visual Basic.NET and C++. In order to use a component in your application, you must first add a reference to it.

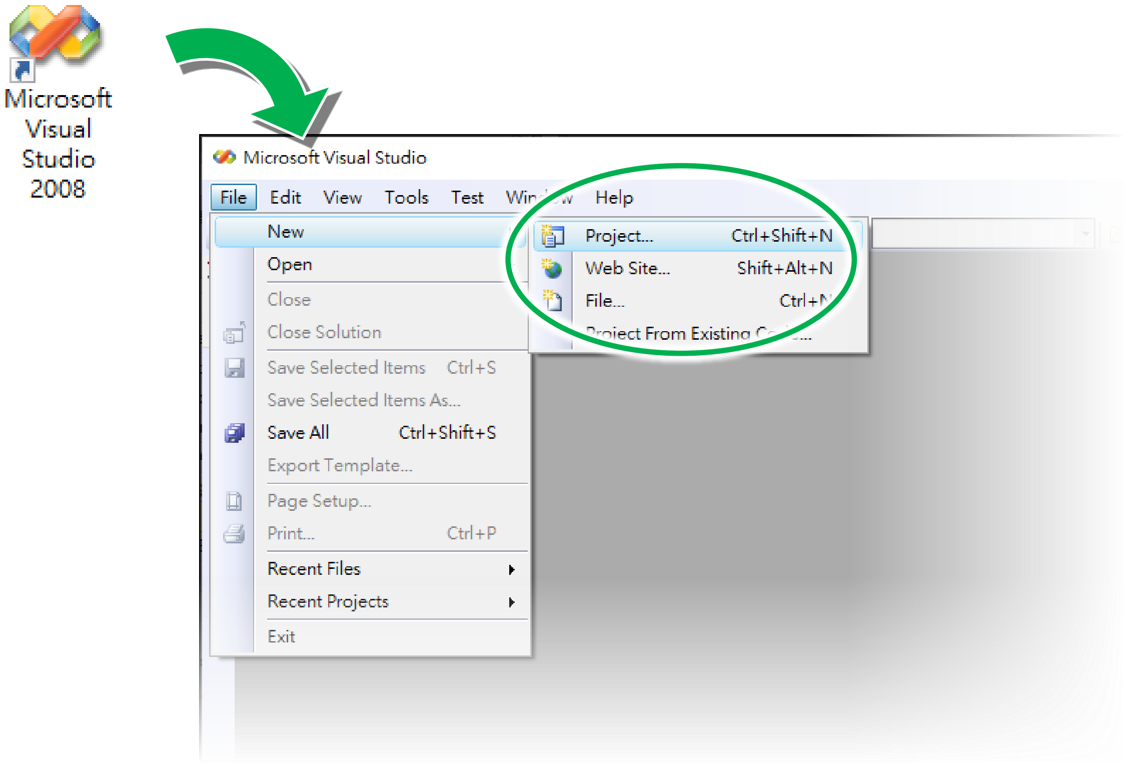
1.2.1. C#

The HSDAQ SDK provides a complete solution to integrate with HSDAQ models and it's compatible with Visual C#, Visual Basic.NET and C++. In order to use a component in your application, you must first add a reference to it.

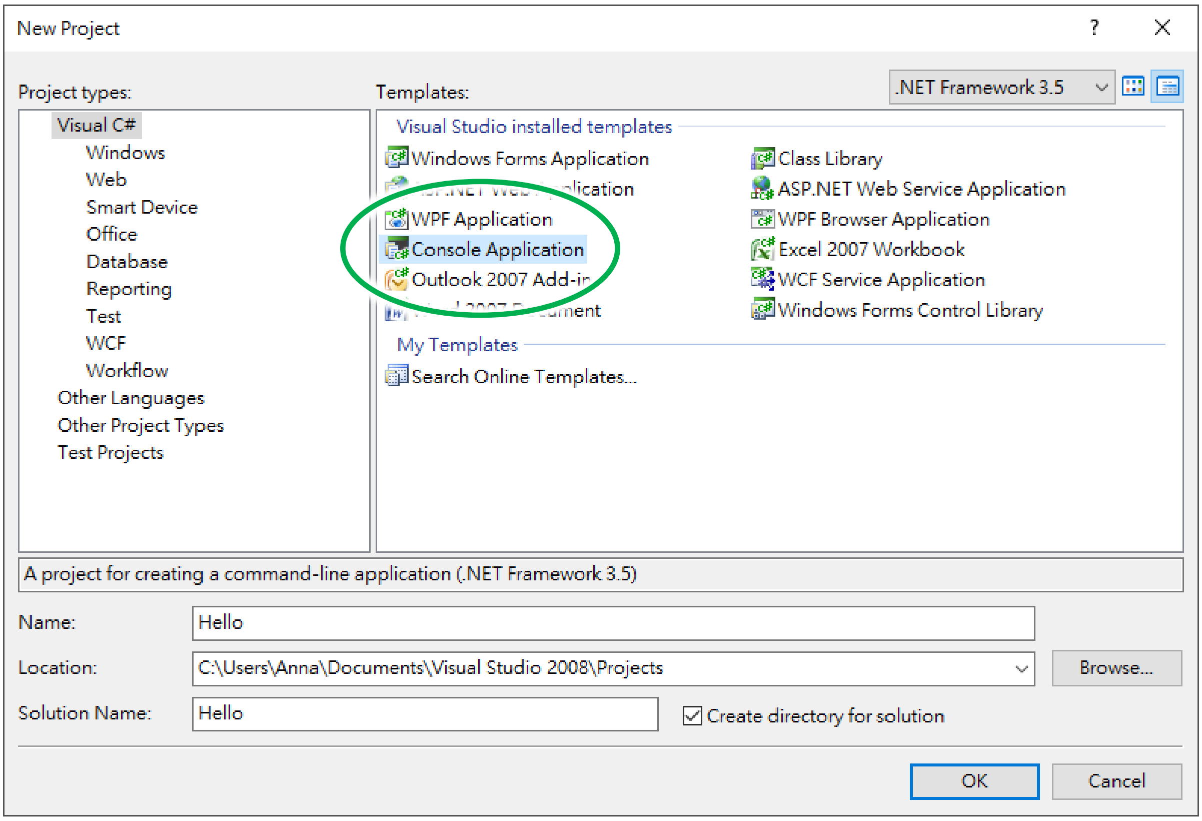
Required DLLs

HSDAQ.dll

Step 1: Create a new project by using Visual Studio 2008



Step 2: Select the Console Application and specify the project name for newly created project



A project for creating a command-line application (.NET Framework 3.5)

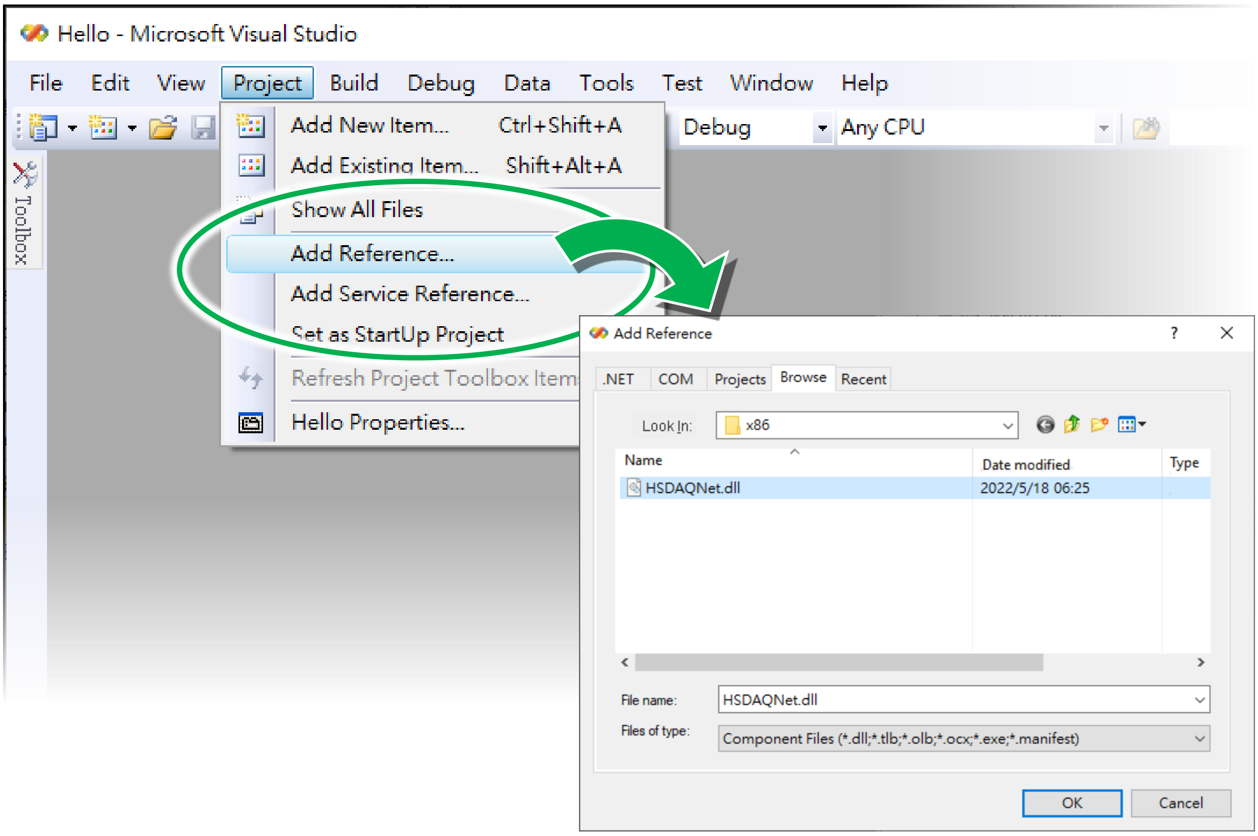
Name: Hello

Location: C:\Users\Anna\Documents\Visual Studio 2008\Projects

Solution Name: Hello

☑ Create directory for solution

Step 3: Add reference to the project



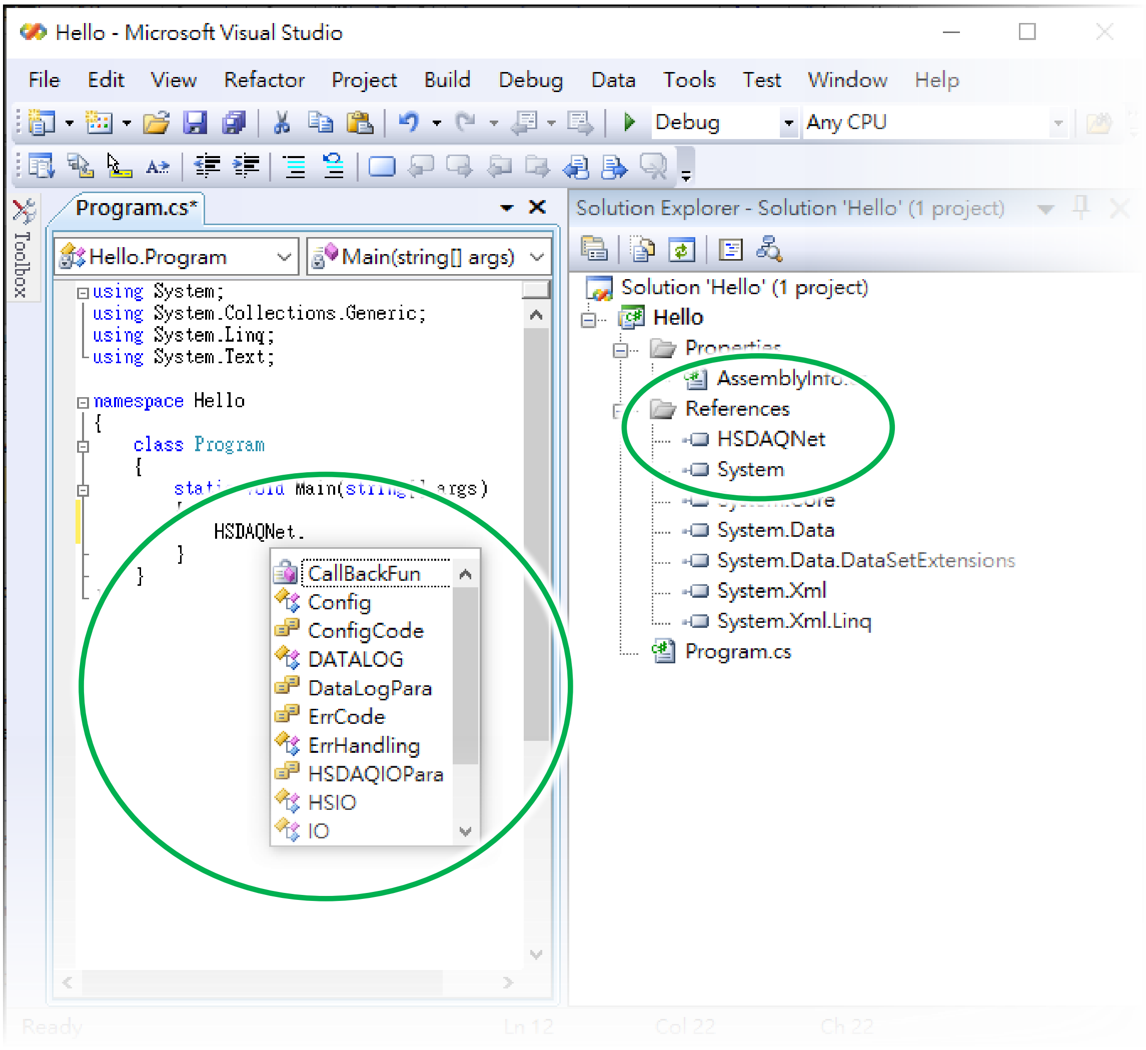
Look In: x86

Name	Date modified	Type
HSDAQNet.dll	2022/5/18 06:25	

File name: HSDAQNet.dll

Files of type: Component Files (*.dll;*.tlb;*.olb;*.ocx;*.exe;*.manifest)

Step 4: Using the HSDAQ API



```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace Hello
{
    class Program
    {
        static void Main(string[] args)
        {
            HSDAQNet.
        }
    }
}
```

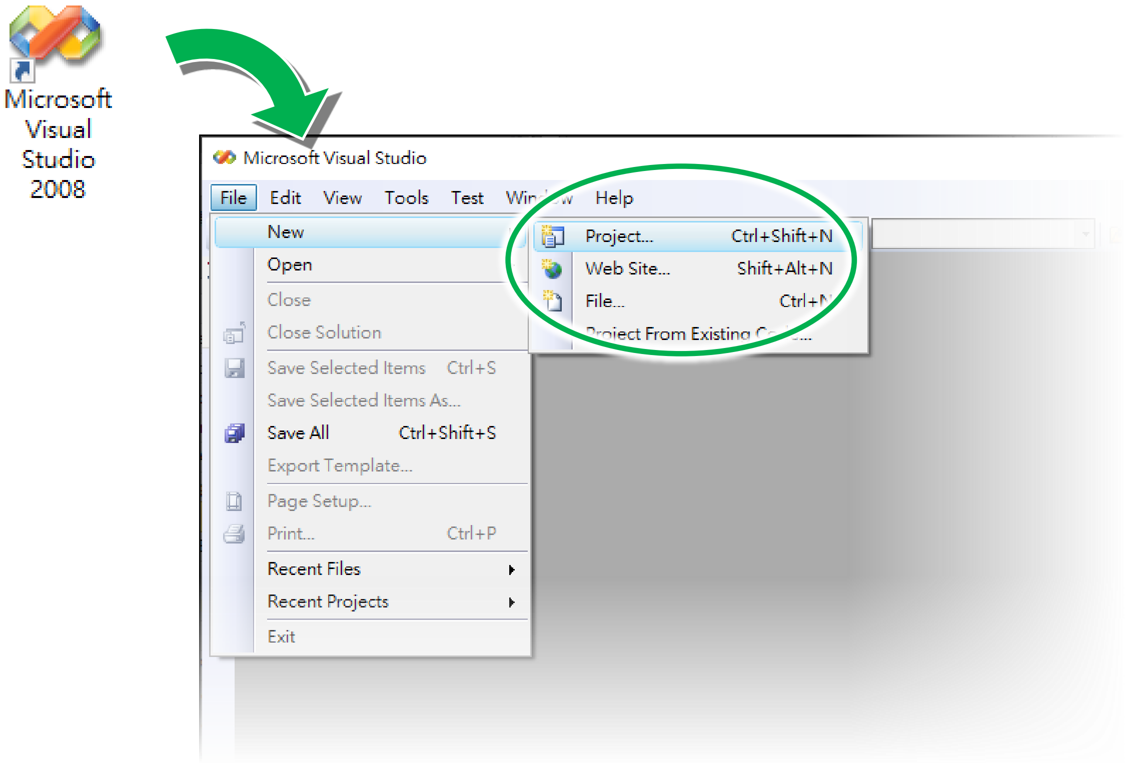
1.2.2. VB.NET

The HSDAQ SDK provides a complete solution to integrate with HSDAQ models and it's compatible with Visual C#, Visual Basic.NET and C++. In order to use a component in your application, you must first add a reference to it.

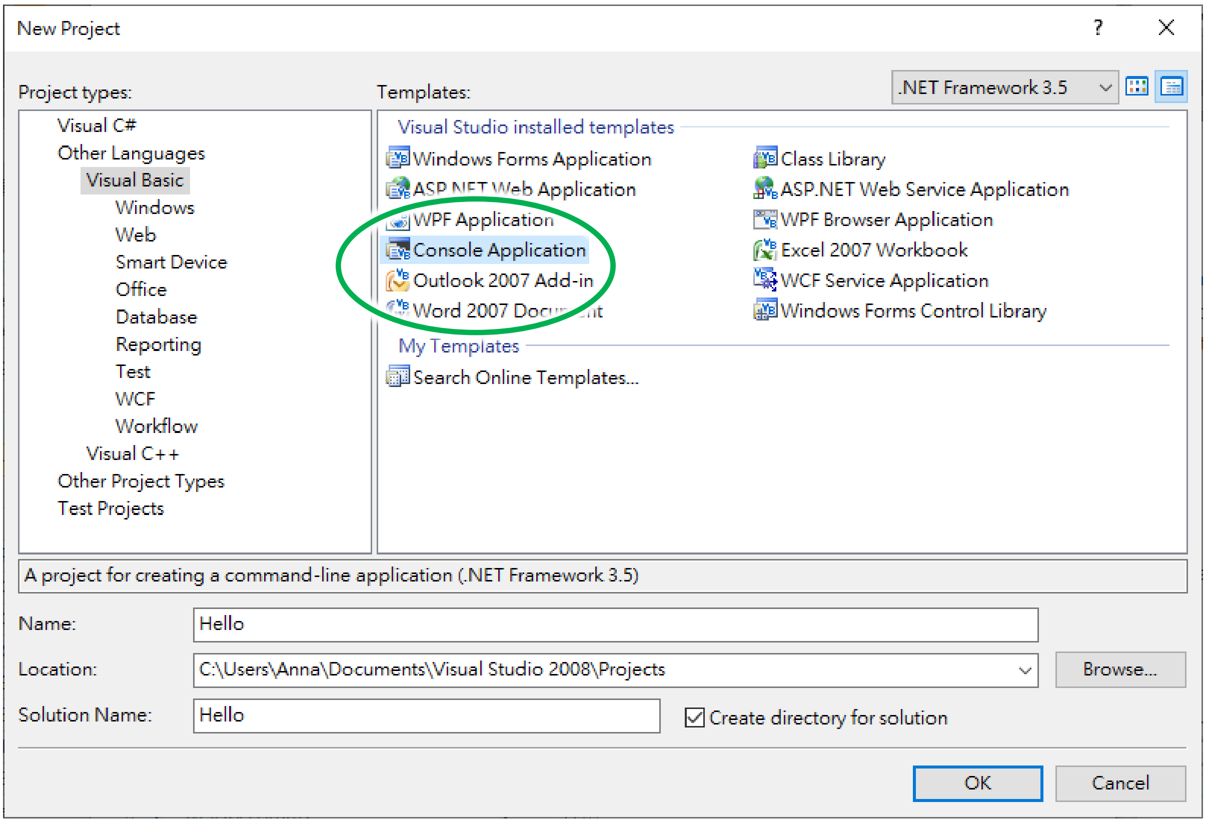
Required DLLs

HSDAQ.dll

Step 1: Create a new project by using Visual Studio 2008



Step 2: Select the Console Application and specify the project name for newly created project



A project for creating a command-line application (.NET Framework 3.5)

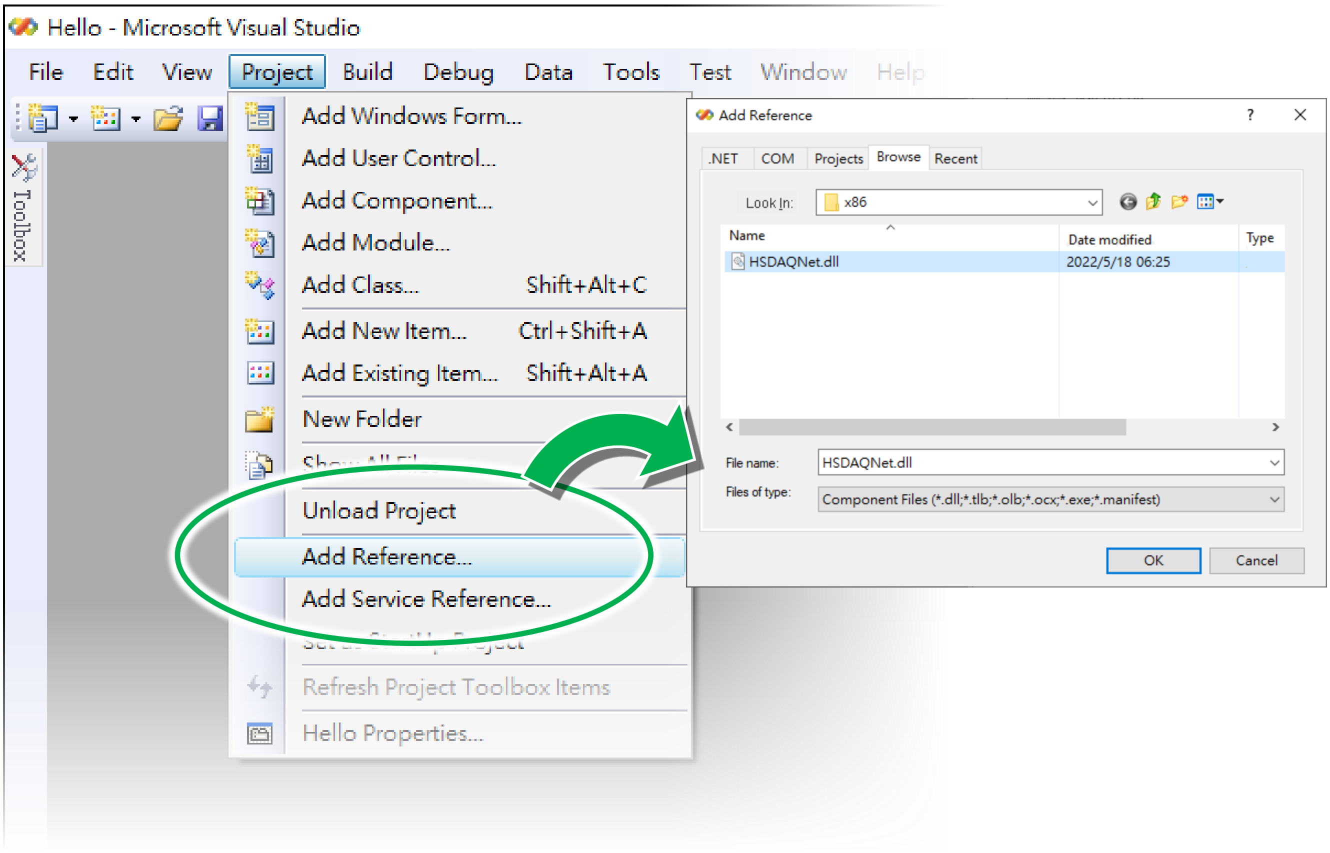
Name: Hello

Location: C:\Users\Anna\Documents\Visual Studio 2008\Projects

Solution Name: Hello

☑ Create directory for solution

Step 3: Add reference to the project



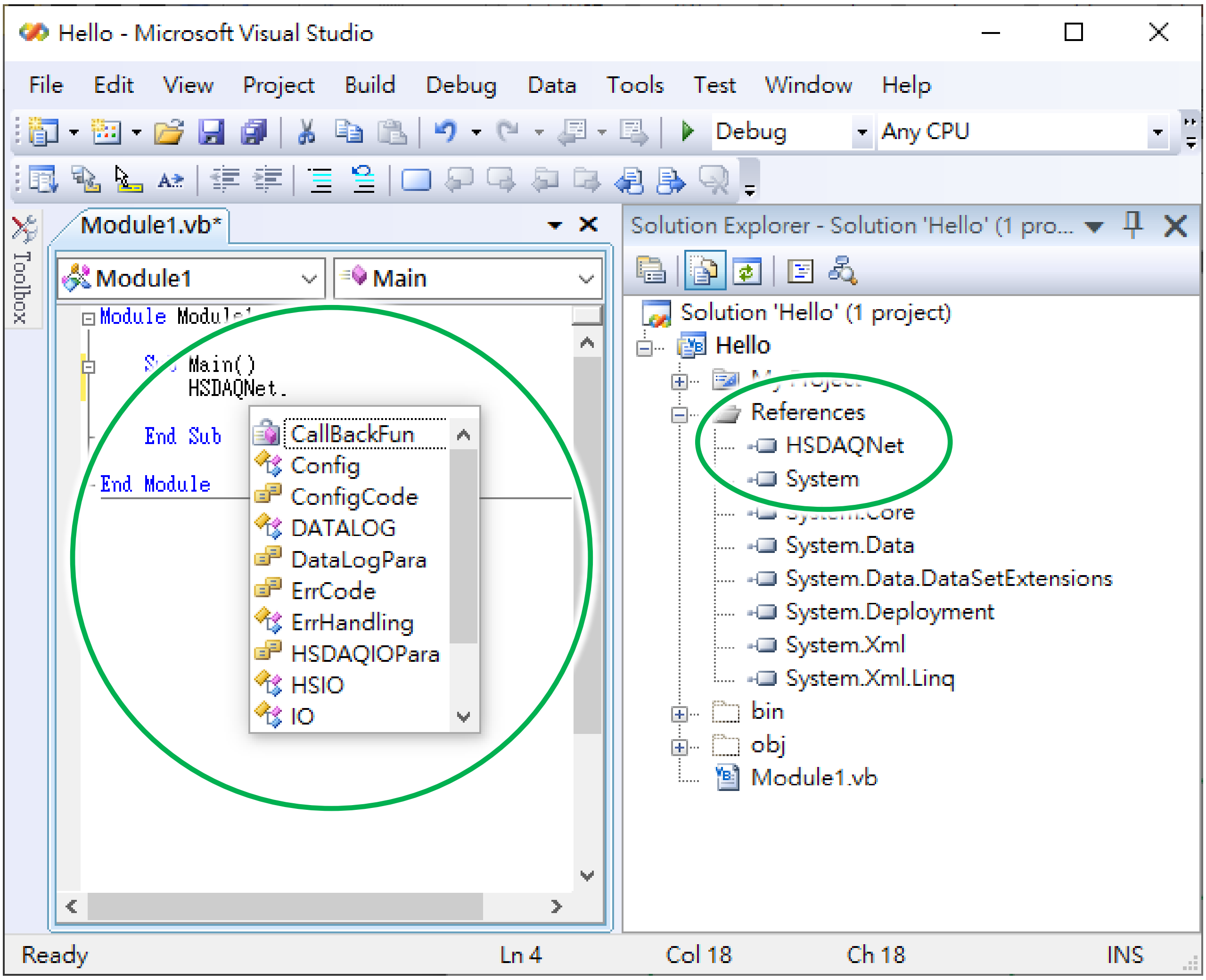
Look In: x86

HSDAQNet.dll 2022/5/18 06:25

File name: HSDAQNet.dll

Files of type: Component Files (*.dll;*.tlb;*.olb;*.ocx;*.exe;*.manifest)

Step 4: Using the HSDAQ API



```
Module Module1

    Sub Main()
        HSDAQNet.

    End Sub

End Module
```

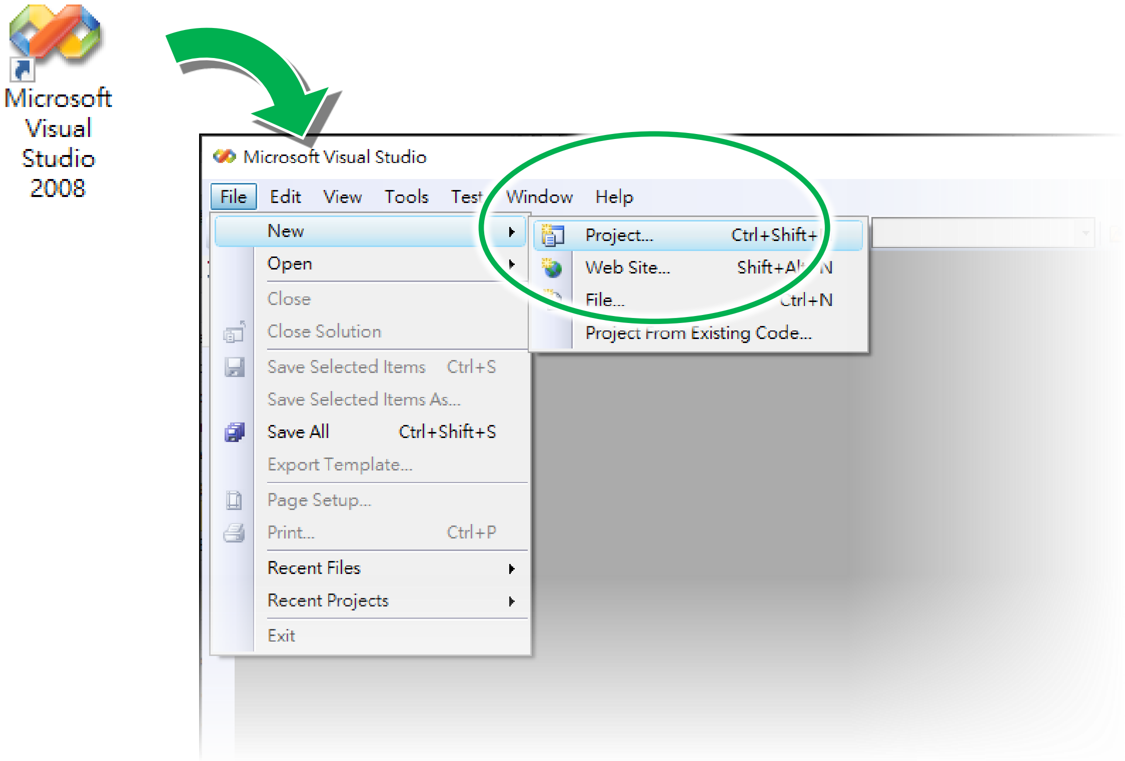
1.2.3. C/C++

The HSDAQ SDK provides a complete solution to integrate with HSDAQ models and it's compatible with Visual C#, Visual Basic.NET and C++. In order to use a component in your application, you must first add a reference to it.

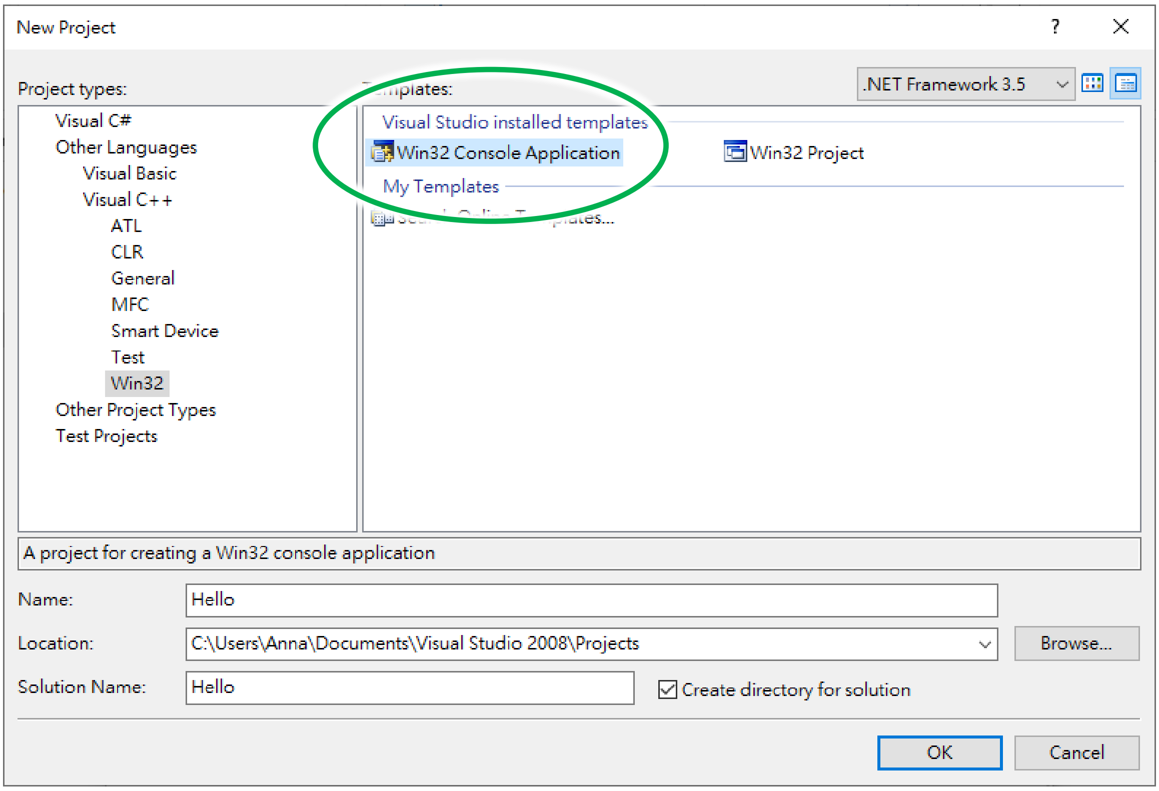
Required Header files and libraries

- HSDAQ.h
- HSDAQ.lib

Step 1: Create a new project by using Visual Studio 2008



Step 2: Select the Win32 Console Application and specify the project name for newly created project



New Project

Project types:
- Visual C#
- Other Languages
  - Visual Basic
  - Visual C++
    - ATL
    - CLR
    - General
    - MFC
    - Smart Device
    - Test
    - Win32
- Other Project Types
- Test Projects

Templates: .NET Framework 3.5

Visual Studio installed templates
- Win32 Console Application
- Win32 Project

My Templates

A project for creating a Win32 console application

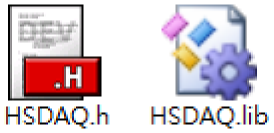
Name: Hello

Location: C:\Users\Anna\Documents\Visual Studio 2008\Projects

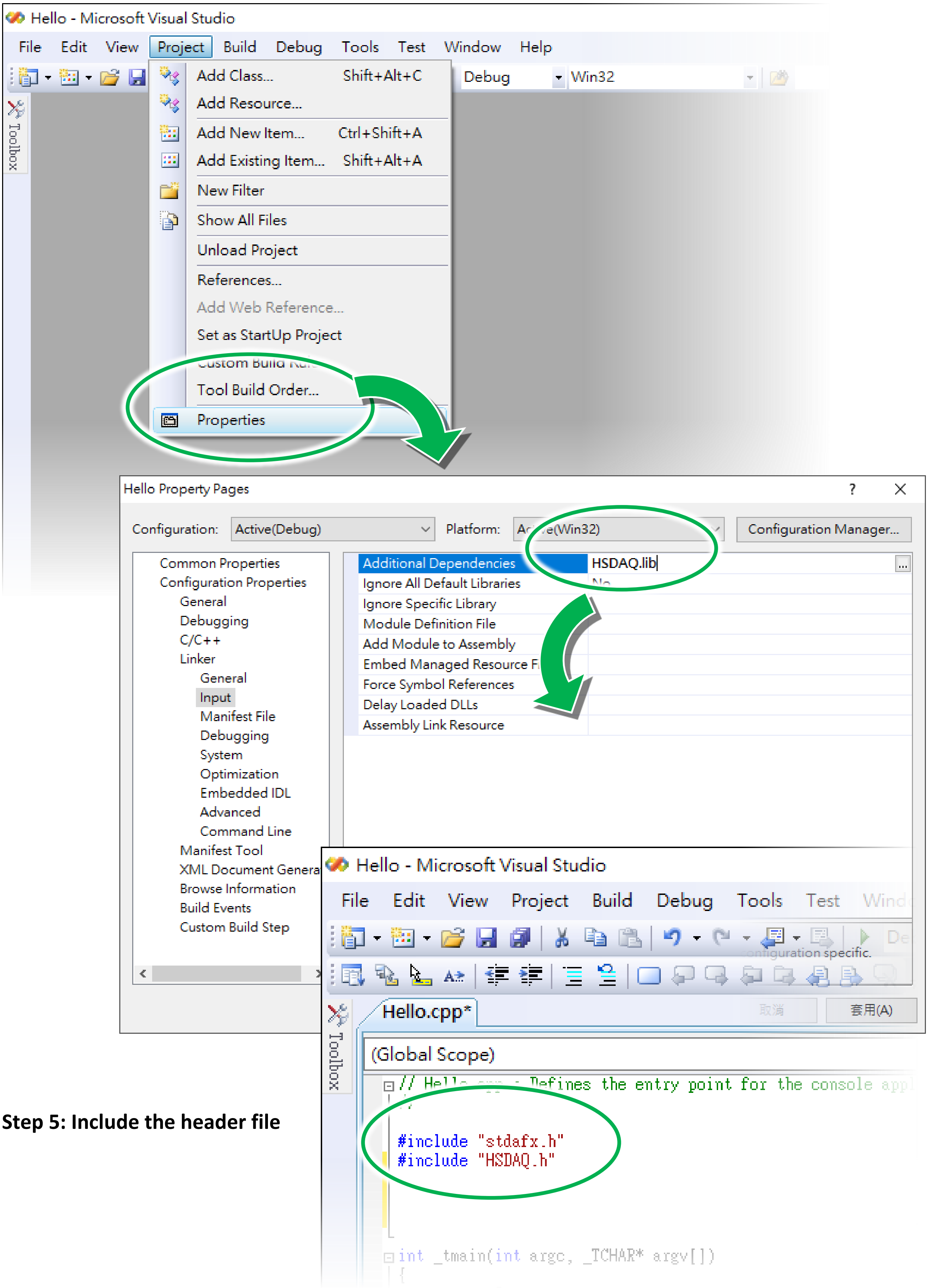
Solution Name: Hello

☑ Create directory for solution

Step 3: Copy the required files, HSDAQ.h and HSDAQ.lib, into the folder of the new project



Step 4: Specify the libraries of the HSDAQ SDK



Configuration: Active(Debug)

Platform: Active(Win32)

Additional Dependencies: HSDAQ.lib

Step 5: Include the header file

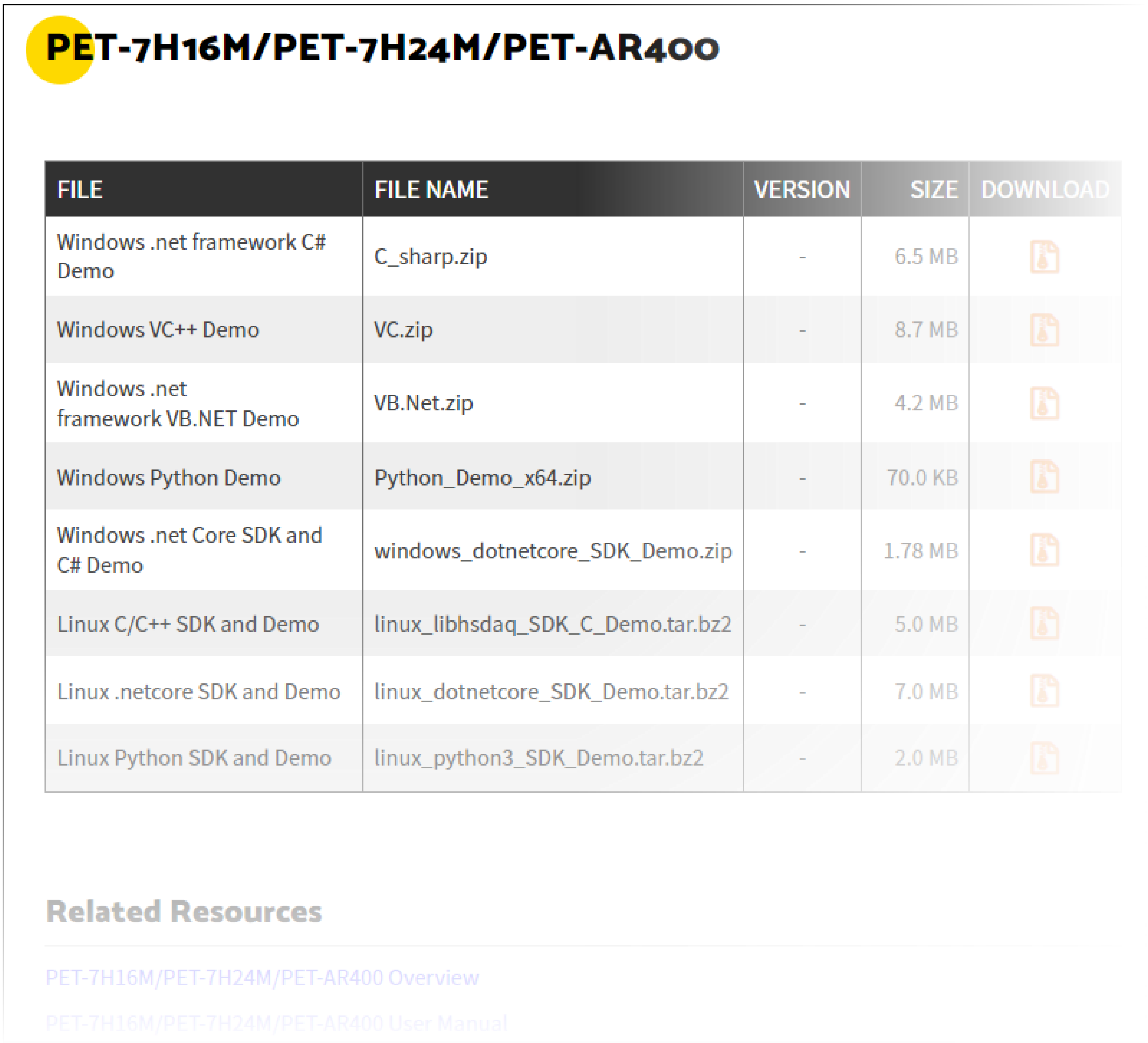
(Global Scope)

```
// Hello.cpp : Defines the entry point for the console app
//

#include "stdafx.h"
#include "HSDAQ.h"


int _tmain(int argc, _TCHAR* argv[])
{
```

1.3. Using the Demo Programs

ICP DAS provides a set of demo project source code for HSDAQ model features. This enables you to see, manipulate, and copy demonstrated program functionality. Demo project source code can be obtained from:

https://www.icpdas.com/en/download/show.php?num=2328



PET-7H16M/PET-7H24M/PET-AR400

FILE	FILE NAME	VERSION	SIZE	DOWNLOAD
Windows .net framework C# Demo	C_sharp.zip	-	6.5 MB	📄
Windows VC++ Demo	VC.zip	-	8.7 MB	📄
Windows .net framework VB.NET Demo	VB.Net.zip	-	4.2 MB	📄
Windows Python Demo	Python_Demo_x64.zip	-	70.0 KB	📄
Windows .net Core SDK and C# Demo	windows_dotnetcore_SDK_Demo.zip	-	1.78 MB	📄
Linux C/C++ SDK and Demo	linux_libhsdaq_SDK_C_Demo.tar.bz2	-	5.0 MB	📄
Linux .netcore SDK and Demo	linux_dotnetcore_SDK_Demo.tar.bz2	-	7.0 MB	📄
Linux Python SDK and Demo	linux_python3_SDK_Demo.tar.bz2	-	2.0 MB	📄

Related Resources

PET-7H16M/PET-7H24M/PET-AR400 Overview

PET-7H16M/PET-7H24M/PET-AR400 User Manual

2. API Functions

The HSDAQ API Library is composed of six groups of functions, which can be utilized to configure the acquisition data mode and acquiring data.

2.1. System API

The system API functions and messages describe how to create/release the connection and read the information from High-speed data acquisition module.

Supported Models

The table below lists available system functions and their supported models.

Models APIs	PET-7H16M	PET-7H24M	PET-AR400
HS_Device_Create	√	√	√
HS_Device_Release	√	√	√
HS_Reboot	√	√	√
HS_GetFirmwareVersion	√	√	√
HS_GetSDKVersion	√	√	√
GetHSDAQNetVersion	√	√	√
HS_GetHWFirmwareVersion	√	√	√

System Functions

The table below lists available system functions and their short description.

HSDAQ.dll	HSDAQNet.dll	Description
HS_Device_Create	Sys.HS_Device_Create	Create a connection to the device and initialize the device. This function is the driver entry.
HS_Device_Release	Sys.HS_Device_Release	Release the device from system.
HS_Reboot	Sys.Reboot	Reboot the module.
HS_GetFirmwareVersion	Sys.GetFirmwareVersion	Read the firmware version of module
HS_GetSDKVersion	Sys.GetSDKVersion	Retrieve the version number of the current HSDAQ.dll
-	Sys.GeHSDAQNetVersion	Retrieve the version number of the current HSDAQNet.dll
HS_GetHWFirmwareVersion	Sys. HS_GetHWFirmwareVersion	Read the Hardware firmware version of module

2.1.1. HS_Device_Create

Create a connection to the device and initialize the device. This function must be called before calling any functions.

Syntax

C/C++

```
HANDLE HS_Device_Create (
    LPCSTR ConnectionString
);
```

.Net

```
IntPtr HS_Device_Create(
    string ConnectionString
)
```

Parameters

ConnectionString

[in] Specifies the IP addresses, command port, data transmit port of the HSDAQ model.

The default of command port is 9999.

The default of data transmit port is 10010.

Return Values

If the function succeeds, the return value is a handle for a specified device.

If the function fails, the return value is NULL. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
```

[C#]

```
IntPtr hHS;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
```

Remarks

The following input formats are acceptable

HS_Device_Create(“192.168.1.10”).

It indicates that a connection with IP address 192.168.1.10 and default command port 9999, data transmit port 10010 will be created.

HS_Device_Create(“192.168.1.10,9000,10011”).

It indicates that a connection with IP address 192.168.1.10 and command port 9000, data transmit port 10011 will be created. (The command port and data transmit port must be changed according to the setting mode of the HSDAQ models).

2.1.2. HS_Device_Release

Release the device from system. It must be called after calling any functions.

Syntax

C/C++

```
bool HS_Device_Release (
    HANDLE hobj
);
```

.Net

```
bool HS_Device_Release (
    IntPtr hobj
)
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
if (hHS!=NULL)
{
        ... // Create connection success!!
}
Else
{
        ... //Create Connection fail!!
}
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
if (hHS != IntPtr.Zero)
{
        ... // Create connection success!!
}
Else
{
        ... //Create Connection fail!!
}
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.1.3. HS_Reboot

Reboot the High-speed data acquisition module.

Syntax

C/C++

```
bool HS_Reboot (
    HANDLE hobj
);
```

.Net

```
bool Reboot (
    IntPtr hobj
)
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
HS_Reboot(hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.Sys.Reboot(hHS);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.1.4. HS_GetFirmwareVersion

Read the firmware version of High-speed data acquisition module.

Syntax

C/C++

```
bool HS_GetFirmwareVersion (
    HANDLE hobj,
    LPSTR version
);
```

.Net

```
string GetFirmwareVersion(IntPtr hobj);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

version

[out] The firmware version number of the HSDAQ model.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Return Values

If the function succeeds, the return string is the firmware version number of the HSDAQ model. If the function fails, the return value is NULL. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
char fw_version[32]={0};
hHS = HS_Device_Create(“192.168.1.1”);
HS_GetFirmwareVersion (hHS, fw_version);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
string fwVersion=HSDAQNet.Sys.GetFirmwareVersion(hHS).ToString();
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.1.5. HS_GetSDKVersion

Retrieve the version number of the current HSDAQ.dll.

Syntax

C/C++

```
bool HS_GetSDKVersion (
    LPSTR sdk_version
);
```

.Net

```
string GetSDKVersion ();
```

Parameters

sdk_version

[out] The version number of HSDAQ.dll

Return Values

[C/C++]

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

[.Net]

If the function succeeds, the return string is the version number of HSDAQ.dll

If the function fails, the return value is NULL. To get extended error information, call HS_GetLastError.

Examples

[C]

```
char sdk_version [32]={0};
HS_HS_GetSDKVersion(fw_version);
```

[C#]

```
string version = HSDAQNet.Sys.GetSDKVersion().ToString();
```

Remarks

-

2.1.6. GetHSDAQNetVersion

Retrieve the version number of the current HSDAQNet.dll. **(For .Net programming only)**

Syntax

.Net

```
string GetHSDAQNetVersion();
```

Parameters

-

Return Values

If the function succeeds, the return string is the version number of HSDAQNet.dll

If the function fails, the return value is NULL. To get extended error information, call HS_GetLastError.

Examples

[C#]

```
string version = HSDAQNet.Sys.GetHSDAQNetVersion ();
```

Remarks

-

2.1.7. HS_GetHWFirmwareVersion

Read the hardware firmware version of High-speed data acquisition module.

Syntax

C/C++

```
bool HS_GetHWFirmwareVersion (
    HANDLE hobj,
    LPSTR fpga_version
);
```

.Net

```
string GetHWFirmwareVersion(IntPtr hobj);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

version

[out] The hardware firmware version number of the HSDAQ model.

Return Values

[C/C++]

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

[.NET]

If the function succeeds, the return string is the hardware firmware version number of the HSDAQ model. If the function fails, the return value is NULL. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
char fw_version[32]={0};
hHS = HS_Device_Create(“192.168.1.1”);
HS_GetHWFirmwareVersion (hHS, fw_version);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
string fwVersion=HSDAQNet.Sys.GetHWFirmwareVersion(hHS).ToString();
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.2. Configuration API

The configuration API functions describe or change the configuration, settings, and attributes of High-speed data acquisition module.

Supported Models

The table below lists available configuration functions and their supported models.

Models APIs	PET-7H16M	PET-7H24M	PET-AR400
HS_ReadGainOffset	√	√	-
HS_SetConfig	√	√	-
HS_GetConfig	√	√	-

Configuration Functions

The table below lists available configuration functions and their short description.

HSDAQ.dll	HSDAQNet.dll	Description
HS_ReadGainOffset	Config.HS_ReadGainOffset	Read the gain/offset values for application to calibrate each channel's analog data.
HS_SetConfig	Config.HS_SetConfig	Set the configuration option for a device.
HS_GetConfig	Config.HS_GetConfig	Read the configuration option for a device.

5

2.2.1. HS_ReadGainOffset

Read the gain/offset values for application to calibrate each channel’s analog raw data.

Syntax

C/C++

```
bool HS_ReadGainOffset (
    HANDLE hobj,
    int ch,
    unsigned short *gainVal,
    short *offsetVal
);
```

.Net

```
bool HS_ ReadGainOffset (
    IntPtr hobj,
    int ch,
    ref UInt16 gainVal,
    ref Int16 offsetVal
)
```

Parameters

obj

[in] A handle to the specified device opened by HS_Device_Create

ch

[in] The channel that reads the gain/offset values value from the module.

gainVal

[out] Get the gain value of the specified AI channel.

offsetVal

[out] Get the offset value of the specified AI channel.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
unsigned short gainVal=0;
short offsetVal=0;

hHS = HS_Device_Create(“192.168.1.1”);
for (int ch = 0; ch < 8; ch++)
{
HS_ReadGainOffset(hHS,ch,&gainVal,&offsetVal);
   …//user-define code
}
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
UInt16 gVal = 0;
Int16 oVal = 0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
for (int ch = 0; ch < 8; ch++)
{
HSDAQNet.Config.HS_ReadGainOffset(hHS,ch,ref gVal,ref oVal);
   …//user-define code
}
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

The data received from the buffer through calling the HS_GetAIBufferHex function is the raw data without calibration. The user needs to call HS_ReadGainOffset to obtain the gain and offset value to calibrate the raw data.

2.2.2. HS_SetConfig

Set the configuration option for a device.

Syntax

C/C++

```
bool HS_SetConfig (
    HANDLE hobj,
    int configtype,
    int param,
    long settingval
);
```

.Net

```
bool HS_SetConfig (
    IntPtr hobj,
    int configtype,
    int param,
    int settingval
)
```

Parameters

obj

[in] A handle to the specified device opened by HS_Device_Create

configtype

[in] Specifies which configuration type set for the specified module.

param

[in] Specifies which parameter of the configuration type set for the specified module.

settingval

[in] The setting value to set the specified configuration and parameter.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;


hHS = HS_Device_Create(“192.168.1.1”);
HS_SetConfig (hHS, HSDAQ_CONFIG, HSDAQ_CONNECT_TIMEOUT,1);
//set tcp connection timeout as 1 second
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;


hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.Config.HS_SetConfig(hHS, (int)ConfigCode.HSDAQ_CONFIG,
(int)HSDAQIOPara.HSDAQ_CONNECT_TIMEOUT, 1);
  //set tcp connection timeout as 1 second
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

- configtype: DATALOG_CONFIG
- param: LOGFOLDERTYPE
- value:

type 0	using string format of parameter 1 for the log folder
type 1	minute (yyyy_MM_dd_hh_mm)
type 2	hour (yyyy_MM_dd_hh)
type 3	day (yyyy_MM_dd)
type 4	month (yyyy_MM)
type 5	year (yyyy)
type 6	week (yyyy_MM_w1~ yyyy_MM_wn)

- configtype: DATA_RESPONSE_CONFIG
- param: RMS_SOURCE_BASE
- value: Input signal period 45~500Hz
- param: RMS_TRANSFER_RATE
- value: transfer rate ： 1~1000Hz

- configtype: RMS_EXT_DEVICE_GAIN
- param: CH
- value: Extern Device Gain

- configtype: HSDAQ_CONFIG(Only for PET-7H16M)
- param: AI_FILTER_AVERAGING
- value:

OverSampling	Ratio	Max (KHz)
type 1	disable	200
type 1	2	100
type 2	4	50
type 3	8	25
type 4	16	12.5
type 5	32	6.25
type 6	64	3.125

2.2.3. HS_GetConfig

Read the configuration option for a device.

Syntax

C/C++

```
bool HS_GetConfig (
    HANDLE hobj,
    int configtype,
    int param,
    long *settingval
);
```

.Net

```
bool HS_GetConfig (
    IntPtr hobj,
    int configtype,
    int param,
    ref int settingval
)
```

Parameters

obj

[in] A handle to the specified device opened by HS_Device_Create

configtype

[in] Specifies which configuration type set for the specified module.

param

[in] Specifies which parameter of the configuration type set for the specified module.

settingval

[out] Get the setting value of the specified configuration and parameter.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
long lvalue=0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_GetConfig(hHS, HSDAQ_CONFIG, HSDAQ_CONNECT_TIMEOUT,& lvalue);
//Get the tcp connection timeout value
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
int lvalue=0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.Config.HS_GetConfig(hHS, (int)ConfigCode.HSDAQ_CONFIG,
(int)HSDAQIOPara.HSDAQ_CONNECT_TIMEOUT, ref lvalue);
//Get tcp connection timeout value
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

Refer to 2.2.2 HS_SetConfig for more details.

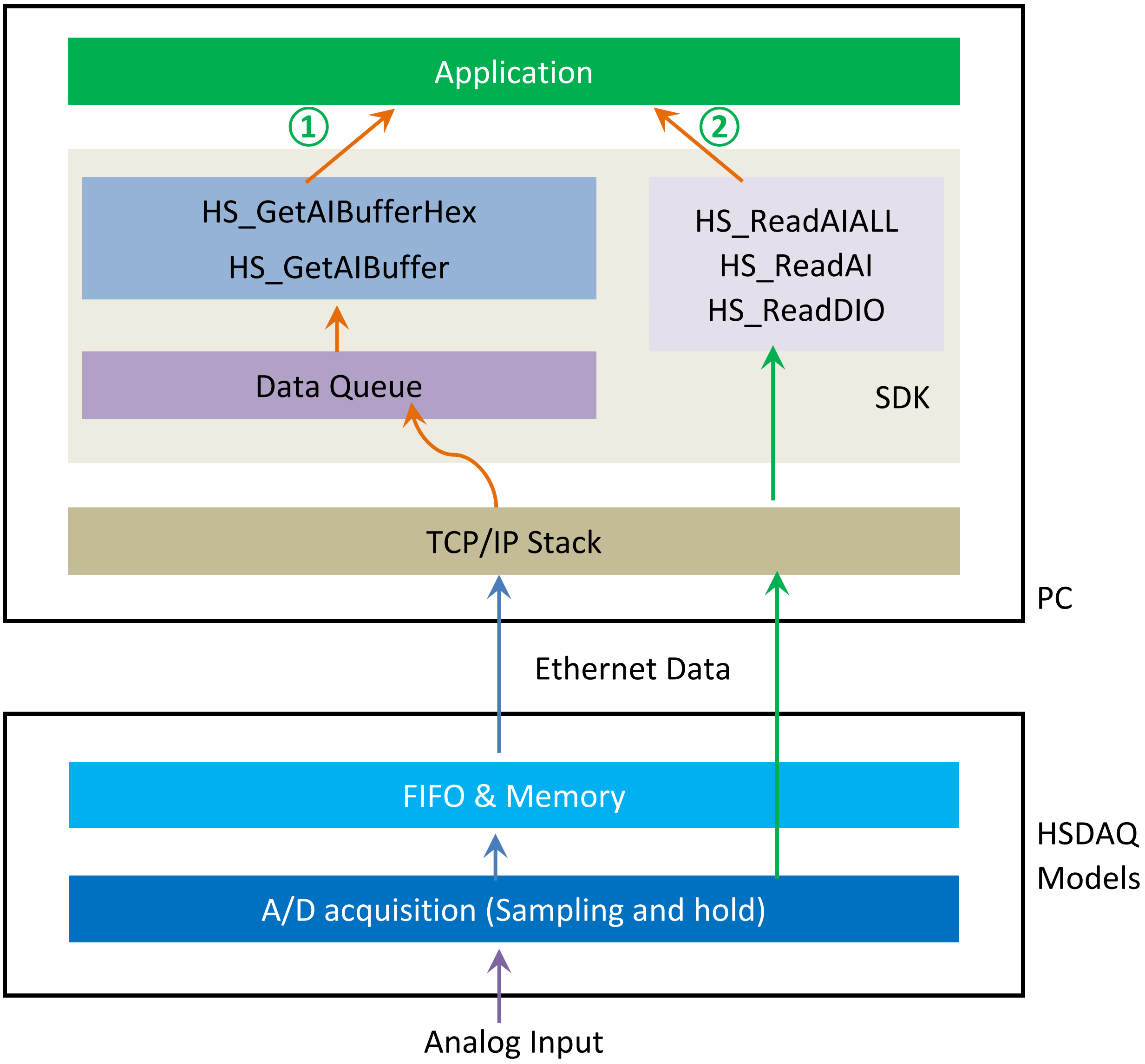
2.3. IO API

IO API supports to operate IO modules.

Data Flow

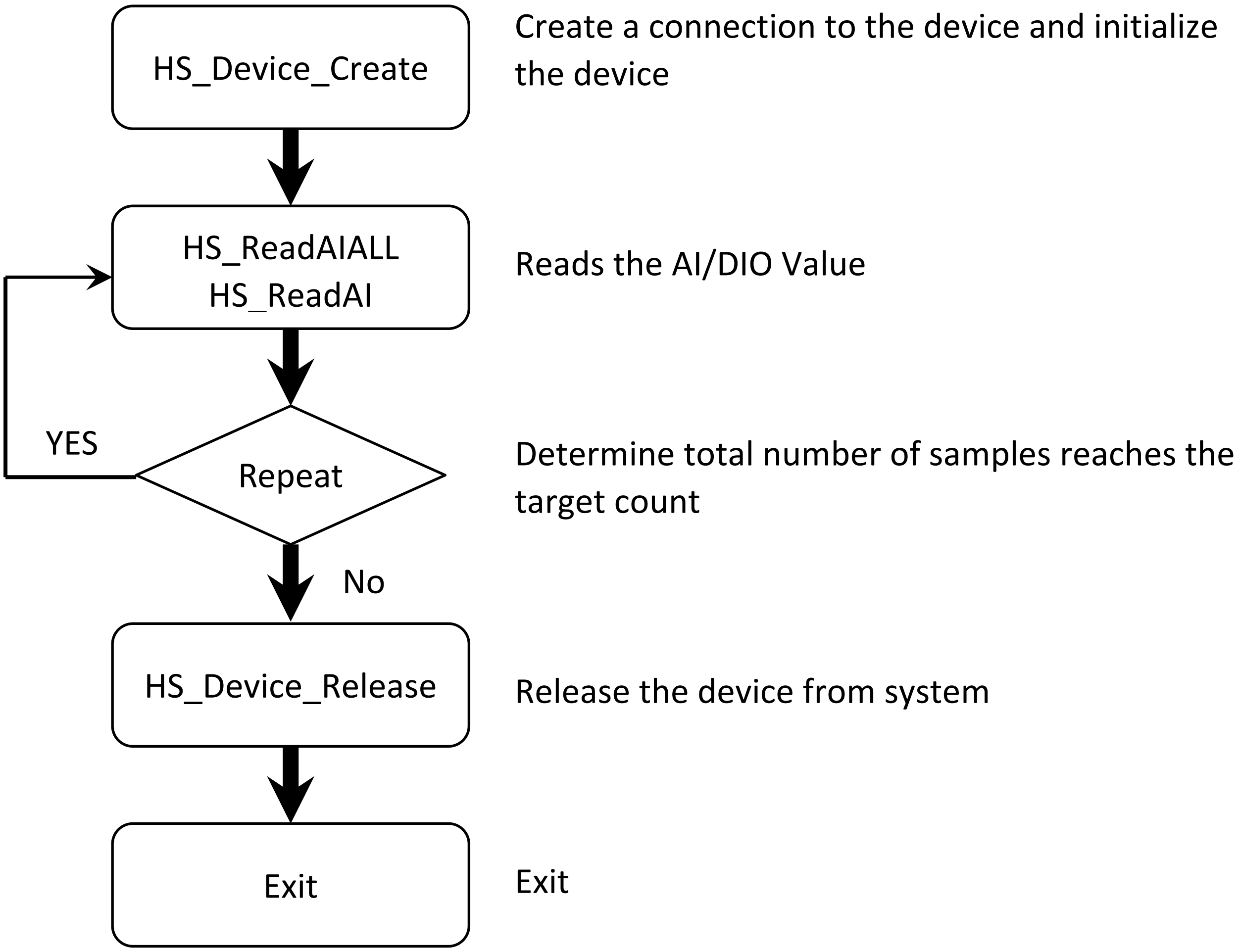
Flow 1: It means the module is in high speed data acquisition (Refer to the **Chapter 2.4**), The acquiring data is sent continuously from the HSDAQ model to PC over the Ethernet. The huge queue provided by the HSDAQ SDK is used to receive the data, The queue buffer provides the data first-in and first-out. And the queues can save data to avoid the data loss even if the PC is busy or Ethernet isn't stable.

Flow 2: It means that the application simply polls the AI/DIO value from HSDAQ model.



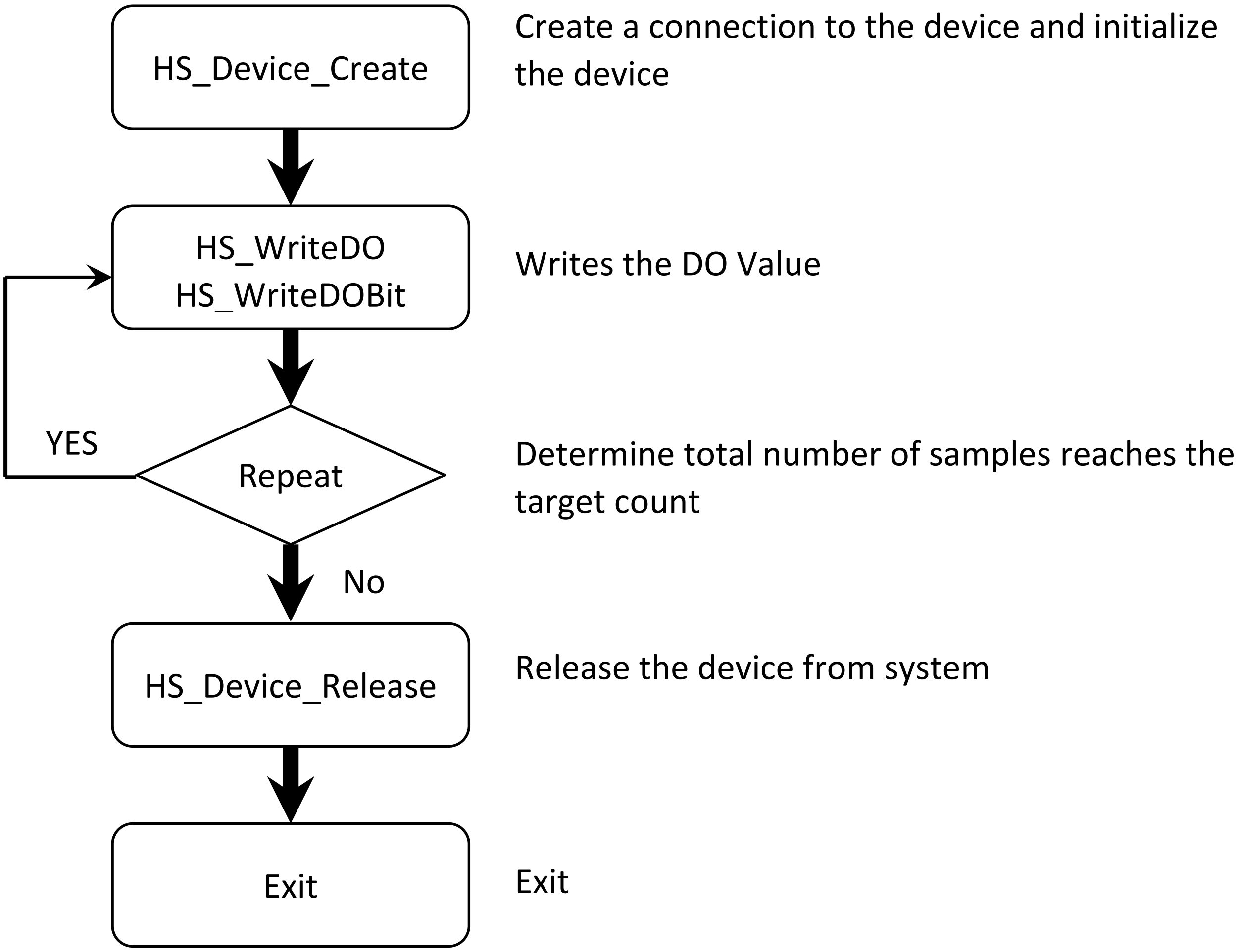
Polling the AI/DI Values

API function call process chart


HS_Device_Create
Create a connection to the device and initialize the device
HS_ReadAIALL
HS_ReadAI
Reads the AI/DIO Value
YES
Repeat
Determine total number of samples reaches the target count
No
HS_Device_Release
Release the device from system
Exit
Exit

Writing the DO Values

API function call process chart



Create a connection to the device and initialize the device

Writes the DO Value

Determine total number of samples reaches the target count

Release the device from system

Exit

Supported Models

The table below lists available I/O functions and their supported models.

Models APIs	PET-7H16M	PET-7H24M	PET-AR400
HS_ReadAIALL	√	√	√
HS_ReadAI	√	√	√
HS_WriteAO	-	√	-
HS_WriteAOHEX	-	√	-
HS_ReadDIO	√	√	-
HS_WriteDO	√	√	-
HS_WriteDOBit	√	√	-
HS_SetDICNTConfig	√	-	-
HS_SetCounterConfig	√	-	-
HS_GetDICNTConfig	√	-	-
HS_GetCounterConfig	√	-	-
HS_GetDICNT	√	-	-
HS_GetCounter	√	-	-
HS_GetDICNTAll	√	-	-
HS_GetCounterAll	√	-	-
HS_ClearCounter	√	-	-
HS_ClearDICNT	√	-	-
HS_ClearCounterALL	√	-	-
HS_ClearDICNTALL	√	-	-
HS_GetEncoderMode	-	√	-
HS_SetEncoderMode	-	√	-
HS_ReadEncoder	-	√	-
HS_ClearEncoder	-	√	-
HS_Calibrate_Data_HEX	√	√	√
HS_Calibrate_Data_Float	√	√	√

I/O Functions

The table below lists available I/O functions and their short description.

HSDAQ.dll	HSDAQNet.dll	Description
HS_ReadAIALL	IO. ReadAIALL	Read all the AI values of all channels in engineering-mode.
HS_ReadAI	IO. ReadAI	Read the AI value of a channel in engineering-mode
HS_WriteAO	IO.WriteAO	Write the AO value
HS_WriteAOHEX	IO.WriteAOHEx	Write the AO HEX value
HS_ReadDIO	IO. ReadDIO	Read the DI and DO values
HS_WriteDO	IO. WriteDO	Write the DO value
HS_WriteDOBit	IO. WriteDOBit	Write a DO value to a channel
HS_SetDICNTConfig	IO. SetDICNTConfig	Set the configuration of DI Counter
HS_SetCounterConfig	IO. SetCounterConfig	Set the configuration of Counter
HS_GetDICNTConfig	IO. GetDICNTConfig	Read the configuration of DI Counter
HS_GetCounterConfig	IO. GetCounterConfig	Read the configuration of Counter
HS_GetDICNT	IO. GetDICNT	Read the DI Counter values
HS_GetCounter	IO. GetCounter	Read the Counter value
HS_GetDICNTAll	IO. GetDICNTAll	Read all channel of DI Counter
HS_GetCounterAll	IO. GetCounterAll	Read all channel of Counter
HS_ClearCounter	IO. ClearCounter	Clear the Counter value
HS_ClearDICNT	IO. ClearDICNT	Clear all channel of Counter
HS_ClearCounterALL	IO. ClearCounter	Clear all channel of Counter value
HS_ClearDICNTALL	IO. ClearDICNTALL	Clear all channel of DI Counter value
HS_GetEncoderMode	IO. HS_GetEncoderMode	Get the Encoder setting parameter from PET-7H24M
HS_SetEncoderMode	IO. HS_SetEncoderMode	Set the Encoder parameter for PET-7H24M
HS_ReadEncoder	IO. HS_ReadEncoder	Read the Encoder value
HS_ClearEncoder	IO. HS_ClearEncoder	Clear the Encoder value
HS_Calibrate_Data_HEX	IO. HS_Calibrate_Data_HEX	Calibrate raw data to Hex value
HS_Calibrate_Data_Float	Io. HS_Calibrate_Data_Float	Calibrate raw data to float value

2.3.1. HS_ReadAIALL

Read all the AI values of all channels in engineering-mode.

Syntax

C/C++

```
bool HS_ReadAIALL (
    HANDLE hobj,
    int gain,
    float ai[],
    int totalchannel
);
```

.Net

```
bool ReadAIALL (
    IntPtr hobj,
    float ai[],
    int totalchannel
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

gain

[in] What gain range AI value to read

ai

[out] The array contains the AI values that read back from the module. The AI value getting from the HS_ReadAIALL function is calibrated.

totalchannel

[in] A pointer to a variable that specifies the size of the buffer pointed to by the ai.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
float fAI[8];
int gain=0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_ReadAIALL(hHS,gain,fAI,8);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
float[] fAI = new float[8];
int gain=0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.ReadAIALL(hHS,gain, fAI,8);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remark

-

2.3.2. HS_ReadAI

Read the AI value of a channel in engineering-mode.

Syntax

C/C++

```
bool HS_ReadAI (
    HANDLE hobj,
    int ChannelIndex,
    int gain,
    float ai
);
```

.Net

```
bool ReadAI (
    IntPtr hobj,
    int gain,
    int ChannelIndex,
    ref float ai
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

gain

[in] What gain range AI value to read

ChannelIndex

[in] The channel that reads the AI value back from the module.

ai

[in] The pointer to an AI value that is read back from the module. The AI value getting from the HS_ReadAI function is calibrated.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
float fAI=0;
int gain=0;
hHS = HS_Device_Create("192.168.1.1");
HS_ReadAI(hHS,0,gain,&fAI);
//Read a AI value of the channel 0
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
float fAI=0;
int gain=0;
hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.IO.ReadAI(hHS,0,gain,ref fAI);
//Read a AI value of the channel 0
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.3. HS_WriteAO

Write the AO value.

Syntax

C/C++

```
bool HS_WriteAO (
    HANDLE hobj,
    int ChannelIndex,
    int Gain,
    float aoValue
);
```

.Net

```
bool WriteAO (
    IntPtr hobj,
    int ChannelIndex,
    int Gain,
    float aoValue
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

ChannelIndex

[in] The channel that reads the AI value back from the module.

Gain

[in] Write the analog output range. The gain range for analog output is

0: 0V~ 5V;   1: 0V~ 10V;   2: +/- 5V;   3: +/- 10V

aoValue

[in] Write the analog output value.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
float fAO=2;
int gainval=0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_WriteAO(hHS,0,gainval,fAO);
//Write the AO value of the channel 0
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
float fAI=0;
int gainval=0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.WriteAO(hHS,0,gainval,fAO);
// Write the AO value of the channel 0
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.4. HS_WriteAOHEX

Write the AO HEX value.

Syntax

C/C++

```
bool HS_WriteAOHEX (
    HANDLE hobj,
    int ChannelIndex,
    int Gain,
    long aoValue
);
```

.Net

```
bool WriteAO (
    IntPtr hobj,
    int ChannelIndex,
    int Gain,
    long aoValue
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

ChannelIndex

[in] The channel that reads the AI value back from the module.

Gain

[in] Write the analog output range. The gain range for analog output is

0: 0V~ 5V; 1: 0V~ 10V; 2: +/- 5V; 3: +/- 10V

aoValue

[in] Write the analog output HEX value.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
long AO=2;
int gainval=0;
hHS = HS_Device_Create("192.168.1.1");
HS_WriteAOHEX(hHS,0,gainval,AO);
//Write the AO HEX value of the channel 0
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
float fAI=0;
int gainval=0;
hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.IO.WriteAOHEX (hHS,0,gainval,AO);
// Write the AO HEX value of the channel 0
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.5. HS_ReadDIO

Read the DI and DO values.

Syntax

C/C++

```
bool HS_ReadDIO (
    HANDLE hobj,
    unsigned long *diVal,
    unsigned long * doVal
);
```

.Net

```
bool ReadDIO (
    IntPtr hobj,
    ref ulong diVal,
    ref ulong doVal
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

diVal

[out] The pointer to the value of DI read back.

doVal

[out] The pointers to the value of DO read back.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
unsigned long ulDI=0,ulDO=0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_ReadDIO(hHS,&ulDI,&ulDO);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
uint uiDI = 0;
uint uiDO = 0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.ReadDIO(hHS,ref uiDI,ref uiDO);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.6. HS_WriteDO

Write the DO value.

Syntax

C/C++

```
bool HS_WriteDO (
    HANDLE hobj,
    unsigned long val
);
```

.Net

```
bool WriteDIO (
    IntPtr hobj,
    ulong val
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

Val

[in] A hexadecimal value, where bit 0 corresponds to DO0, bit 1 corresponds to DO1, etc. When the bit is 1, it denotes that the digital output channel is on, and 0 denotes that the digital output channel is off.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
unsigned long ulDO=0x3;
hHS = HS_Device_Create(“192.168.1.1”);
HS_WriteDO(hHS, ulDO);
//Write 0x3 the digital output
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
ulong uiDO =0x3;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.WriteDO(hHS, uiDO);
//Write 0x3 the digital output
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.7. HS_WriteDOBit

Write a DO value to a channel.

Syntax

C/C++

```
bool HS_WriteDOBit (
    HANDLE hobj,
    int ChannelIndex,
    bool val
);
```

.Net

```
bool WriteDOBit(
    IntPtr hobj,
    int ChannelIndex,
    bool val
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

ChannelIndex

[in] Write a DO value to the specified channel

Val

[in] 1 is to turn on the DO channel; 0 is off.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create("192.168.1.1");
HS_WriteDOBit(hHS, 1, 1);
//Set DO1 (channel 1) to ON
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
ulong uiDO =0x33;
hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.IO.WriteDOBit(hHS, 1,true);
//Set DO1 (channel 1) to ON
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.8. HS_SetDICNTConfig

Set the configuration of DI Counter

Syntax

C/C++

```
bool HS_SetDICNTConfig (
    HANDLE hobj,
    DWORD wChannel,
    DWORD wMode,
    DWORD dwValue,
    DWORD reserved
);
```

.Net

```
bool SetDICNTConfig(
    IntPtr hobj,
    UInt32 wChannel,
    UInt32 wMode,
    UInt32 dwValue,
    UInt32 reserved
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wChannel

[in] Set the configuration setting of the specified DI counter channel

wMode

[in] Set counter mode

Mode	Description
CNT_ENABLE / CNT_DISABLE	Enable/Disable the counter / DI counter
CNT_SYNC	Set Counter/DI counter as synchronous Input data acquisition

dwValue

[in] DI counter initialize value.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
HS_SetDICNTConfig(hHS, 4, CNT_ENABLE, 0, 0);
//Enable 4-channel DI counter with initialization value set to 0
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
ulong uiDO =0x33;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.SetDICNTConfig(hHS, 4, CNTCong.CNT_ENABLE, 0, 0);
//Enable 4-channel DI counter with initialization value set to 0
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.9. HS_SetCounterConfig

Set the configuration of Counter

Syntax

C/C++

```
bool HS_SetCounterConfig (
    HANDLE hobj,
    DWORD wChannel,
    DWORD wMode,
    DWORD dwValue,
    DWORD reserved
);
```

.Net

```
bool SetDICNTConfig(
    IntPtr hobj,
    UInt32 wChannel,
    UInt32 wMode,
    UInt32 dwValue,
    UInt32 reserved
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wChannel

[in] Set the configuration setting of the specified counter channel

wMode

[in] Set counter mode

Mode	Description
CNT_ENABLE / CNT_DISABLE	Enable/Disable the counter / DI counter
CNT_SYNC	Set Counter/DI counter as synchronous Input data acquisition

dwValue

[in] Counter initialize value.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
HS_SetCounterConfig(hHS, 1, CNT_ENABLE, 0, 0);
//Enable 1-channel counter with initialization value set to 0
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
ulong uiDO =0x33;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.SetCounterConfig(hHS, 1, CNTCong.CNT_ENABLE, 0, 0);
//Enable 1-channel counter with initialization value set to 0
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.10. HS_GetDICNTConfig

Read the configuration of DI Counter

Syntax

C/C++

```
bool HS_GetDICNTConfig (
    HANDLE hobj,
    DWORD wChannel,
    DWORD* wMode,
    DWORD* dwValue,
    DWORD* reserved
);
```

.Net

```
bool GetDICNTConfig(
    IntPtr hobj,
    UInt32 wChannel,
    ref UInt32 wMode,
    ref UInt32 dwValue,
    ref UInt32 reserved
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wChannel

[in] Set the configuration setting of the specified DI counter channel

wMode

[in] Set counter mode

Mode	**Description**
CNT_ENABLE / CNT_DISABLE	Enable/Disable the counter / DI counter
CNT_SYNC	Set Counter/DI counter as synchronous Input data acquisition

dwValue

[out] Get the DI counter initialize value.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
DWORD wmode=0;
DWORD diCntInit=0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_GetDICNTConfig(hHS, 4, & wmode, &diCntInit , 0);
//Get the configuration of 4-channel DI counter
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
UInt32 wmode=0;
UInt32 diCntInit=0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.GetDICNTConfig(hHS, 4, ref wmode,ref diCntInit, 0);
//Get the configuration of 4-channel DI counter
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.11. HS_GetCounterConfig

Read the configuration of Counter

Syntax

C/C++

```
bool HS_GetCounterConfig (
    HANDLE hobj,
    DWORD wChannel,
    DWORD* wMode,
    DWORD* dwValue,
    DWORD* reserved
);
```

.Net

```
bool GetCounterConfig(
    IntPtr hobj,
    UInt32 wChannel,
    ref UInt32 wMode,
    ref UInt32 dwValue,
    ref UInt32 reserved
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wChannel

[in] Set the configuration setting of the specified counter channel

wMode

[in] Set counter mode

Mode	**Description**
CNT_ENABLE / CNT_DISABLE	Enable/Disable the counter / DI counter
CNT_SYNC	Set Counter/DI counter as synchronous Input data acquisition

dwValue

[out] Get the counter initialize value.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
DWORD wmode=0;
DWORD CntInit=0;

hHS = HS_Device_Create(“192.168.1.1”);
HS_GetCounterConfig(hHS, 1, &wmode, &CntInit, 0);
//Get the configuration of 1-channel DI counter
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
ulong uiDO =0x33;
UInt32 wmode=0;
UInt32 CntInit=0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.GetCounterConfig(hHS, 1, ref wmode, ref CntInit, 0);
//Get the configuration of 1-channel DI counter
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.12. HS_GetDICNT

Read the DI Counter values.

Syntax

C/C++

```
bool HS_GetDICNT (
    HANDLE hobj,
    DWORD wChannel,
    DWORD *dwValue
);
```

.Net

```
bool GetDICNT (
    IntPtr hobj,
    UInt32 wChannel,
    ref UInt32 dwValue
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wChannel

[in] Get the DI counter value of the specified channel

dwValue

[out] The pointers to the value of DI counter

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
DWORD dwValue = 0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_GetDICNT(hHS, 2, &dwValue);
//Get the value of 2-channel DI counter
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
UInt32 dwValue=0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.GetDICNT(hHS, 2,ref dwValue);
//Get the value of 2-channel DI counter
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.13. HS_GetCounter

Read the Counter values.

Syntax

C/C++

```
bool HS_GetCounter (
    HANDLE hobj,
    DWORD wChannel,
    DWORD *dwValue
);
```

.Net

```
bool GetCounter (
    IntPtr hobj,
    UInt32 wChannel,
    ref UInt32 dwValue
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wChannel

[in] Get the counter value of the specified channel

dwValue

[out] The pointers to the value of counter

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
DWORD dwValue = 0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_GetCounter(hHS, 2, &dwValue);
//Get the value of 2-channel counter
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
UInt32 dwValue=0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.GetCounter(hHS, 2,ref dwValue);
//Get the value of 2-channel counter
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.14. HS_GetDICNTALL

Read all channel of DI Counter value

Syntax

C/C++

```
bool HS_GetDICNTALL (
    HANDLE hobj,
    DWORD dwValue[],
    int totalchannel
);
```

.Net

```
bool GetDICNTALL (
    IntPtr hobj,
    UInt32[] dwValue,
    UInt32 totalchannel
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

dwValue

[out] The array contains the DI counter values that read back from the module.

wChannel

[in] specifies the size of the buffer pointed to by the dwValue array.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
DWORD dwValue[8] = 0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_GetDICNTALL(hHS, dwValue, 8);
//Get the 8-channel value of DI counter
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
UInt32[] dwValue=new Uint32[8]
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.GetDICNTALL(hHS, dwValue, 8);
//Get the 8-channel value of DI counter
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.15. HS_GetCounterALL

Read all channel of Counter value

Syntax

C/C++

```
bool HS_GetCounterALL (
    HANDLE hobj,
    DWORD dwValue[],
    int totalchannel
);
```

.Net

```
bool GetCounterALL (
    IntPtr hobj,
    UInt32[] dwValue,
    UInt32 totalchannel
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

dwValue

[out] The array contains the counter values that read back from the module.

wChannel

[in] specifies the size of the buffer pointed to by the dwValue array.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
DWORD dwValue[8] = 0;
hHS = HS_Device_Create("192.168.1.1");
HS_GetCounterALL(hHS, dwValue, 8);
//Get the 8-channel value of counter
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
UInt32[] dwValue=new Uint32[8]
hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.IO.GetCounterALL(hHS, dwValue, 8);
//Get the 8-channel value of counter
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.16. HS_ClearDICNT

Clear the DI Counter value

Syntax

C/C++

```
bool HS_ClearDICNT (
    HANDLE hobj,
    DWORD wChannel,
);
```

.Net

```
bool ClearDICNT(
    IntPtr hobj,
    UInt32 wChannel,
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wChannel

[in] the specified DI counter channel

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
HS_ClearDICNT (hHS, 1);
//Clear DI counter value of channel 1
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.ClearDICNT(hHS, 1);
//Clear DI counter value of channel 1
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.17. HS_ClearCounter

Clear the Counter value

Syntax

C/C++

```
bool HS_ClearCounter (
    HANDLE hobj,
DWORD wChannel,
);
```

.Net

```
bool ClearCounter(
    IntPtr hobj,
    UInt32 wChannel,
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wChannel

[in] the specified Counter channel

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create("192.168.1.1");
HS_ClearCounter (hHS, 0);
//Clear Counter value of channel 0
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.IO.ClearCounter(hHS, 0);
//Clear Counter value of channel 0
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.18. HS_ClearDICNTALL

Clear all channel of DI Counter value

Syntax

C/C++

```
bool HS_ClearDICNTALL (
    HANDLE hobj,
);
```

.Net

```
bool ClearDICNTALL(
    IntPtr hobj,
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
HS_ClearDICNTALL (hHS);
//Clear all channel of DI counter value
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.ClearDICNTALL(hHS);
//Clear all channel of DI counter value
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.19. HS_ClearCounterALL

Clear all channel of Counter value

Syntax

C/C++

```
bool HS_ClearCounterALL(
    HANDLE hobj,
);
```

.Net

```
bool ClearCounterALL(
    IntPtr hobj,
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
HS_ClearCounterALL (hHS);
//Clear all channel of counter value
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.ClearCounterALL(hHS);
//Clear all channel of counter value
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.20. HS_SetEncoderMode

Set the encoder parameter for PET-7H24M regarding.

Syntax

C/C++

```
bool HS_SetEncoderMode(
    HANDLE hobj,
    int ChannelIndex,
    int Mode,
    int LPF,
    int Xor,
);
```

.Net

```
bool HS_SetEncoderMode(
    IntPtr hobj,
    int ChannelIndex,
    int Mode,
    int LPF,
    int Xor,
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

ChannelIndex

[in] The specified encoder channel, PET-7H24M has only one encoder channel, just input 1

Mode

[in] Set the encoder mode

0: CW/CCW
1: DIR/PLS
2: A/B Phase

LPF

[in] Set the Low pass filter. The range for LPF is

0: 4MHz (No low pass filter)
1: 3.6MHz
2: 1.8MHz
3: 950KHz
4: 480KHz
5: 240KHz
6: 120KHz
7: 60KHz
8: 30KHz

Xor

[in] Set the xor mode

0: ENC_A disable xor , ENC_B disable xor
1: ENC_A enable xor , ENC_B disable xor
2: ENC_A disable xor , ENC_B enable xor
3: ENC_A enable xor , ENC_B enable xor

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
int ChannelIndex=1;
int Mode=0;
int LPF=0;
int Xor=0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_SetEncoderMode (hHS,ChannelIndex,Mode,LPF,Xor);
//Set encoder parameter
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
int ChannelIndex=1;
int Mode=0;
int LPF=0;
int Xor=0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO. HS_SetEncoderMode (hHS,ChannelIndex,Mode,LPF,Xor);
//Set encoder parameter
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

Only for PET-7H24M.

2.3.21. HS_GetEncoderMode

Get the encoder parameter for PET-7H24M regarding.

Syntax

C/C++

```
bool HS_GetEncoderMode(
    HANDLE hobj,
    int ChannelIndex;
    int *Mode;
    int *LPF,
    int *Xor
);
```

.Net

```
bool HS_GetEncoderMode(
    IntPtr hobj,
    int ChannelIndex,
    ref int Mode,
    ref int LPF,
    ref int Xor
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

ChannelIndex

[in] The specified encoder channel, PET-7H24M has only one encoder channel, just input 1

Mode

[in] Set the encoder mode

0: CW/CCW
1: DIR/PLS
2: A/B Phase

LPF

[in] Set the Low pass filter. The range for LPF is

0: 4MHz (No low pass filter)
1: 3.6MHz
2: 1.8MHz
3: 950KHz
4: 480KHz
5: 240KHz
6: 120KHz
7: 60KHz
8: 30KHz

Xor

[in] Set the xor mode

0: ENC_A disable xor , ENC_B disable xor
1: ENC_A enable xor , ENC_B disable xor
2: ENC_A disable xor , ENC_B enable xor
3: ENC_A enable xor , ENC_B enable xor

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
int ChannelIndex=1;
int Mode=0;
int LPF=0;
int Xor=0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_GetEncoderMode (hHS,ChannelIndex,&Mode,&LPF,&Xor);
//Get encoder parameter
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
int ChannelIndex=1;
int Mode=0;
int LPF=0;
int Xor=0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO. HS_GetEncoderMode (hHS,ChannelIndex,ref Mode,ref LPF,ref Xor);
//Get encoder parameter
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

Only for PET-7H24M.

2.3.22. HS_ReadEncoder

Read the encoder value for PET-7H24M regarding.

Syntax

C/C++

```
bool HS_ReadEncoder(
    HANDLE hobj,
    int ChannelIndex,
    unsigned long *Value
);
```

.Net

```
bool HS_ReadEncoder(
    IntPtr hobj,
    int ChannelIndex,
    ref Uint32 Value
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

ChannelIndex

[in] The specified encoder channel, PET-7H24M has only one encoder channel, just input 1

Value

[Out] Get the counter value of the encoder

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
int ChannelIndex=1;
unsigned long Value=0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_ReadEncoder(hHS,ChannelIndex,&Value);
//Get counter value of the encoder
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
int ChannelIndex=1;
Uint32 Value=0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO. HS_ReadEncoder(hHS,ChannelIndex,ref Value);
// Get counter value of the encoder
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

Only for PET-7H24M.

2.3.23. HS_ClearEncoder

Clear the encoder value for PET-7H24M regarding.

Syntax

C/C++

```
bool HS_GetEncoderMode(
    HANDLE hobj,
    int ChannelIndex
);
```

.Net

```
bool HS_SetEncoderMode(
    IntPtr hobj,
    int ChannelIndex
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

ChannelIndex

[in] The specified encoder channel, PET-7H24M has only one encoder channel, just input 1

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
int ChannelIndex=1;
hHS = HS_Device_Create(“192.168.1.1”);
HS_ClearEncoder(hHS,ChannelIndex);
//Clear counter value of the encoder
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
int ChannelIndex=1;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.IO.ClearEncoder(hHS,ChannelIndex);
// Clear counter value of the encoder
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

Only for PET-7H24M.

2.3.24. HS_Calibrate_Data_HEX

Calibrate raw data to HEX value.

Syntax

C/C++

```
bool HS_Calibrate_Data_HEX(
    HANDLE hobj,
    int ChannelIndex,
    int gain,
    long RawData,
    long *value
);
```

.Net

```
bool HS_Calibrate_Data_HEX (
    IntPtr hobj,
    int ChannelIndex,
    int gain,
    long RawData,
    ref long value
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

ChannelIndex

[in] Which channel data is to be calibrate

gain

[in] What gain calibrate to use

RawData

[in] Enter the raw data to be calibrate

value

[out] Corrected value

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
int ChannelIndex=1;
long Hvalue=0;
int gain=0;
short *databuffer;
hHS = HS_Device_Create(“192.168.1.1”);
HS_StartAIScan (hHS);
ret=HS_GetAIBufferStatus(hHS,&BufferStatus,&ulleng);
if(ret==false){
printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
if(ulleng)
{
readsize=HS_GetAIBufferHEX(hHS,(WORD*)dataBuffer, ulleng);
...
}
}
HS_StopAIScan (hHS);
for(int i=0;i<ulleng;i++)
{
   HS_Calibrate_Data_HEX(hHs, ChannelIndex,gain,dataBuffer[i],*Hvalue)
   …
}
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
int ChannelIndex=1;
UInt16[] HdataBuffer = new UInt16[targetCnt];
uint ulleng = 0;
ushort BufferStatus = 0;
Int32 Hvalue=0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_StartAIScan(hHS);
ret = HSDAQNet.HSIO.HS_GetAIBufferStatus(hHS, ref BufferStatus, ref ulleng);
if (ret == false)
{
Console.WriteLine(IP.ToString() + " Error code 0x" +
HSDAQNet.ErrHandling.GetLastError().ToString("x8"));
}
else
{
    if (ulleng == targetCnt)
    {
        readsize = HSDAQNet.HSIO.HS_GetAIBufferHex(hHS, HdataBuffer, ulleng);
}
}
HSDAQNet.HSIO.HS_StopAIScan(hHS);
for(int i=0;i<ulleng;i++)
{
    HSDAQNet.IO. HS_Calibrate_Data_HEX (hHs, ChannelIndex,gain,dataBuffer[i],ref Hvalue)
    …
}

HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.3.25. HS_Calibrate_Data_Float

Calibrate raw data to HEX value.

Syntax

C/C++

```
bool HS_Calibrate_Data_Float(
    HANDLE hobj,
    int ChannelIndex,
    int gain,
    long RawData,
    float *fvalue
);
```

.Net

```
bool HS_Calibrate_Data_Float (
    IntPtr hobj,
    int ChannelIndex,
    int gain,
    long RawData,
    ref float fvalue
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

ChannelIndex

[in] Which channel data is to be calibrate

gain

[in] What gain calibrate to use

RawData

[in] Enter the raw data to be calibrate

fvalue

[out] Corrected value

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
int ChannelIndex=1;
long Hvalue=0;
int gain=0;
short *databuffer;
hHS = HS_Device_Create(“192.168.1.1”);
HS_StartAIScan (hHS);
ret=HS_GetAIBufferStatus(hHS,&BufferStatus,&ulleng);
if(ret==false){
printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
if(ulleng)
{
readsize=HS_GetAIBufferHEX(hHS,(WORD*)dataBuffer, ulleng);
...
}
}
HS_StopAIScan (hHS);
for(int i=0;i<ulleng;i++)
{
    HS_Calibrate_Data_Float(hHs, ChannelIndex,gain,dataBuffer[i],*fvalue)
    …
}
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHs;
int ChannelIndex=1;
UInt16[] HdataBuffer = new UInt16[targetCnt];
uint ulleng = 0;
ushort BufferStatus = 0;
float fvalue=0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_StartAIScan(hHS);
ret = HSDAQNet.HSIO.HS_GetAIBufferStatus(hHS, ref BufferStatus, ref ulleng);
if (ret == false)
{
Console.WriteLine(IP.ToString() + " Error code 0x" +
HSDAQNet.ErrHandling.GetLastError().ToString("x8"));
}
else
{
   if (ulleng == targetCnt)
   {
      readsize = HSDAQNet.HSIO.HS_GetAIBufferHex(hHS, HdataBuffer, ulleng);
}
}
HSDAQNet.HSIO.HS_StopAIScan(hHS);
for(int i=0;i<ulleng;i++)
{
   HSDAQNet.IO. HS_Calibrate_Data_Float (hHs, ChannelIndex,gain,HdataBuffer[i],ref fvalue)
   …
}

HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.4. High Speed IO API

High Speed IO API supports to high speed data acquisition for AI channel.

There are two data acquisition modes and several trigger modes of analog input operation for high speed data acquisition. The following chart shows the acquisition and trigger modes and their operation frequency of each combination.

PET-7H16M

Acquisition Trigger	Continuous	N Sample
Software AD	1 ~ 30 KHz	1 Hz ~ 200 KHz
External CLK AD		-
Analog threshold Trigger	-	1 Hz ~ 200 KHz
Post-Trigger		
Pre-Trigger		
Delay Trigger		

PET-7H24M

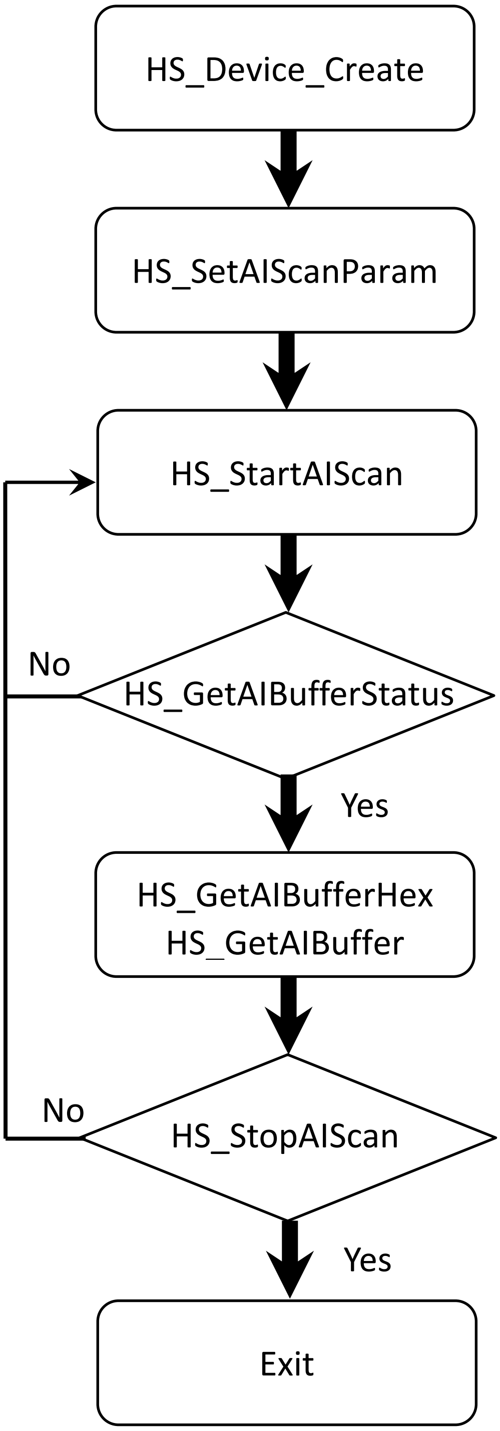
Acquisition Trigger	Continuous	N Sample
Software AD	20~60KHz	60 kHz ~ 128 KHz
Analog threshold Trigger	-	20 Hz ~ 128 KHz

PET-AR400

A/D Trigger	Data Transmission	Total simultaneous sampling channels	Maximum sampling rate
Software A/D Data Acquisition Mode	Continuous Transmission	1	12.8k/16k/32k/64k/128k Hz
		2	12.8k/16k/32k/64k Hz
		3/4	12.8k/16k/32k Hz
Analog Threshold Trigger Mode	N Sample Acquisition	1	12.8k/16k/32k/64k/128k Hz
		2	12.8k/16k/32k/64k Hz
		3/4	12.8k/16k/32k Hz

Continuous mode acquisition and software AD trigger

API function call process chart



Create a connection to the device and initialize the device

Set the AI scan parameter

- Sampling rate <=30 kHz (PET-7H16M)
- Trigger mode = 0 (Software Trigger)

Start data acquisition of scanning AI channels

Determine how much data is in the buffer

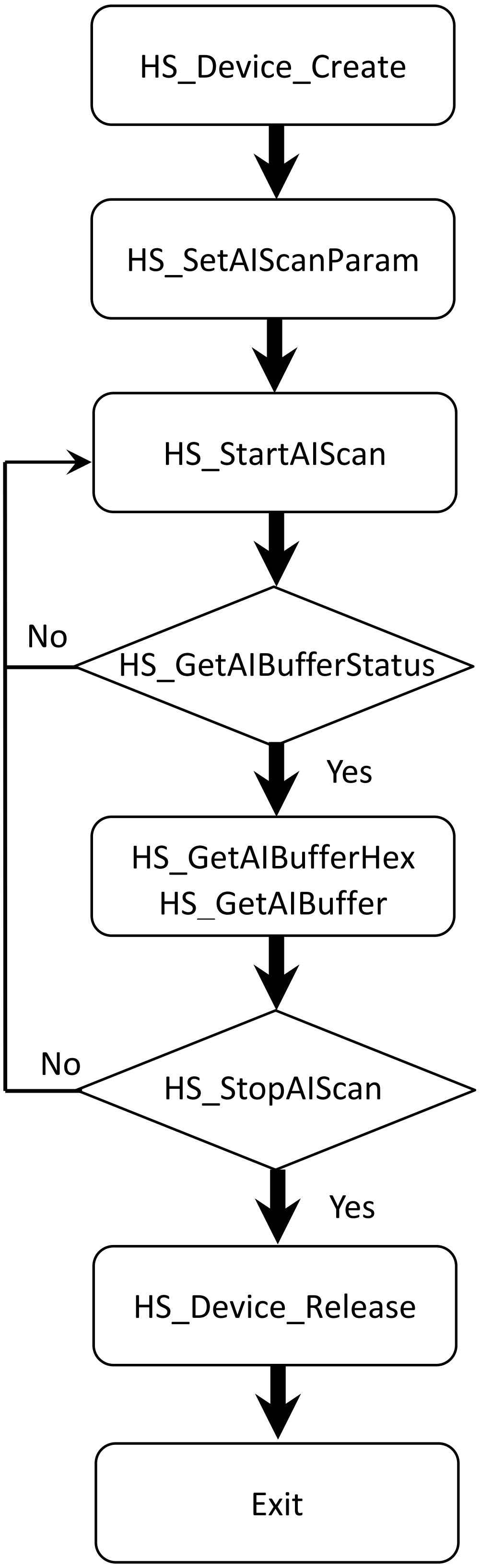
Read the data from the buffer

Whether stop data acquisition manually

Exit

Continuous mode acquisition and External CLK AD

API function call process chart



Create a connection to the device and initialize the device

Set the AI scan parameter

- Sampling rate <=30 kHz (PET-7H16M)
- Trigger mode = 1 (External CLK AD)

Start data acquisition of scanning AI channels

Determine how much data is in the buffer

Read the data from the buffer

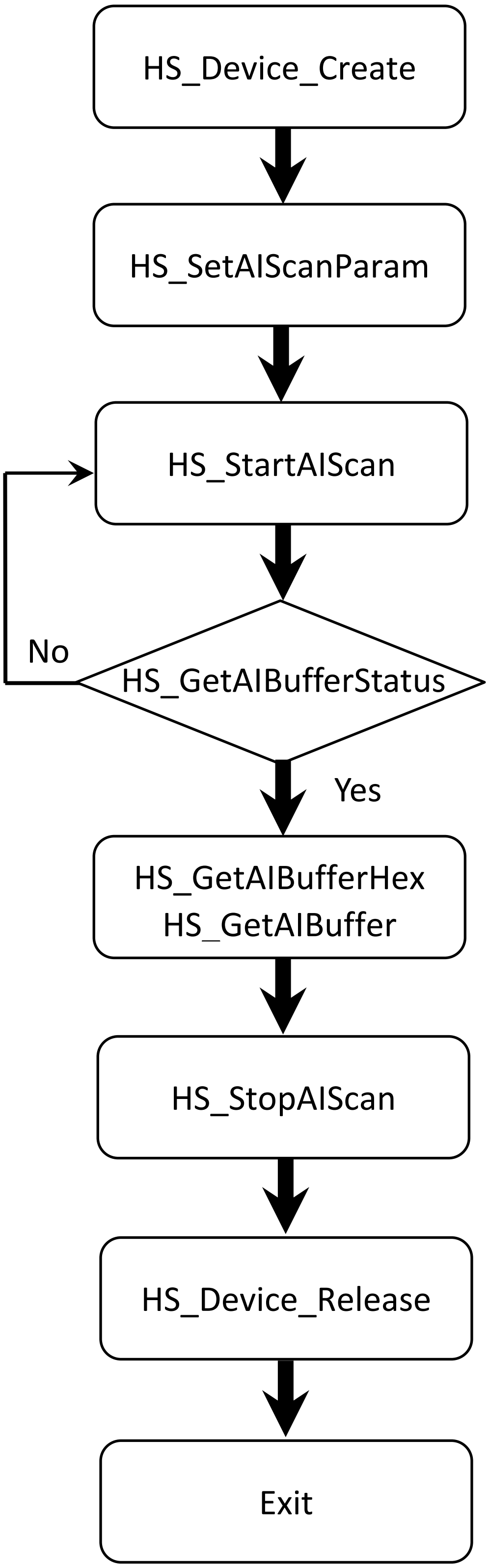
Whether stop data acquisition manually

Release the device from system

Exit

N sample mode acquisition and software AD trigger

API function call process chart



Create a connection to the device and initialize the device

Set the AI scan parameter

- Sampling rate 1 ~ 200 kHz (PET-7H16M)
- Trigger mode = 0 (Software trigger)

Start data acquisition of scanning AI channels

Determine total number of samples reaches the target count

Read the data from the buffer

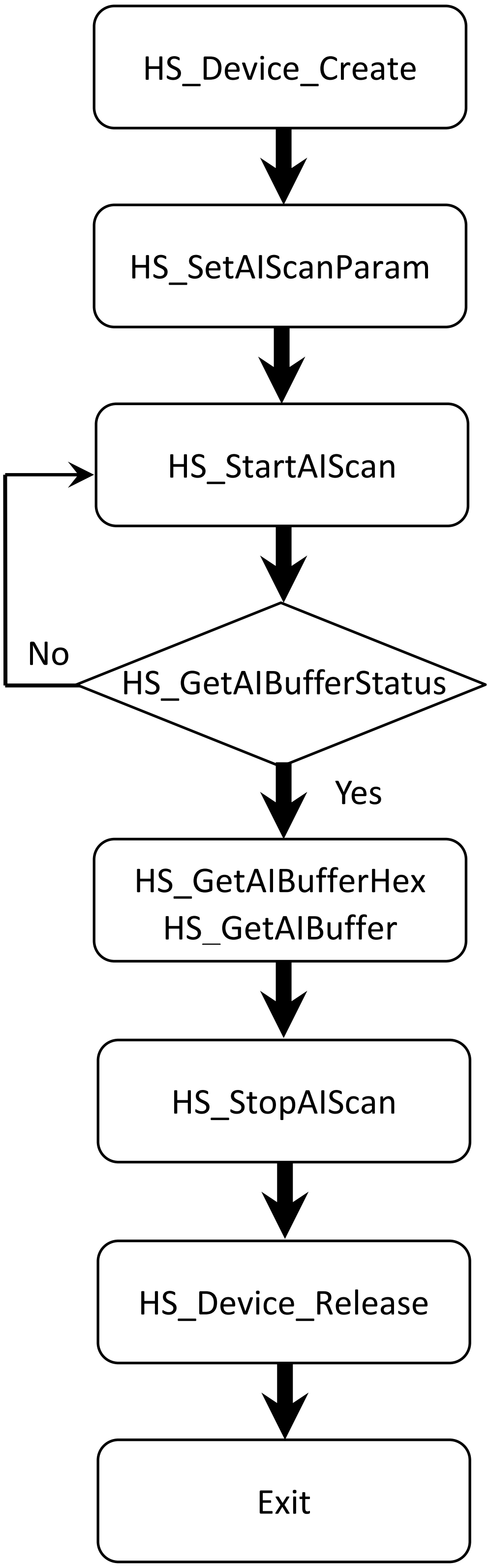
Stop data acquisition

Release the device from system

Exit

N sample mode acquisition and Post-Trigger

API function call process chart



Create a connection to the device and initialize the device

Set the AI scan parameter

- Sampling rate 1 ~ 200 kHz (PET-7H16M)
- Trigger mode = 2 (Post-trigger)

Start data acquisition of scanning AI channels

Determine how much data is in the buffer

Read the data from the buffer

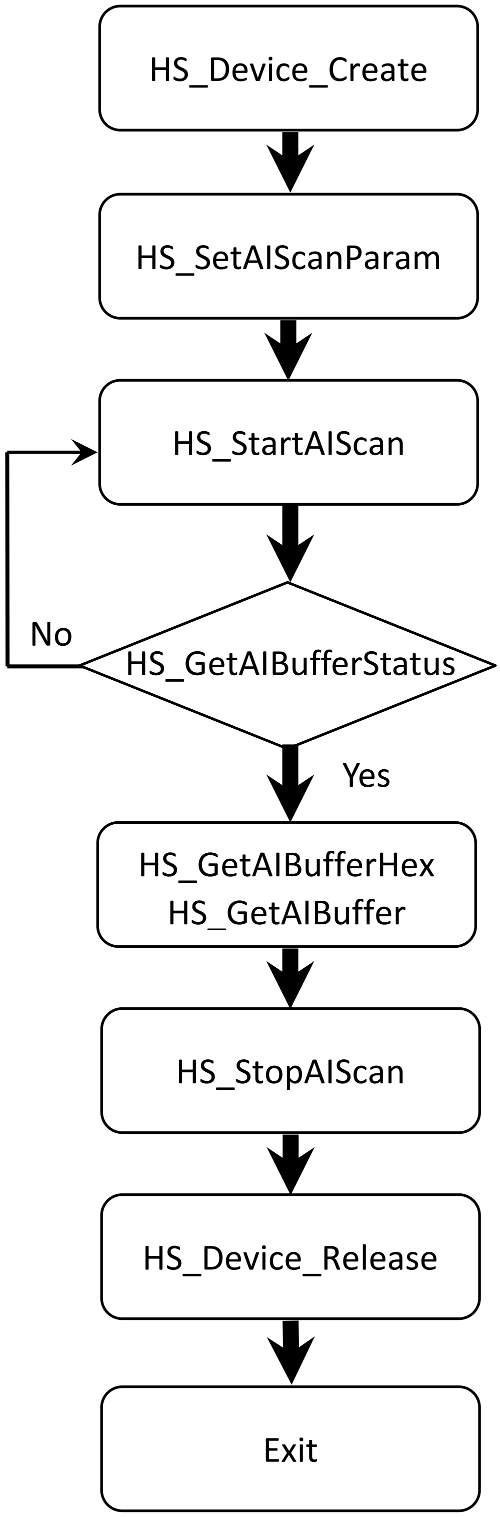
Stop data acquisition

Release the device from system

Exit

N sample mode acquisition and Pre-Trigger

API function call process chart



Create a connection to the device and initialize the device

Set the AI scan parameter

- Sampling rate 1 ~ 200 kHz (PET-7H16M)
- Trigger mode = 3 (Pre-trigger)

Start data acquisition of scanning AI channels

Determine how much data is in the buffer

Read the data from the buffer

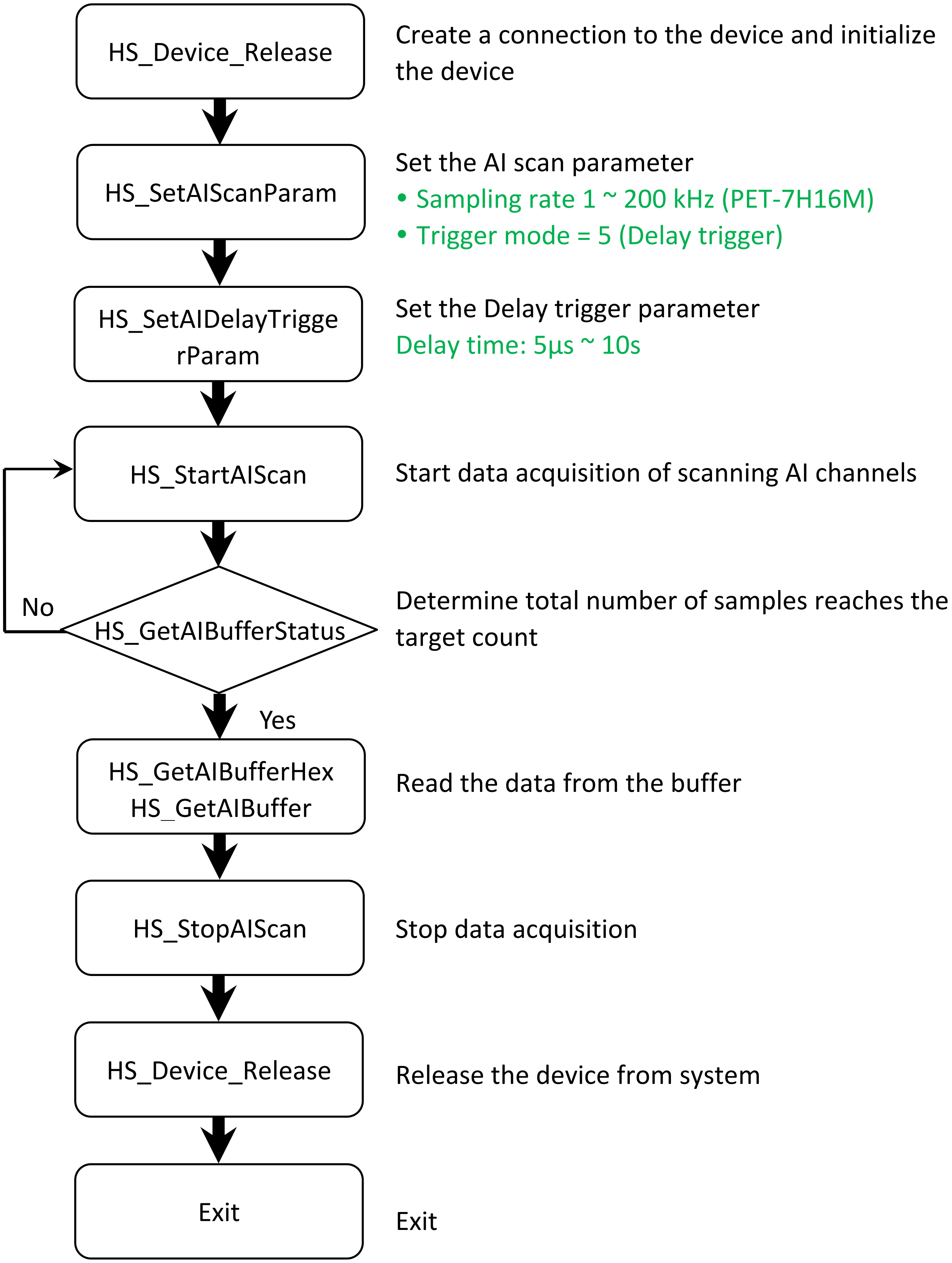
Stop data acquisition

Release the device from system

Exit

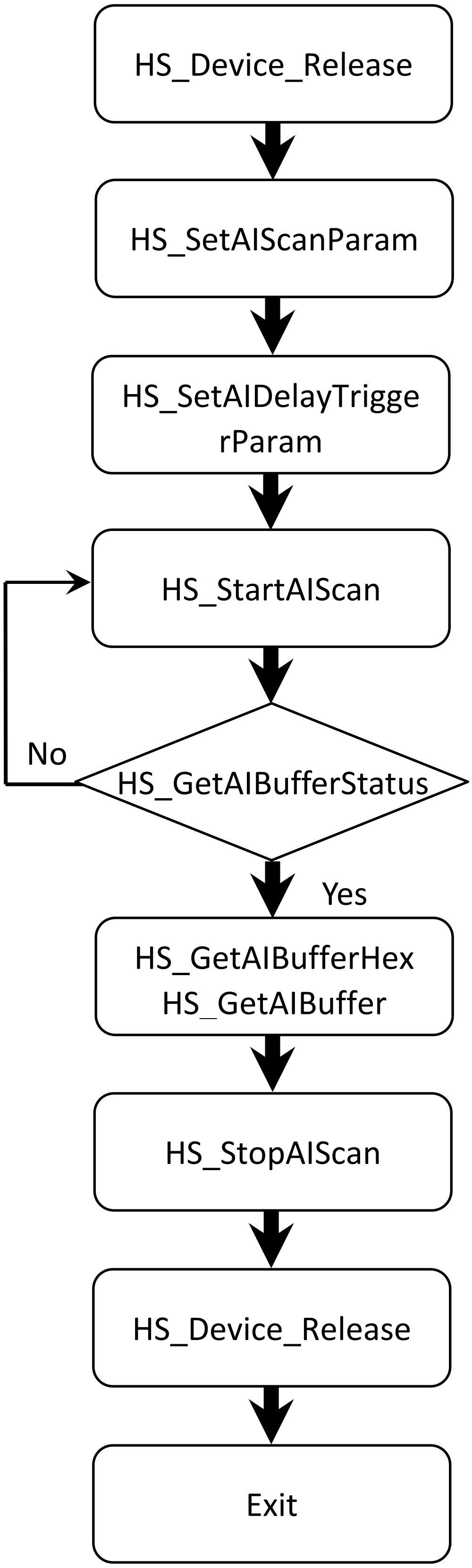
N sample mode acquisition and Delay trigger

API function call process chart


HS_Device_Release
Create a connection to the device and initialize the device
HS_SetAIScanParam
Set the AI scan parameter
• Sampling rate 1 ~ 200 kHz (PET-7H16M)
• Trigger mode = 5 (Delay trigger)
HS_SetAIDelayTriggerParam
Set the Delay trigger parameter
Delay time: 5μs ~ 10s
HS_StartAIScan
Start data acquisition of scanning AI channels
HS_GetAIBufferStatus
No
Yes
Determine total number of samples reaches the target count
HS_GetAIBufferHex
HS_GetAIBuffer
Read the data from the buffer
HS_StopAIScan
Stop data acquisition
HS_Device_Release
Release the device from system
Exit
Exit

N sample mode acquisition and Analog Input Trigger

API function call process chart



Create a connection to the device and initialize the device

Set the AI scan parameter

- Sampling rate 1 ~ 200 kHz (PET-7H16M)
- Trigger mode = 6 (Analog input trigger)

Set the Analog Input trigger parameter

- Analog mode : (4 modes)
- Set high or low level value for each channel
- Set AI scan target count before triggered or target count after triggered

Start data acquisition of scanning AI channels

Determine total number of samples reaches the target count

Read the data from the buffer

Stop data acquisition

Release the device from system

Exit

Supported Models

The table below lists available high speed IO functions and their supported models.

Models APIs	PET-7H16M	PET-7H24M	PET-AR400
HS_GetAIScanParam	√	√	√
HS_SetAIScanParam	√	√	√
HS_StartAIScan	√	√	√
HS_StopAIScan	√	√	√
HS_GetAIBuffer	√	√	√
HS_GetAIBufferHex	√	√	√
HS_GetAIBufferStatus	√	√	√
HS_ClearAIBuffer	√	√	√
HS_GetTotalSamplingStatus	√	√	√
HS_TransmitDataCmd	√	√	√
HS_SetEventCallback	√	√	√
HS_RemoveEventCallback	√	√	√
HS_GetSyncInScanParam	√	-	-
HS_SetSyncInScanParam	√	-	-
HS_GetSyncInBuffer	√	-	-
HS_GetSyncInBufferLV	√	-	-
HS_GetSyncInBufferStatus	√	-	-
HS_ClearSyncInBuffer	√	-	-
HS_GetSyncInTotalSamplingStatus	√	-	-
HS_SetAIAnalogTriggerParam	√	√	√
HS_GetAIAnalogTriggerParam	√	√	√
HS_SetAIDelayTriggerParam	√	√	-
HS_GetAIDelayTriggerParam	√	√	-

High speed IO Functions

The table below lists available high speed IO functions and their short description.

HSDAQ.dll	HSDAQNet.dll	Description
HS_GetAIScanParam	HSIO.HS_GetAIScanParam	Get the AI scan parameter from High-speed data acquisition module regarding of the sampling rate, scan channels, pacer gain, trigger mode.
HS_SetAIScanParam	HSIO.HS_SetAIScanParam	Set the AI scan parameter for High-speed data acquisition module regarding of the sampling rate, scan channels, pacer gain, trigger mode.
HS_StartAIScan	HSIO.HS_StartAIScan	Start data acquisition. The data is stored in memory and transfer to the data buffer on PC.
HS_StopAIScan	HSIO.HS_StopAIScan	Stop data acquisition.
HS_GetAIBuffer	HSIO.HS_GetAIBuffer	Get the floating-point value from data buffer on PC
HS_GetAIBufferHex	HSIO.HS_GetAIBufferHex	Get the binary data from data buffer on PC
HS_GetAIBufferStatus	HSIO.HS_GetAIBufferStatus	Get the status and data number from data buffer on PC.
HS_ClearAIBuffer	HSIO.HS_ClearAIBuffer	Clear the data buffer on PC
HS_GetTotalSamplingStatus	HSIO.HS_GetTotalSamplingStatus	Read the module status of High-speed data acquisition module during data sampling
HS_TransmitDataCmd	HSIO.HS_TransmitDataCmd	Notify High-speed data acquisition module to send data to PC through TCP data port
HS_SetEventCallback	HSIO.HS_SetEventCallback	Bind the event condition to a user-defined callback function
HS_RemoveEventCallback	HSIO.HS_RemoveEventCallback	Disable the event condition and callback function.
HS_GetSyncInScanParam	HSIO.HS_GetSyncInScanParam	Get the parameter of the synchronous input data acquisition from PET-7H16M

HSDAQ.dll	HSDAQNet.dll	Description
HS_SetSyncInScanParam	HSIO.HS_SetSyncInScanParam	Set the parameter of the synchronous input data acquisition from PET-7H16M
HS_GetSyncInBuffer HS_GetSyncInBufferLV	HSIO.HS_GetSyncInBuffer	Get the synchronous input data acquisition parameter
HS_GetSyncInBufferStatus	HSIO.HS_GetSyncInBufferStatus	Get the status of the synchronous input data acquisition and data number from data buffer on PC.
HS_ClearSyncInBuffer	HSIO.HS_ClearSyncInBuffer	Clear the buffer for the synchronous input data acquisition on PC
HS_GetSyncInTotalSamplingStatus	HSIO.HS_GetSyncInTotalSamplingStatus	Read the status of PET-7H16M during synchronous input data acquisition
HS_SetAIAnalogTriggerParam	HSIO. HS_SetAIAnalogTriggerParam	Set the Analog Input trigger parameter for high speed data acquisition for AI channel.
HS_GetAIAnalogTriggerParam	HSIO. HS_GetAIAnalogTriggerParam	Get the Analog Input trigger parameter for high speed data acquisition for AI channel.
HS_SetAIDelayTriggerParam	HSIO. HS_SetAIDelayTriggerParam	Set the delay trigger parameter for high speed data acquisition for AI channel.
HS_GetAIDelayTriggerParam	HSIO. HS_GetAIDelayTriggerParam	Get the delay trigger parameter for high speed data acquisition for AI channel.

2.4.1. HS_GetAIScanParam

Get the AI scan parameter from High-speed data acquisition module regarding of the sampling rate, scan channels, pacer gain, trigger mode.

Syntax

C/C++

```
bool HS_GetAIScanParam (
    HANDLE hobj,
    short *pacerChCnt,
    short *pacerGain,
    short *triggerMode,
    long *sampleRate,
    unsigned long *targetCnt,
    short *DataTransMethod,
    short * AutoRun
);
```

.Net

```
bool HS_GetAIScanParam (
    IntPtr hobj,
    ref short pacerChCnt,
    ref short pacerGain,
    ref short triggerMode,
    ref int sampleRate,
    ref UInt32 targetCnt,
    ref short DataTransMethod,
    ref short AutoRun
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

pacerchCnt

[out] Get the AI scan channels from the HSDAQ model.

The AI scan channel range for PET-7H16M is 1~8.
The AI scan channel range for PET-7H24M / PET-AR400 is 1~4.

pacerGain

[out] Get the AI input type from the HSDAQ model.

PET-7H16M	PET-7H24M	PET-AR400
0: +/- 5V	0: +/- 10V	0: +/- 10V
1: +/- 10V	1: +/- 5V	
	2: +/- 2.5V	
	3: +/- 1.25V	
	4: +/- 0.625V	
	5: +/- 300mV	
	6: +/- 150mV	
	7: +/- 75mV	
	8: +/- 40mV	
	9: +/- 20mV	

triggermode

[out] Get the AI scan trigger mode from the HSDAQ model.

PET-7H16M	PET-7H24M	PET-AR400
0: disable external trigger (software AD)	0: disable external trigger (software AD)	
1: external clock trigger	1: analog threshold trigger	
2: external post-trigger		
3: external pre-trigger		
5: delay trigger		
6: analog threshold trigger		

sampleRate

[out] Get the AI scan sampling rate from the HSDAQ model.

The range of the AI scan sampling rate for PET-7H16M is 1~200KHz.
The range of the AI scan sampling rate for PET-7H24M is 20~128KHz.
The range of the AI scan sampling rate for PET-AR400 is 12.8k/16k/32k/64k/128k Hz.

targetCnt

[out] Get the number of AI scan target count from the HSDAQ model.

0 means the data acquisition mode is continuous mode.
>0 means N sample acquisition mode.
(Maximum number is 30,000,000)

DataTransMethod

[out] Get the data transmission method from the HSDAQ model.

0: TCP socket

AutoRun

[out] Get the auto run status from the HSDAQ model.

0, Auto run disabled
1, Auto run enabled

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
short chCnt=0;
short useGain=0;
short extriggMode=0;
long sampleRate=0;
unsigned long targetCnt=0;
short DataTransMethod=0;
short AutoRun=0;

hHS = HS_Device_Create(“192.168.1.1”);
ret=HS_GetAIScanParam(hHS, &chCnt, &useGain, &extriggMode, &sampleRate, &targetCnt, &DataTransMethod, &AutoRun);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
short rChCnt = 0;
short rGain=0;
short rTrigMode = 0;
int rsampleRate = 0;
UInt32 rtargetCnt = 0;
short rDataTransMethod = 0;
short rAutoRun = 0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_GetAIScanParam(hHS, ref rChCnt, ref rGain, ref rTrigMode, ref rsampleRate, ref rtargetCnt, ref rDataTransMethod, ref rAutoRun);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remark

-

2.4.2. HS_SetAIScanParam

Set the AI scan parameter for High-speed data acquisition module regarding of the sampling rate, scan channels, pacer gain, and trigger mode.

Syntax

C/C++

```
bool HS_SetAIScanParam (
    HANDLE hobj,
    short pacerChCnt,
    short pacerGain,
    short triggerMode,
    long sampleRate,
    unsigned long targetCnt,
    short DataTransMethod,
    short AutoRun
);
```

.Net

```
bool HS_SetAIScanParam (
    IntPtr hobj,
    short pacerChCnt,
    short pacerGain,
    short triggerMode,
    int sampleRate,
    UInt32 targetCnt,
    short DataTransMethod,
    short AutoRun
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

pacerchCnt

[in] Set the AI scan channels for HSDAQ models.

The AI scan channel range for PET-7H16M is 1~8.
The AI scan channel range for PET-7H24M/PET-AR400 is 1~4.

pacerGain

[out] Get the AI input type from the HSDAQ model.

PET-7H16M	PET-7H24M	PET-AR400
0: +/- 5V	0: +/- 10V	0: +/- 10V
1: +/- 10V	1: +/- 5V	
	2: +/- 2.5V	
	3: +/- 1.25V	
	4: +/- 0.625V	
	5: +/- 300mV	
	6: +/- 150mV	
	7: +/- 75mV	
	8: +/- 40mV	
	9: +/- 20mV	

triggermode

[out] Get the AI scan trigger mode from the HSDAQ model.

PET-7H16M	PET-7H24M	PET-AR400
0: disable external trigger (software AD)	0: disable external trigger (software AD)	
1: external clock trigger	1: analog threshold trigger	
2: external post-trigger		
3: external pre-trigger		
5: delay trigger		
6: analog threshold trigger		

sampleRate

[out] Get the AI scan sampling rate from the HSDAQ model.

The range of the AI scan sampling rate for PET-7H16M is 1~200KHz.
The range of the AI scan sampling rate for PET-7H24M is 20~128KHz.
The range of the AI scan sampling rate for PET-AR400 is 12.8k/16k/32k/64k/128k Hz.

targetCnt

[in] Set the number of AI scan target count for HSDAQ models.

0 means the data acquisition mode is continuous mode.

>0 means N sample acquisition mode.

(Maximum number is 30,000,000)

DataTransMethod

[out] Get the data transmission method from the HSDAQ model.

0: TCP socket

AutoRun

[out] Get the auto run status from the HSDAQ model.

0, Auto run disabled
1, Auto run enabled
※This feature is currently not supported, please set it to 0

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
short chCnt=0;              //scan channel is 8
short useGain=0;            //AI input type is 0 (+/- 5V)
short extriggMode=0;        // Software trigger
long sampleRate=1000;    // sampling rate is 1KHz
unsigned long targetCnt=1000; // target count is 1000
short DataTransMethod=0;
short AutoRun=0;

hHS = HS_Device_Create("192.168.1.1");
ret=HS_SetAIScanParam(hHS, chCnt, useGain, extriggMode, sampleRate, targetCnt,
DataTransMethod,AutoRun);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
short ChCnt = 0;            //scan channel is 8
short Gain=0;               //AI input type is 0 (+/- 5V)
short TrigMode = 0;         // Software trigger
int sampleRate = 1000; // sampling rate is 1KHz
Uint32 targetCnt = 1000;    // target count is 1000
short DataTransMethod = 0;
short AutoRun = 0;

hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.HSIO.HS_SetAIScanParam(hHS, ChCnt, Gain, TrigMode, sampleRate, targetCnt,
DataTransMethod, AutoRun);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.4.3. HS_StartAIScan

Start data acquisition of scanning AI channels. The data reading at the specified sampling rate from the specified range of AI channel is stored in memory and transfer to the data buffer on PC.

Syntax

C/C++

```
bool HS_StartAIScan (
    HANDLE obj,
);
```

.Net

```
bool HS_StartAIScan (
    IntPtr obj,
);
```

Parameters

obj

[in] A handle to the specified device opened by HS_Device_Create

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;

hHS = HS_Device_Create(“192.168.1.1”);
ret=HS_StartAIScan (hHS);
...//user-define code
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_StartAIScan(hHS);
...  //user-define code
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

In high-speed data acquisition, use HS_StartAIScan to start data acquisition and use HS_StopAIScan to stop data acquisition. The data reading at the specified sampling rate from the specified range of AI channel is stored in memory of the HSDAQ model and transfer to the data buffer on PC via Ethernet. It must use HS_GetAIBuffer and HS_GetAIBufferHex function to get data from the data buffer.

2.4.4. HS_StopAIScan

Stop data acquisition.

Syntax

C/C++

```
bool HS_StopLogger (
    HANDLE obj,
);
```

.Net

```
bool HS_ StopLogger (
    IntPtr obj,
);
```

Parameters

obj

[in] A handle to the specified device opened by HS_Device_Create

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;

hHS = HS_Device_Create(“192.168.1.1”);
ret=HS_StartAIScan (hHS);
...//user-define code
HS_StopAIScan (hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_StartAIScan(hHS);
...  //user-define code
HSDAQNet.HSIO.HS_StopAIScan(hHS);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

In high-speed data acquisition, use HS_StartAIScan to start data acquisition and use HS_StopAIScan to stop data acquisition. The data reading at the specified sampling rate from the specified range of AI channel is stored in memory of the HSDAQ model and transfer to the data buffer on PC via Ethernet. It must use HS_GetAIBuffer and HS_GetAIBufferHex function to get data from the data buffer.

2.4.5. HS_GetAIBufferHex

Get the binary data from data buffer on PC

Syntax

C/C++

```
DWORD HS_GetAIBufferHex (
    HANDLE hobj,
    WORD *wBuffer,
    DWORD dwBufferSize
);
```

.Net

```
UInt32 HS_GetAIBufferHex (
    IntPtr hobj,
    UInt16 [] wBuffer,
    UInt32 dwBufferSize
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wBuffer

[out] A pointer to a WORD buffer reading from the data buffer. Declare the WORD array and the array size is dwBufferSize.

dwBufferSize

[in] The number of data in the data buffer on PC

Return Values

If the function succeeds, returns the number of data actually received from the buffer. If the function fails or no data received from buffer, the return value is 0. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
WORD BufferStatus=0;
short *dataBuffer;
unsigned long ulleng=0;

hHS = HS_Device_Create(“192.168.1.1”);
HS_StartAIScan (hHS);
dataBuffer=(short *)malloc(sizeof(short)*targetCnt);
ret=HS_GetAIBufferStatus(hHS,&BufferStatus,&ulleng);
if(ret==false){
printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
if(ulleng==targetCnt)
{
readsize=HS_GetAIBufferHex(hHS,(WORD *)dataBuffer, ulleng);
...
}
}
HS_StopAIScan (hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
UInt16[] HdataBuffer = new UInt16[targetCnt];
uint ulleng = 0;
ushort BufferStatus = 0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_StartAIScan(hHS);
ret = HSDAQNet.HSIO.HS_GetAIBufferStatus(hHS, ref BufferStatus, ref ulleng);
if (ret == false)
{
Console.WriteLine(IP.ToString() + " Error code 0x" +
HSDAQNet.ErrHandling.GetLastError().ToString("x8"));
}
else
{
    if (ulleng == targetCnt)
    {
        readsize = HSDAQNet.HSIO.HS_GetAIBufferHex(hHS, HdataBuffer, ulleng);
}
}
HSDAQNet.HSIO.HS_StopAIScan(hHS);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

The data received from the buffer through calling the HS_GetAIBufferHex function is the raw data without calibration. The user needs to call HS_Calibrate_Data_HEX or HS_Calibrate_Data_Float to calibrate the raw data.

2.4.6. HS_GetAIBuffer

Get the floating-point value from data buffer on PC

Syntax

C/C++

```
DWORD HS_GetAIBuffer (
    HANDLE hobj,
    float *fBuffer,
    DWORD dwBufferSize
);
```

.Net

```
UInt32 HS_GetAIBuffer (
    IntPtr hobj,
    float [] fBuffer,
    UInt32 dwBufferSize
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

fBuffer

[out] A pointer to a float-point buffer reading from the data buffer. Declare the float-point array and the array size is dwBufferSize.

dwBufferSize

[in] The number of data in the data buffer on PC

Return Values

If the function succeeds, returns the number of data actually received from the buffer. If the function fails or no data, the return value is 0. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
WORD BufferStatus=0;
float fdataBuffer[10000];
unsigned long ulleng=0;

hHS = HS_Device_Create(“192.168.1.1”);
HS_StartAIScan (hHS);

ret=HS_GetAIBufferStatus(hHS,&BufferStatus,&ulleng);
if(ret==false){
printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
if(ulleng)
{
readsize=HS_GetAIBuffer(hHS,fdataBuffer, ulleng);
...
}
}
HS_StopAIScan (hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
float[] fdataBuffer = new float[10000];
uint ulleng = 0;
ushort BufferStatus = 0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSIO.HS_StartAIScan(hHS);
ret = HSIO.HS_GetAIBufferStatus(hHS, ref BufferStatus, ref ulleng);
if (ret == false)
{
Console.WriteLine(IP.ToString() + " Error code 0x" +
HSDAQNet.ErrHandling.GetLastError().ToString("x8"));
}
else
{
   if (ulleng)
   {
      readsize = HSDAQNet.HSIO.HS_GetAIBuffer(hHS, fdataBuffer, ulleng);
  ….
}
}
HSIO.HS_StopAIScan(hHS);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

HS_GetAIBufferHex and HS_GetAIBuffer functions are used to read the data from data buffer on PC. The difference between these two functions is not only the type of the read data, but the floating point value getting from the HS_GetAIBuffer function is calibrated.

2.4.7. HS_GetAIBufferStatus

Get the status and data number from data buffer on PC.

Syntax

C/C++

```
bool HS_GetAIBufferStatus (
    HANDLE hobj,
    WORD *wBufferStatus,
    DWORD *dwDataCountOnBuffer
);
```

.Net

```
bool HS_GetAIBufferStatus (
    IntPtr hobj,
    ref UInt16 wBufferStatus,
    ref UInt32 dwDataCountOnBuffer
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wBufferStatus

[out] The buffer status

0: the data buffer is empty

1: the data exists in the buffer

2: the data buffer is overflow

4: the AI scan is stopped

0x80: Number of samples reached

dwDataCountOnBuffer

[out] The data number in the data buffer on PC

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
WORD BufferStatus=0;
float fdataBuffer[10000];
unsigned long ulleng=0;
  hHS = HS_Device_Create("192.168.1.1");
HS_StartAIScan (hHS);
ret=HS_GetAIBufferStatus(hHS,&BufferStatus,&ulleng);
if(ret==false){
printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
if(BufferStatus>2) //AI buffer overflow
    {
    // 2: AD_BUF_OVERFLOW     4: AD_SCAN_STOP      8: AD_DATA_SAMPLING_TIMEOUT
        printf("Error<%d>, %lu\r\n",BufferStatus,ulleng);
        break;
    }
if(ulleng)
{
readsize=HS_GetAIBuffer(hHS,fdataBuffer, ulleng);
...
}
}
HS_StopAIScan (hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
float[] HdataBuffer = new float[10000];
uint ulleng = 0;
ushort BufferStatus = 0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_StartAIScan(hHS);
ret = HSDAQNet.HSIO.HS_GetAIBufferStatus(hHS, ref BufferStatus, ref ulleng);
if (ret == false)
{
Console.WriteLine(IP.ToString() + " Error code 0x" +
HSDAQNet.ErrHandling.GetLastError().ToString("x8"));
}
else
{
if (BufferStatus > 2) //AI buffer overflow
  {
     // 2: AD_BUF_OVERFLOW4: AD_SCAN_STOP      8: AD_DATA_SAMPLING_TIMEOUT
     Console.WriteLine(IP.ToString() + " Error<" + BufferStatus + ">," + ulleng);      break;
  }
  if (ulleng == targetCnt)
  {
    readsize = HSDAQNet.HSIO.HS_GetAIBufferHex(hHS, HdataBuffer, ulleng);
}
}
HSDAQNet.HSIO.HS_StopAIScan(hHS);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.4.8. HS_ClearAIBuffer

Clear the data buffer on PC.

Syntax

C/C++

```
bool HS_ClearAIBuffer(
    HANDLE hobj
);
```

.Net

```
bool HS_ClearAIBuffer(
    IntPtr hobj
);
```

Parameters

Hobj

[in] A handle to the specified device opened by HS_Device_Create.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;

hHS = HS_Device_Create(“192.168.1.1”);
HS_ClearAIBuffer(hHS);
ret=HS_StartAIScan (hHS);
...//user-define code
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_ClearAIBuffer(hHS);

HSDAQNet.HSIO.HS_StartAIScan(hHS);
...  //user-define code
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.4.9. HS_GetTotalSamplingStatus

Read the module status of High-speed data acquisition module during data sampling.

Syntax

C/C++

```
bool HS_GetTotalSamplingStatus (
    HANDLE hobj,
    unsigned long * totalReadCnt,
    unsigned int * SamplingStatus
);
```

.Net

```
bool HS_GetTotalSamplingStatus (
    IntPtr hobj,
    ref UInt32 totalReadCnt,
    ref UInt32 triggerStatus
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

totalReadCnt

[out] The count of the sampling data stored in the memory on the module

SamplingStatus

[out] The trigger status of module in data sampling

1: The digital signal is triggered in the pre-trigger mode
0: The signal isn’t triggered.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
unsigned long ulleng=0;
unsigned long triggerStatus=0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_StartLogger(hHS,NULL,2,0);
ret=HS_GetTotalSamplingstatus(hHS,&ulleng,&triggerStatus);
if(ret==false)
{
    printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
    if(ulleng>=targetCnt && targetCnt>0) //N sample mode
    {
            ret=HS_TransmitDataCmd(hHS);
        … //user-define code
}
}
HS_StopLogger (hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
float[] HdataBuffer = new float[10000];
uint ulleng = 0;
uint triggerStatus = 0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.DATALOG.HS_StartLogger(hHS,NULL,2,0);
ret= HSDAQNet.HSIO.HS_ GetTotalSamplingstatus(hHS,ref ulleng,ref triggerStatus);
if(ret==false)
{
   printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
   if(ulleng>=targetCnt && targetCnt>0) //N sample mode
   {
         ret= HSDAQNet.HSIO.HS_TransmitDataCmd(hHS);
      … //user-define code
}
}
HSDAQNet.DATALOG.HS_StopLogger (hHS);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.4.10. HS_TransmitDataCmd

Notify High-speed data acquisition module to send data to PC from data port.

Syntax

C/C++

```
bool HS_TransmitDataCmd (
    HANDLE hobj
);
```

.Net

```
bool HS_TransmitDataCmd (
    IntPtr hobj
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
unsigned long ulleng=0;

hHS = HS_Device_Create(“192.168.1.1”);
HS_StartLogger(hHS,NULL,2,0);
ret=HS_GetTotalSamplingCnt(hHS,&ulleng);
if(ret==false)
{
    printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
    if(ulleng>=targetCnt && targetCnt>0) //N sample mode
    {
            ret=HS_TransmitDataCmd(hHS);
        … //user-define code
}
}
HS_StopLogger (hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
float[] HdataBuffer = new float[10000];
uint ulleng = 0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.DATALOG.HS_StartLogger(hHS,NULL,2,0);
ret= HSDAQNet.HSIO.HS_GetTotalSamplingCnt(hHS,&ulleng);
if(ret==false)
{
    printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
    if(ulleng>=targetCnt && targetCnt>0) //N sample mode
    {
            ret= HSDAQNet.HSIO.HS_TransmitDataCmd(hHS);
        … //user-define code
}
}
HSDAQNet.DATALOG.HS_StopLogger (hHS);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.4.11. HS_SetEventCallback

Bind the event condition to a user-defined callback function.

Syntax

C/C++

```
WORD HS_SetEventCallback (
    HANDLE hobj,
    WORD wEventType,
    WORD EventParam,
    PVOID CallbackFun,
    void *pdwCallBackParameter
);
```

.NET

```
UInt16 HS_SetEventCallback (
    IntPtr hobj,
    UInt16 wEventType,
    UInt16 EventParam,
    CallBackFun CallbackFun,
    IntPtr pdwCallBackParameter
);
```

Callback Function Type

```
void CallBackFun(UInt32 Param, UInt32 Param2);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wEventType

[in] Sets notification event type, each bit can be enable one mode

Event type	Code	Description
EVENT_ERROR	0x0001	Generates an event upon while an error occurred
EVENT_N_SAMPLE_REACH	0x0002	Generates an event while the total number of samples reached
EVENT_DATA_SAMPLING_TIMEOUT	0x0004	Generates an event upon while a sampling timeout occurred
EVENT_LAN_BUFFER_OVERFLOW	0x0008	Generates an event while the LAN buffer overflow occurred

EventParam

[in] Sets additional data required to specify event conditions.

CallbackFun

[in] Sets Callback Function. The address of pointer to the user-defined callback function to handle the above event type.

pdwCallBackParameter

[in] Sets the Parameters for Callback Function

Return Values

If the function succeeds, the return value is 0.

If the function fails, the return value is NoneZero. To get extended error information, call HS_GetLastError.

Examples

-

Remarks

-

2.4.12. HS_RemoveEventCallback

Disable the event condition and callback function.

Syntax

C/C++

```
WORD HS_RemoveEventCallback (
    HANDLE hobj,
    WORD wEventType
);
```

.Net

```
UInt16 HS_RemoveEventCallback (
    IntPtr hobj,
    UInt16 wEventType
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wEventType

[in] Sets notification event type, each bit can be enable one mode

Event type	Code	Description
EVENT_ERROR	0x0001	Generates an event upon while an error occurred
EVENT_N_SAMPLE_REACH	0x0002	Generates an event while the total number of samples reached
EVENT_DATA_SAMPLING_TIMEOUT	0x0004	Generates an event upon while a sampling timeout occurred
EVENT_LAN_BUFFER_OVERFLOW	0x0008	Generates an event while the LAN buffer overflow occurred

Return Values

If the function succeeds, the return value is 0.

If the function fails, the return value is NoneZero. To get extended error information, call HS_GetLastError.

Examples

-

Remarks

-

2.4.13. HS_GetSyncInScanParam

Get the parameter of the synchronous input data acquisition from PET-7H16M

Syntax

C/C++

```
bool HS_GetSyncInScanParam (
    HANDLE hobj,
    DWORD * SyncInheader,
    WORD *InChNumArray[],
    WORD *InChTypeArray[],
    WORD Arraycount,
    WORD * ActualArrayAmout ,
    DWORD *Options,
    DWORD *Reserved,
);
```

.Net

```
bool HS_GetSyncInScanParam (
    IntPtr hobj,
    ref UInt32 SyncInheader,
    UInt16[] InChNumArray,
    UInt16[] InChTypeArray,
    UInt16 Arraycount,
    ref UInt16 ActualArrayAmout,
    ref UInt32 Options,
    ref UInt32 Reserved
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

SyncInheader

[Out] Get the header format of data frame of the synchronous input data acquisition

Mode	Description
0	None, no header for the data frame
1	Package index, Increase 1 for each synchronous input data acquisition. When counting to the maximum value(Max. 65535), the counter will return to 0 automatically.

2	Timestamp (type 1)
	typedef struct daqtime { //timestamp type 1
	        __int16 day:5; //5 bits
	        __int16 hour:5; //5 bits
	        __int16 minute:6; //6 bits
	        __int16 sec:6; //6 bits
	        __int16 msec:10; //10 bits
	} DAQ_TIME; //total 32 bits

2	Timestamp (type 2)
	typedef struct { //timestamp type 2
	        __int32 minute:6; //6 bits
	        __int32 sec:6; //6 bits
	        __int32 msec:10; //10 bits
	        __int32 usec:10; //10 bits
	} DAQ_TIME2; //total 32 bits

InChNumArray

[Out] Get the input channel number of each element of the array used for synchronous input data acquisition (The max. length of the array is 7)

InChTypeArray

[Out] Get the input channel type for the corresponding of InChNumArray array

SYNC_IN_TYPE	**Descriptions**
SYNC_IN_AI=0,	2 bytes AI float data(Hex to float)
SYNC_IN_AI_HEX,	2 bytes AI Hex data
SYNC_IN_WORD_DI_CNT,	2 bytes DI Counter data (16-bit)
SYNC_IN_WORD_CNT,	2 bytes Counter data (16-bit)
SYNC_IN_DWORD_DI_CNT,	4 bytes DI Counter data (32-bit)
SYNC_IN_DWORD_CNT,	4 bytes Counter data (32-bit)
SYNC_IN_DI,	One bit represents a DI channel value
SYNC_IN_DO,	One bit represents a DI channel value
SYNC_IN_UD_BYTE,	1 byte user-defined data
SYNC_IN_UD_WORD,	2 bytes user-defined data
SYNC_IN_UD_DWORD,	4 bytes user-defined data
SYNC_IN_UD_FLOAT	4 bytes user-defined float data

Arraycount

[In] Defined the array length for InChNumArray and InChTypeArray

ActualArrayAmout

[Out]Get the actual array length of InChNumArray and InChTypeArray

Options

[Out] Get the options of the synchronous input data acquisition

Mode	**Description**
SYNC_ENABE/SYNC_DISABLE (Default : disable)	Enable/disable synchronous data acquisition

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

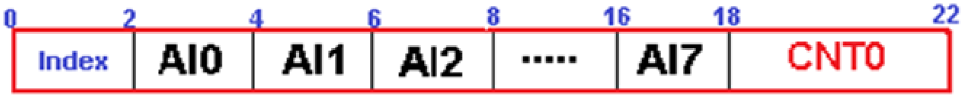
```
HANDLE hHS;
WORD InChNumArray[8]={0};
WORD InChTypeArray [8]={0};
WORD totalInCount=8;
WORD AcutArryAcount=0;
WORD SyncInheader =0;
WORD woption= 0;
hHS = HS_Device_Create(“192.168.1.1”);
HS_GetSyncInScanParam(hHS,(DWORD *)&SyncInheader, InChNumArray, InChTypeArray,
totalInCount,(WORD *)&AcutArryAcount,(DWORD *)& woption,NULL);
...
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
UInt32 headertype=0;
UInt16 [] InChNumArray= new Uint16[8];
UInt16 [] InChTypeArray= new UInt16[8];
UInt16 totalInCount=8;
UInt16 AcutArryAcount=0;
UInt32 woption= 0;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_GetSyncInScanParam(hHS, ref headertype, InChNumArray, InChTypeArray,
totalInCount , ref AcutArryAcount, ref woption, 0);
...
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

The ethernet frame for VC and C# example above is as



2.4.14. HS_SetSyncInScanParam

Set the parameter of the synchronous input data acquisition for PET-7H16M.

Syntax

C/C++

```
bool HS_SetSyncInScanParam (
    HANDLE hobj,
    DWORD SyncInheader,
    WORD InChNumArray[],
    WORD InChTypeArray[],
    WORD Arraycount,
    DWORD Options,
    DWORD Reserved,
);
```

.Net

```
bool HS_GetSyncInScanParam (
    IntPtr hobj,
    UInt32 SyncInheader,
    UInt16[] InChNumArray,
    UInt16[] InChTypeArray,
    UInt16 Arraycount,
    UInt32 Options,
    UInt32 Reserved
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

SyncInheader

[Out] Get the header format of data frame of the synchronous input data acquisition

Mode	**Description**
0	None, no header for the data frame
1	Package index, Increase 1 for each synchronous input data acquisition. When counting to the maximum value(Max. 65535), the counter will return to 0 automatically.

2	Timestamp (type 1)
	typedef struct daqtime { //timestamp type 1
	    __int16 day:5; //5 bits
	    __int16 hour:5; //5 bits
	    __int16 minute:6; //6 bits
	    __int16 sec:6; //6 bits
	    __int16 msec:10; //10 bits
	} DAQ_TIME; //total 32 bits

2	Timestamp (type 2)
	typedef struct { //timestamp type 2
	    __int32 minute:6; //6 bits
	    __int32 sec:6; //6 bits
	    __int32 msec:10; //10 bits
	    __int32 usec:10; //10 bits
	} DAQ_TIME2; //total 32 bits

InChNumArray

[Out] Get the input channel number of each element of the array used for synchronous input data acquisition (The max. length of the array is 7)

InChTypeArray

[Out] Get the input channel type for the corresponding of InChNumArray array

SYNC_IN_TYPE	Descriptions
SYNC_IN_AI=0,	2 bytes AI float data(Hex to float)
SYNC_IN_AI_HEX,	2 bytes AI Hex data
SYNC_IN_WORD_DI_CNT,	2 bytes DI Counter data (16-bit)
SYNC_IN_WORD_CNT,	2 bytes Counter data (16-bit)
SYNC_IN_DWORD_DI_CNT,	4 bytes DI Counter data (32-bit)
SYNC_IN_DWORD_CNT,	4 bytes Counter data (32-bit)
SYNC_IN_DI,	One bit represents a DI channel value
SYNC_IN_DO,	One bit represents a DI channel value
SYNC_IN_UD_BYTE,	1 byte user-defined data
SYNC_IN_UD_WORD,	2 bytes user-defined data
SYNC_IN_UD_DWORD,	4 bytes user-defined data
SYNC_IN_UD_FLOAT	4 bytes user-defined float data

Arraycount

[In] Defined the array length for InChNumArray and InChTypeArray

Options

[Out] Get the options of the synchronous input data acquisition

Mode	Description
SYNC_ENABE/SYNC_DISABLE (Default : disable)	Enable/disable synchronous data acquisition

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

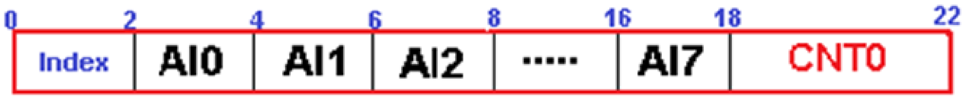
```
HANDLE hHS;
short chCnt=8;              //scan channel is 8
short useGain=0;             //AI input type is 0 (+/- 5V)
short extriggMode=0;             // Software trigger
unsigned long targetCnt=0;              //Continue mode
long sampleRate=2000;             // sampling rate is 2 KHz
short DataTransMethod=0;
short AutoRun=0
WORD InChNumArray[2]={0};
WORD InChTypeArray [2]={0};
WORD totalInCount=2;              //scan 2 input type for synchronous input data acquisition.
WORD headertype=1             // Package index for the header of data frame
WORD woption= SYNC_ENABE;             //enable synchronous input data acquisition.

//First input type is AI (Hex format) with scanning 8 channels
InChNumArray[0]=8;
InChTypeArray[0]= SYNC_IN_AI_HEX;

//2'nd input type is Counter (32-bit) with scanning 1 channels
InChNumArray[1]=1;
InChTypeArray[1]= SYNC_IN_DWORD_CNT;

hHS = HS_Device_Create("192.168.1.1");
HS_SetAIScanParam(hHS, chCnt, useGain, extriggMode, sampleRate, targetCnt,
DataTransMethod,AutoRun);
HS_SetSyncInScanParam(hHS, headertype, InChNumArray, InChTypeArray, totalInCount,
woption ,0);
...
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
short ChCnt = 8;            //scan channel is 8
short Gain=0;           //AI input type is 0 (+/- 5V)
short TrigMode = 0;             // Software trigger
int sampleRate = 2000;              // sampling rate is 2KHz
Uint32 targetCnt = 0;             //Continue mode
short DataTransMethod = 0;
short AutoRun = 0;
UInt32 headertype=1;             // Package index for the header of data frame
UInt16 [] InChNumArray= new Uint16[2];
UInt16 [] InChTypeArray= new UInt16[2];
UInt16 totalInCount=2;             //scan 2 input type for synchronous input data acquisition.
UInt32 woption= SYNC_STATUS.SYNC_ENABE; //enable synchronous input data acquisition.
//First input type is AI (Hex format) with scanning 8 channels
InChNumArray[0]=8;
InChTypeArray[0]= SYNC_IN_TYPE.SYNC_IN_AI_HEX;
//2’nd input type is Counter (32-bit) with scanning 1 channels
InChNumArray[1]=1;
InChTypeArray[1]= SYNC_IN_TYPE.SYNC_IN_DWORD_CNT;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_SetAIScanParam(hHS, ChCnt, Gain, TrigMode, sampleRate, targetCnt,
DataTransMethod, AutoRun);
HSDAQNet.HSIO.HS_SetSyncInScanParam (hHS, headertype, InChNumArray, InChTypeArray,
totalInCount, woption, 0);
...
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

- The ethernet frame for VC and C# example above is as



- In synchronous input data acquisition. Use HS_SetAIScanParam function to set the trigger mode (4th parameter of HS_SetAIScanParam) to 0(software trigger) and set the target count (6th parameter of HS_SetAIScanParam) to 0 (continuous mode).
- In synchronous input data acquisition, the sampling rate (5th parameter of HS_SetAIScanParam) can be 2KHZ Max

2.4.15. HS_GetSyncInBuffer

Get the parameter of the synchronous input data acquisition from PET-7H16M

Syntax

C/C++

```
DWORD HS_GetSyncInBuffer (
    HANDLE hobj,
    void *packetheader,
    void **wfAIBuffer,
    BYTE **bDIBuffer,
    BYTE **bDOBuffer,
    void **pDICNTbuffer,
    void **pCNTbuffer,
    void **pUDbuffer1,
    void **pUDbuffer2,
    DWORD dwFrameDataNumber
);
```

.Net

```
UInt32 HS_GetSyncInBuffer(
    IntPtr hobj,
    IntPtr packetheader,
    IntPtr[] wfAIBuffer,
    IntPtr bDIBuffer,
    IntPtr bDOBuffer,
    IntPtr[] pDICNTbuffer,
    IntPtr[] pCNTbuffer,
    IntPtr[] pUDbuffer1,
    IntPtr[] pUDbuffer2,
    UInt32 dwFrameDataNumber
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

packetheader

[Out] the buffer containing the package index or packet timestamp

wfAIBuffer

[out]the 2-D buffer containing synchronous AI value (Hex, float)

bDIBuffer

[out] the 2-D buffer containing DI value

bDOBuffer

[out] the 2-D buffer containing DO read-back value

pDICNTbuffer

[out] the 2-D buffer containing DI counter value (WORD/DWORD)

pCNTbuffer

[out] the 2-D buffer containing counter value (WORD/DWORD)

pUDbuffer1

[out] the 2-D buffer containing the user-defined array

pUDbuffer2

[out] the 2-D buffer containing the user-defined array

dwFrameDataNumber

the number of data frame in the data buffer

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
short chCnt=8;              //scan channel is 8
short    useGain=0;              //AI input type is 0 (+/- 5V)
short extriggMode=0;              // Software trigger
unsigned long targetCnt=0;              //Continue mode
long sampleRate=2000;              // sampling rate is 2KHz
short DataTransMethod=0;
short AutoRun=0;
int SyInTypeNum=2;              //scan 2 input types for synchronous input data acquisition
int SyncInheader=1;              // Package index for the header of data frame
WORD SyInChTypeArray[2]={SYNC_IN_AI_HEX,SYNC_IN_DWORD_CNT};
WORD SyInChNumArray[2]={chCnt,1};
// 2 input types
// 1st input type is AI (Hex format) with scanning 8 channels
// 2nd input type is Counter (32-bit) with scanning 1 channels
DWORD dwCNTmode=CNT_ENABLE;
DWORD dwCNTInitValue=0;
WORD BufferStatus=0;
unsigned long ulFramelength=0
hHS = HS_Device_Create(“192.168.1.1”);
ret=HS_SetAIScanParam(hHS, chCnt, useGain, extriggMode, sampleRate, targetCnt,
DataTransMethod,AutoRun);
HS_SetCounterConfig(hHS,0,dwCNTmode,dwCNTInitValue,0);
HS_SetSyncInScanParam(hHS,SyncInheader,SyInChNumArray,SyInChTypeArray,SyInTypeNum,SY
NC_ENABE,0);

HS_StartAIScan (hHS);
ret=HS_GetSyncInBufferStatus(hHS,&BufferStatus,&ulFramelength);
if(ret==false){
printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
if(ulFramelength)
{
DWORD *dwheaderbuf=NULL;
void *vheaderpointer=NULL;
WORD **wAIbuffer=NULL;
DWORD **wCNTbuffer=NULL;
void **vAIbuffpointer=NULL;
void **vCNTbuffpointer=NULL;
dwheaderbuf=new DWORD[ulFramelength];
vheaderpointer=dwheaderbuf;
for(int i=0;i<SyInTypeNum;i++)
{
switch(SyInChTypeArray[i])
{
case SYNC_IN_AI_HEX:               //2 bytes
wAIbuffer=NEW2D(ulFramelength, SyInChNumArray[i], WORD);
   vAIbuffpointer=(void **)wAIbuffer;
break;
case SYNC_IN_DWORD_CNT:               //4 bytes
   wCNTbuffer=NEW2D(ulFramelength, SyInChNumArray[i], DWORD);
   vCNTbuffpointer=(void **)wCNTbuffer;
break;
     …
}
}
readsize=HS_GetSyncInBuffer(hHS,vheaderpointer,vAIbuffpointer,NULL,NULL,NULL,vCNTbuffpoi
nter,NULL,NULL,ulFramelength);
if(readsize)
{
...
     }
}
}
HS_StopAIScan (hHS);
HS_Device_Release (hHS);
```

Remarks

It’s recommended to use HS_GetSyncInBuffer1D function of HSDAQnet.dll for C# demo.

2.4.16. HS_GetSyncInBufferLV

Get the parameter of the synchronous input data acquisition from PET-7H16M

Syntax

C/C++

```
DWORD HS_GetSyncInBufferLW (
    HANDLE hobj,
    DWORD *packetheader,
    DWORD *wfAIBuffer,
    BYTE *bDIBuffer,
    BYTE *bDOBuffer,
    DWORD *pDICNTbuffer,
    DWORD *pCNTbuffer,
    DWORD *pUDbuffer1,
    DWORD *pUDbuffer2,
    DWORD dwFrameDataNumber
);
```

.Net

```
UInt32 HS_GetSyncInBuffer1D(
    IntPtr hobj,
    UInt32[] packetheader,
    UInt32[] wfAIBuffer,
    ushort[] bDIBuffer,
    ushort[] bDOBuffer,
    UInt32[] pDICNTbuffer,
    UInt32[] pCNTbuffer,
    UInt32[] pUDbuffer1,
    UInt32[] pUDbuffer2,
    UInt32 dwFrameDataNumber
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

packetheader

[out] the buffer containing the package index or packet timestamp

wfAIBuffer

[out] the 1-D buffer containing synchronous AI value (Hex, float)

bDIBuffer

[out] the 1-D buffer containing DI value

bDOBuffer

[out] the 1-D buffer containing DO read-back value

pDICNTbuffer

[out] the 1-D buffer containing DI counter value (WORD/DWORD)

pCNTbuffer

[out] the 1-D buffer containing counter value (WORD/DWORD)

pUDbuffer1

[out] the 1-D buffer containing the user-defined array

pUDbuffer2

[out] the 1-D buffer containing the user-defined array

dwFrameDataNumber

the number of data frame in the data buffer

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
short chCnt=8;                      //scan channel is 8
short    useGain=0;                //AI input type is 0 (+/- 5V)
short extriggMode=0;                // Software trigger
unsigned long targetCnt=0;    //Continue mode
long sampleRate=2000;          // sampling rate is 2KHz
short DataTransMethod=0;
short AutoRun=0;

int SyInTypeNum=2;          //scan 2 input types for synchronous input data acquisition
int SyncInheader=1;          // Package index for the header of data frame
WORD SyInChTypeArray[2]={SYNC_IN_AI_HEX,SYNC_IN_DWORD_CNT};
WORD SyInChNumArray[2]={chCnt,1};
// 2 input types
//1st input type is AI (Hex format) with scanning 8 channels
//2nd input type is Counter (32-bit) with scanning 1 channels
DWORD dwCNTmode=CNT_ENABLE;
DWORD dwCNTInitValue=0;
WORD BufferStatus=0;
unsigned long ulFramelength=0

hHS = HS_Device_Create(“192.168.1.1”);
ret=HS_SetAIScanParam(hHS, chCnt, useGain, extriggMode, sampleRate, targetCnt,
DataTransMethod,AutoRun);
HS_SetCounterConfig(hHS,0,dwCNTmode,dwCNTInitValue,0);
HS_SetSyncInScanParam(hHS,SyncInheader,SyInChNumArray,SyInChTypeArray,SyInTypeNum,SY
NC_ENABE,0);

HS_StartAIScan (hHS);

ret=HS_GetSyncInBufferStatus(hHS,&BufferStatus,&ulFramelength);
if(ret==false){
printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
```

```
if(ulFramelength)
{
DWORD *dwheaderbuf=NULL;

DWORD *wAIbuffer=NULL;
DWORD *wCNTbuffer=NULL;

dwheaderbuf=new DWORD[ulFramelength];
for(int i=0;i<SyInTypeNum;i++)
{
switch(SyInChTypeArray[i])
{
case SYNC_IN_AI_HEX:          //2 bytes
temp=ulFramelength*SyInChNumArray[i];
wAIbuffer=new DWORD[temp];
memset(wAIbuffer,0x0,sizeof(DWORD)*temp);
break;
case SYNC_IN_DWORD_CNT:          //4 bytes
temp=ulFramelength*SyInChNumArray[i];
wCNTbuffer=new DWORD[temp];
memset(wCNTbuffer,0x0,sizeof(DWORD)*temp);
break;
    …
}
}
readsize=HS_GetSyncInBufferLV(hHS,dwheaderbuf,wAIbuffer,NULL,NULL,NULL,wCNTbuffer,NULL,NULL,ulFramelength);
if(readsize)
{
...
    }
}
}
HS_StopAIScan (hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
short ChCnt = 8;          //scan channel is 8
short Gain = 0;          //AI input type is 0 (+/- 5V)
uint ulFramelength = 0;
ushort BufferStatus = 0;
short TrigMode = 0;          // Software trigger
UInt32 targetCnt = 0;          //Continue mode
int sampleRate = 2000;          // sampling rate is 2KHz
short DataTransMethod = 0;
short AutoRun = 0;

hHS =Sys.HS_Device_Create(“192.168.1.1”);
HSIO.HS_SetAIScanParam(hHS, ChCnt, Gain, TrigMode, sampleRate, targetCnt,
DataTransMethod, AutoRun);
UInt32 dwCNTmode = (UInt32)IO.CNTCong.CNT_DISABLE;
UInt32 dwCNTInitValue = 0;

ret=IO.HS_SetCounterConfig(hHS,0, dwCNTmode, dwCNTInitValue, 0);
UInt16 SyInTypeNum = 2;
//scan 2 input types for synchronous input data acquisition
UInt32 SyncInheader = 1;          // Package index for the header of data frame
UInt32 options = (UInt32)HSIO.SYNC_STATUS.SYNC_ENABE;
UInt16[] SyInChTypeArray = new
UInt16[]{(UInt16)HSIO.SYNC_IN_TYPE.SYNC_IN_AI_HEX ,(UInt16)HSIO.SYNC_IN_TYPE.SYNC_IN_
DWORD_CNT};
UInt16[] SyInChNumArray = new UInt16[] { (UInt16)ChCnt, 1 };
// 2 input types
//1st input type is AI (Hex format) with scanning 8 channels
//2nd input type is Counter (32-bit) with scanning 1 channels
ret = HSIO.HS_SetSyncInScanParam(hHS,SyncInheader,SyInChNumArray,
SyInChTypeArray,(UInt16) SyInTypeNum,(UInt32)options, 0);
HSIO.HS_StartAIScan(hHS);
ret = HSIO.HS_GetSyncInBufferStatus(hHS, ref BufferStatus, ref ulFramelength);
if (ret == false)
{
Console.WriteLine("Error code3 0x" + ErrHandling.GetLastError().ToString("x8"));
}
else
```

```
{
if (ulFramelength > 0)
{
UInt32[] dwheaderbuf = null;
UInt32[] wAIbuffer = null;
UInt32[] wCNTbuffer = null;
dwheaderbuf = new UInt32[ulFramelength];
for (i = 0; i < SyInTypeNum; i++)
{
switch (SyInChTypeArray[i])
{
case 1:         //HSIO.SYNC_IN_TYPE.SYNC_IN_AI_HEX: //2bytes
temp = ulFramelength * SyInChNumArray[i];
wAIbuffer = new UInt32[temp];
break;
case 5:         // HSIO.SYNC_IN_TYPE.SYNC_IN_DWORD_CNT:    //4bytes
    temp = ulFramelength * SyInChNumArray[i];
wCNTbuffer = new UInt32[temp];
break;
...
}
}
readsize = HSIO.HS_GetSyncInBufferLV(hHS, dwheaderbuf, wAIbuffer, null, null, NULL,
wCNTbuffer, null, null, ulFramelength);
if(readsize)
{
...
    }
}
...
}
Sys.HS_Device_Release(hHS);
```

Remarks

-

2.4.17. HS_GetSyncInBufferStatus

Get the status of the synchronous input data acquisition and data number from data buffer on PC.

Syntax

C/C++

```
DWORD HS_GetSyncInBufferStatus (
    HANDLE hobj,
    WORD *wBufferStatus,
    DWORD *dwDataCountOnBuffer
);
```

.Net

```
bool HS_GetSyncInBufferStatus (
    IntPtr hobj,
    ref UInt16 wBufferStatus,
    ref UInt32 dwDataCountOnBuffer
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

wBufferStatus

[out] The buffer status

0: the data buffer is empty

1: the data exists in the buffer

2: the data buffer is overflow

4: the synchronous input data acquisition scan is stopped

dwDataCountOnBuffer

[out] The frame number in the buffer of synchronous input data acquisition on PC

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
short chCnt=8;                    //scan channel is 8
short    useGain=0;              //AI input type is 0 (+/- 5V)
short extriggMode=0;              // Software trigger
unsigned long targetCnt=0;    //Continue mode
long sampleRate=2000;         // sampling rate is 2KHz
short DataTransMethod=0;
short AutoRun=0;

int SyInTypeNum=2; //scan 2 input types for synchronous input data acquisition
int SyncInheader=1; // Package index for the header of data frame
int AcutArryAcount=0;
int options=0;
WORD SyInChTypeArray[2]={SYNC_IN_AI_HEX,SYNC_IN_DWORD_CNT};
WORD SyInChNumArray[2]={chCnt,1};
// 2 input types
//1st input type is AI (Hex format) with scanning 8 channels
//2nd input type is Counter (32-bit) with scanning 1 channel
DWORD dwCNTmode=CNT_ENABLE;
DWORD dwCNTInitValue=0;
WORD BufferStatus=0;
unsigned long ulFramelength=0

hHS = HS_Device_Create(“192.168.1.1”);
ret=HS_SetAIScanParam(hHS, chCnt, useGain, extriggMode, sampleRate, targetCnt,
DataTransMethod,AutoRun);
HS_SetCounterConfig(hHS,0,dwCNTmode,dwCNTInitValue,0);
HS_SetSyncInScanParam(hHS,SyncInheader,SyInChNumArray,SyInChTypeArray,SyInTypeNum,SY
NC_ENABE,0);
```

```
HS_StartAIScan (hHS);

ret=HS_GetSyncInBufferStatus(hHS,&BufferStatus,&ulFramelength);
if(ret==false){
printf("Error code 0x%x\r\n",HS_GetLastError());
}
else
{
if(ulFramelength)
{
DWORD *dwheaderbuf=NULL;

DWORD *wAIbuffer=NULL;
DWORD *wCNTbuffer=NULL;

dwheaderbuf=new DWORD[ulFramelength];
for(int i=0;i<SyInTypeNum;i++)
{
switch(SyInChTypeArray[i])
{
case SYNC_IN_AI_HEX: //2bytes
temp=ulFramelength*SyInChNumArray[i];
wAIbuffer=new DWORD[temp];
memset(wAIbuffer,0x0,sizeof(DWORD)*temp);
break;
case SYNC_IN_DWORD_CNT:     //4bytes
temp=ulFramelength*SyInChNumArray[i];
wCNTbuffer=new DWORD[temp];
memset(wCNTbuffer,0x0,sizeof(DWORD)*temp);
break;
     …
}
}
readsize=HS_GetSyncInBufferLV(hHS,dwheaderbuf,wAIbuffer,NULL,NULL,NULL,wCNTbuffer,NULL,NULL,ulFramelength);
if(readsize)
{
...
    }
}
}
HS_StopAIScan (hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
float[] HdataBuffer = new float[10000];
uint ulleng = 0;
ushort BufferStatus = 0;

hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.HSIO.HS_StartAIScan(hHS);
ret = HSDAQNet.HSIO.HS_GetAIBufferStatus(hHS, ref BufferStatus, ref ulleng);
if (ret == false)
{
Console.WriteLine(IP.ToString() + " Error code 0x" +
HSDAQNet.ErrHandling.GetLastError().ToString("x8"));
}
else
{
if (BufferStatus > 2) //AI buffer overflow
   {
     /*
     2:   AD_BUF_OVERFLOW
     4:   AD_SCAN_STOP
     8:   AD_DATA_SAMPLING_TIMEOUT
     */
        Console.WriteLine(IP.ToString() + " Error<" + BufferStatus + ">," + ulleng);      break;
   }
   if (ulleng == targetCnt)
   {
      readsize = HSDAQNet.HSIO.HS_GetAIBufferHex(hHS, HdataBuffer, ulleng);
}
}
HSDAQNet.HSIO.HS_StopAIScan(hHS);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.4.18. HS_ClearSyncInBuffer

Clear the buffer of synchronous input data acquisition on PC.

Syntax

C/C++

```
bool HS_ClearSyncInBuffer(
    HANDLE hobj
);
```

.Net

```
bool HS_ClearSyncInBuffer(
    IntPtr hobj
);
```

Parameters

Hobj

[in] A handle to the specified device opened by HS_Device_Create.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;

hHS = HS_Device_Create(“192.168.1.1”);
HS_ClearAIBuffer(hHS);
ret=HS_StartAIScan (hHS);
...//user-define code
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_ClearAIBuffer(hHS);

HSDAQNet.HSIO.HS_StartAIScan(hHS);
...  //user-define code
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.4.19. HS_GetSyncInTotalSamplingStatus

Read the status of PET-7H16M during synchronous input data acquisition.

Syntax

C/C++

```
bool HS_GetSyncInTotalSamplingStatus (
    HANDLE hobj,
    unsigned long * totalReadCnt,
    unsigned int * SamplingStatus
);
```

.Net

```
bool HS_GetSyncInTotalSamplingStatus (
    IntPtr hobj,
    ref UInt32 totalReadCnt,
    ref UInt32 triggerStatus
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

totalReadCnt

[out] The count of the sampling data stored in the memory on the PET-7H16M module

SamplingStatus

[out] The trigger status of PET-7H16M module in data sampling

1: The digital signal is triggered in the pre-trigger mode

0: The signal isn't triggered.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

-

Remarks

-

2.4.20. HS_SetAIAnalogTriggerParam

Set the Analog threshold trigger parameter for High-speed data acquisition module.

Syntax

C/C++

```
bool    HS_SetAIAnalogTriggerParam(
    HANDLE obj,
    int analogmode,
    bool En_Channel[],
    float hightriglevel[],
    float lowtriglevel[],
    int totalSetchannel,
    unsigned long leftsidecnt,
    unsigned long rightsidecnt,
    unsigned long RESERVED
);
```

.Net

```
bool HS_ SetAIAnalogTriggerParam (
    IntPtr hobj,
    int analogmode,
    char[] En_Channel,
    float[] hightriglevel,
    float[] lowtriglevel,
    UInt32 leftsidecnt,
    UInt32 rightsidecnt,
    UInt32 RESERVED
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

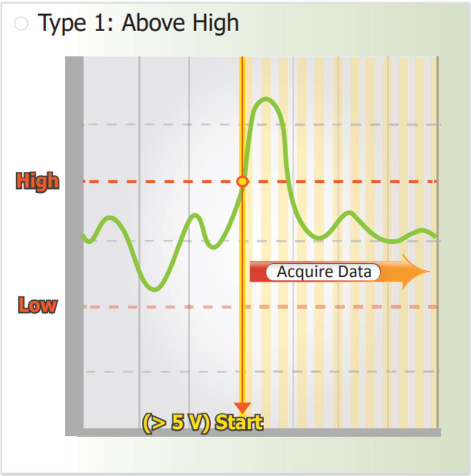
analogmode

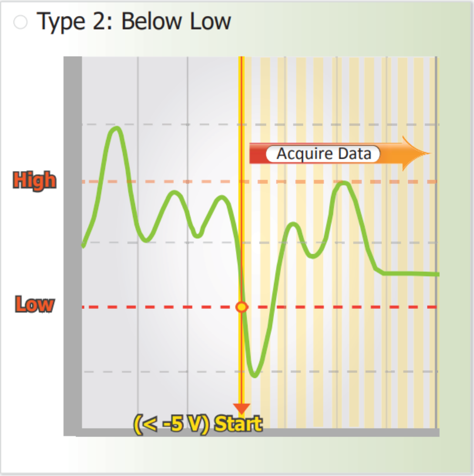
[in] : Set Analog threshold trigger mode

(0 : Above high,   1 : Below low,   2 : Leave-region,   3 : Entry-region)

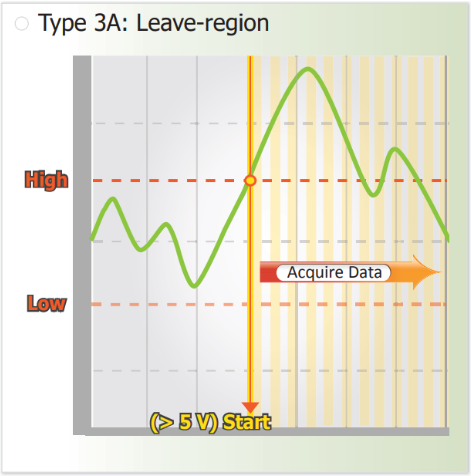
Above High: The signal is triggered above the high level and collects N data.

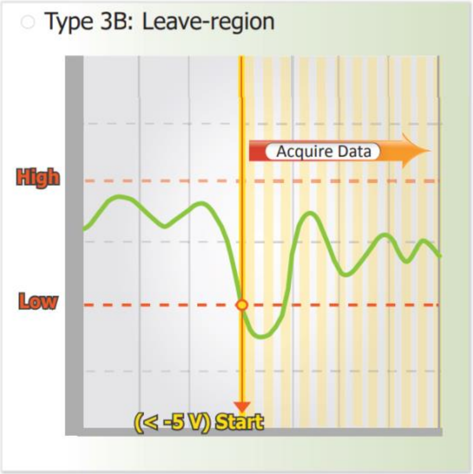
Below Low : The signal is triggered below the low level and collects N data



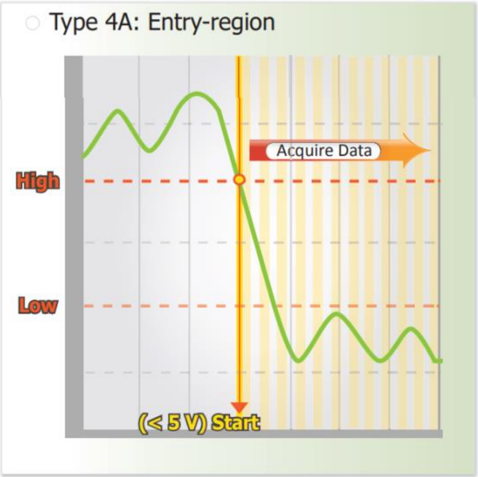


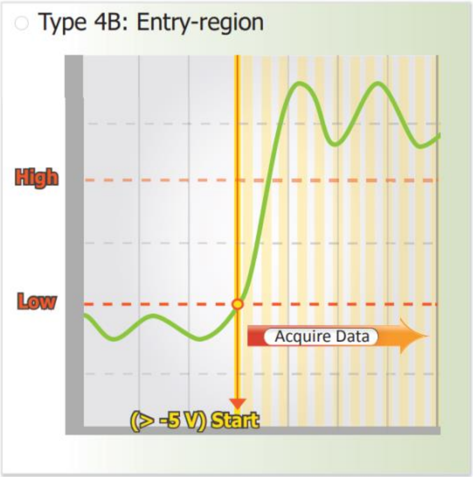
Leave-region : Trigger when the signal leaves the high and low level region, collect N data





Entry-region : Trigger when the signal enters the high and low level region, collect N data





En_Channel

[in] Enable/Disable Analog threshold trigger function for each channel, and one element of the array represents an AI channel.

hightriglevel

[in] The float array is used for set the high level value for each AI channel.

lowtriglevel

[in] The float array is used for set the low level value for each AI channel.

totalSetchannel

[in] set the array length for En_Channel/ hightriglevel/ lowtriglevel array

leftsidecnt

[in] Set the number of AI scan target count before triggered.

rightsidecnt

[in] Set the number of AI scan target count after triggered.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
short chCnt=8;              //scan channel is 8
short useGain=0;              //AI input type is 0 (+/- 5V)
short extriggMode= 6;              //6 : Analog threshold trigger Mode
long sampleRate=1000;              // sampling rate is 1KHz
unsigned long targetCnt=400;              // target count is 400, In Analog Input Mode, the
targetCnt value must equal to leftsidecnt and rightsidecnt value
short DataTransMethod=0;
short AutoRun=0;
int analogmode=2;              // Analog threshold mode sets to Entry-region
bool En_Channel[8]={1,1,1,1,1,1,1,1} //Enable all AI channels for Analog threshold trigger
float hightriglevel[8]={4.0,4.0,4.0,4.0,4.0,4.0,4.0,4.0};
//set high level value for all AI channels
float lowtriglevel[8]= {1.0,1.0,1.0,1.0,1.0,1.0,1.0,1.0};
//set Low level value for all AI channels
unsigned long leftsidecnt=200; // target count is 200 before triggered
unsigned long rightsidecnt=200; // target count is 200 after triggered

hHS = HS_Device_Create(“192.168.1.1”);
ret=HS_SetAIScanParam(hHS, chCnt, useGain, extriggMode, sampleRate, targetCnt,
DataTransMethod,AutoRun);
ret =
HS_SetAIAnalogTriggerParam(hHS,analogmode,En_Channel,hightriglevel,lowtriglevel,8,leftsidec
nt,rightsidecnt,0);
...
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
short ChCnt = 8;               //scan channel is 8
short Gain=0;              //AI input type is 0 (+/- 5V)
short TriggerMode = 6;              //Analog threshold Trigger
int sampleRate = 1000;              // sampling rate is 1KHz
Uint32 targetCnt = 400;              // target count is 400, In Analog Input Mode, the targetCnt
value must equal to leftsidecnt and rightsidecnt value 0
short DataTransMethod = 0;
short AutoRun = 0;
short AItriggmode=2;              //AI trigger mode sets to Entry-region
char[] Ch_En_arr = new char[] {1,1,1,1,1,1,1,1};
float[] HighLevel_arr = new float[] {4.0,4.0,4.0,4.0,4.0,4.0,4.0,4.0};
//set high level value for all AI channels
float[] LowLevel_arr = new float[] {1.0,1.0,1.0,1.0,1.0,1.0,1.0,1.0};
//set Low level value for all AI channels
UInt32 leftsidecnt=200;              // target count is 200 before triggered
UInt32 rightsidecnt=200;              // target count is 200 after triggered

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.HSIO.HS_SetAIScanParam(hHS, ChCnt, Gain, TrigMode, sampleRate, targetCnt,
DataTransMethod, AutoRun);
HSDAQNet.HSIO.HS_SetAIAnalogTriggerParam (hHS, AItriggmode , Ch_En_arr, HighLevel_arr,
LowLevel_arr,8, leftsidecnt, rightsidecnt, (uint)0)
...
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

- In the Analog threshold trigger mode, Use HS_SetAIScanParam function to set the triggerMode (4th parameter of HS_SetAIScanParam) to 6.
- In the Analog threshold trigger mode, the targetCnt value (6th parameter of HS_SetAIScanParam) must be equal to the total value of leftsidecnt (AI scan target count before triggered, 6th parameter of HS_SetAIAnalogTriggerParam) and rightsidecnt (AI scan target count after triggered, 7th parameter of HS_SetAIAnalogTriggerParam).

2.4.21. HS_GetAIAnalogTriggerParam

Get the AI trigger parameter for High-speed data acquisition module.

Syntax

C/C++

```
bool    HS_GetAIAnalogTriggerParam(
    HANDLE obj,
    Int* analogmode,
    bool En_Channel[],
    float hightriglevel[],
    float lowtriglevel[],
    int totalSetchannel,
    unsigned long* leftsidecnt,
    unsigned long* rightsidecnt,
    unsigned long* RESERVED
);
```

.Net

```
bool HS_GetAIAnalogTriggerParam (
    IntPtr hobj,
    Ref int analogmode,
    bool[] En_Channel,
    float[] hightriglevel,
    float[] lowtriglevel,
    ref UInt32 leftsidecnt,
    ref UInt32 rightsidecnt,
    ref UInt32 RESERVED
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

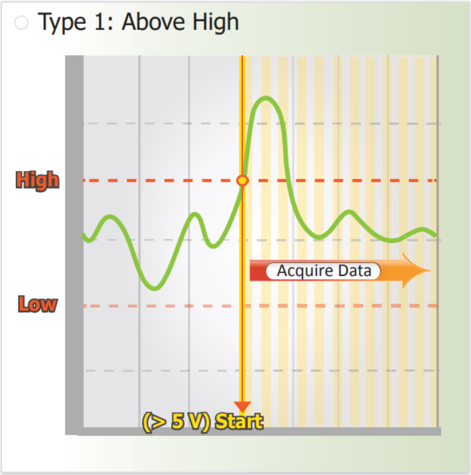
analogmode

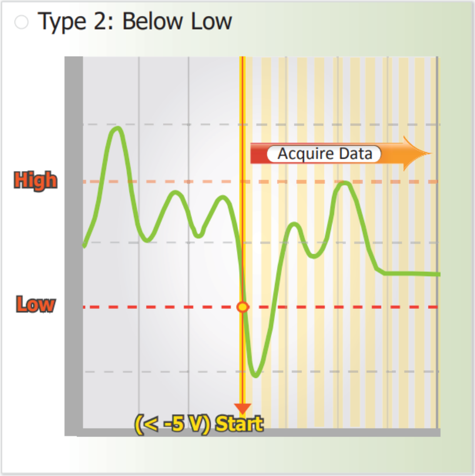
[in] : Set Analog threshold trigger mode

(0 : Above high, 1 : Below low, 2 : Leave-region, 3 : Entry-region)

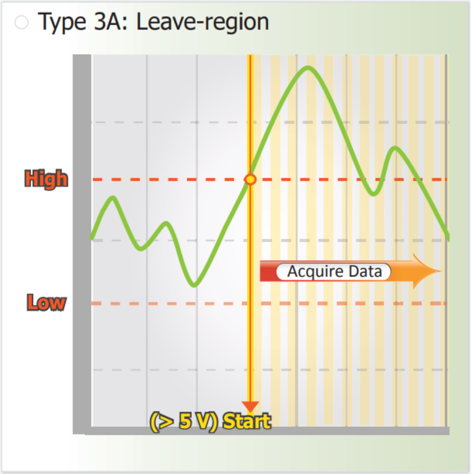
Above High: The signal is triggered above the high level and collects N data.

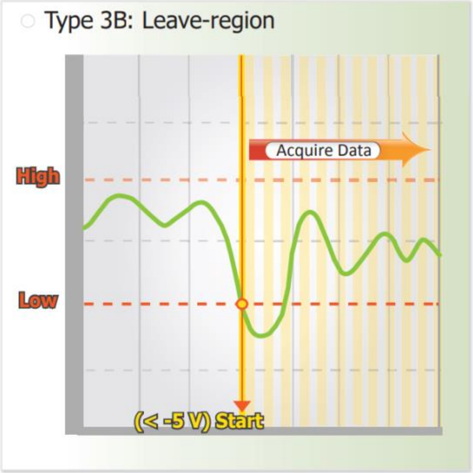
Below Low : The signal is triggered below the low level and collects N data



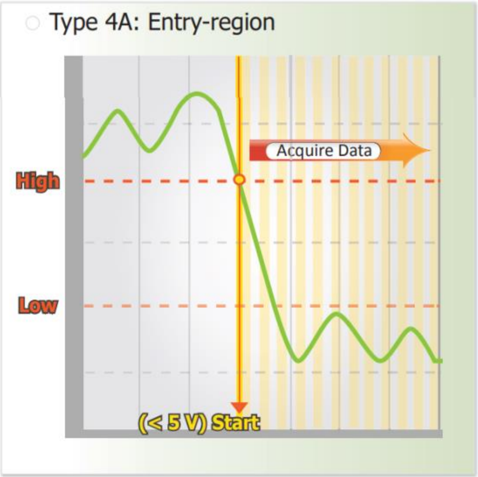


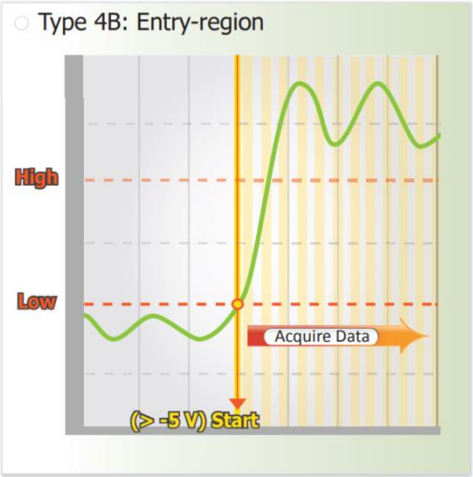
Leave-region : Trigger when the signal leaves the high and low level region, collect N data





Entry-region : Trigger when the signal enters the high and low level region, collect N data





En_Channel

[Out] Get the Enable/Disable status of Analog threshold trigger function for each channel, and one element of the array represents an AI channel.

hightriglevel

[in] The float array is used for get the high level value for each AI channel.

lowtriglevel

[in] The float array is used for get the low level value for each AI channel.

totalSetchannel

[in] set the array length for En_Channel/ hightriglevel/ lowtriglevel array

leftsidecnt

[in] Get the number of AI scan target count before triggered.

rightsidecnt

[in] Get the number of AI scan target count after triggered.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
short chCnt=0;
short useGain=0;
short extriggMode=0;
long sampleRate=0;
unsigned long targetCnt=0;
short DataTransMethod=0;
short AutoRun=0;
int analogmode=0;
bool En_Channel[8];
float hightriglevel[8];
float lowtriglevel[8];
unsigned long leftsidecnt=0;
unsigned long rightsidecnt=0;

hHS = HS_Device_Create("192.168.1.1");
HS_GetAIScanParam(hHS, &chCnt, &useGain, &extriggMode, &sampleRate, &targetCnt,
&DataTransMethod, &AutoRun);

If(extriggMode==6) //Analog Input trigger
HS_GetAIAnalogTriggerParam(hHS,&analogmode,En_Channel,hightriglevel,lowtriglevel,8,&leftsidecnt,&rightsidecnt,0);
...
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
short rChCnt = 0;
short rGain=0;
short rTrigMode = 0;
int rsampleRate = 0;
UInt32 rtargetCnt = 0;
short rDataTransMethod = 0;
short rAutoRun = 0;
short AItriggmode=0;
char[] Ch_En_arr;
float[] HighLevel_arr;
float[] LowLevel_arr;
UInt32 leftsidecnt=0;
UInt32 rightsidecnt=0;
uint RESERVED=0;

hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.HSIO.HS_GetAIScanParam(hHS, ref rChCnt, ref rGain, ref rTrigMode, ref rsampleRate,
ref rtargetCnt, ref rDataTransMethod, ref rAutoRun);
If(rTrigMode ==6) //Analog threshold trigger
HSDAQNet.HSIO.HS_GetAIAnalogTriggerParam(hHS, ref analogmode, En_Channel, hightriglevel,
lowtriglevel, 8, ref    leftsidecnt, ref    rightsidecnt, ref    RESERVED)
...
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

In the Analog threshold trigger mode, Use HS_SetAIScanParam function to set the triggerMode (4th parameter of HS_SetAIScanParam) to 6.

2.4.22. HS_SetAIDelayTriggerParam

Set the delay trigger parameter for high speed data acquisition

Syntax

C/C++

```
bool HS_SetAIDelayTriggerParam (
    HANDLE hobj,
    unsigned long delaytime,
    unsigned long RESERVED
);
```

.Net

```
bool HS_SetAIDelayTriggerParam (
    IntPtr hobj,
    UInt32 delaytime,
    UInt32 RESERVED
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

delaytime

[in] Set the delay time for delay trigger, 5µs ~ 10s (1 unit: 1µs)

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
int chCnt=8;          //scan channel is 8
int useGain=0;              //AI input type is 0 (+/- 5V)
int TrigMode = 5;                 //5 : delay trigger
long sampleRate=1000;              // sampling rate is 1KHz
unsigned long targetCnt=1000;          // target count is 1000
int DataTransMethod=0;
int AutoRun=0;
unsigned long delaytime = 1000;               //Set delay timer to 1000μs
unsigned long Reserv = 0;

hHS = HS_Device_Create(“192.168.1.1”);
HS_SetAIScanParam(hHS, chCnt, useGain, TrigMode, sampleRate, targetCnt, DataTransMethod,
AutoRun);
ret = HS_SetAIDelayTriggerParam(hHS,delaytime,0);
//Set delay time of 1000μs for delay trigger mode
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
short ChCnt = 8;                    //scan channel is 8
short Gain=0;               //AI input type is 0 (+/- 5V)
short TriggerMode =    5;           //5 : delay trigger
int sampleRate = 1000;              // sampling rate is 1KHz
Uint32 targetCnt = 1000             // target count is 1000
short DataTransMethod = 0;
short AutoRun = 0;
UInt32 delaytime = 1000;            //Set delay timer to 1000µs
UInt32 Reserv = 0;

hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.HSIO.HS_SetAIScanParam(hHS, ChCnt, Gain, TriggerMode, sampleRate, targetCnt,
DataTransMethod, AutoRun);
HSDAQNet.HSIO.HS_SetAIDelayTriggerParam (hHS, delaytime, Reserv);
//Set delay time of 1000µs for delay trigger mode
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

In the delay trigger mode, Use HS_SetAIScanParam function to set the triggerMode (4th parameter of HS_SetAIScanParam) to 5.

2.4.23. HS_GetAIDelayTriggerParam

Get the delay trigger parameter for high speed data acquisition

Syntax

C/C++

```
bool HS_GetAIDelayTriggerParam (
    HANDLE hobj,
    unsigned long delaytime,
    unsigned long RESERVED //Reserved
    DWORD* reserved
);
```

.Net

```
bool HS_GetAIDelayTriggerParam (
    IntPtr hobj,
    UInt32 wChannel,
    ref UInt32 wMode,
    ref UInt32 dwValue,
    ref UInt32 reserved
);
```

Parameters

hobj

[in] A handle to the specified device opened by HS_Device_Create

delaytime

[out] Get the delay time of delay trigger, 5µs ~ 10s (1 unit: 1µs)

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
int chCnt=0;
int useGain=0;
int TrigMode = 0;
long sampleRate=0;
unsigned long targetCnt=0;
int DataTransMethod=0;
int AutoRun=0;
unsigned long delaytime = 0;
unsigned long Reserv = 0;

hHS = HS_Device_Create("192.168.1.1");
HS_GetAIScanParam(hHS, &chCnt, &useGain, &TrigMode, &sampleRate, &targetCnt,
&DataTransMethod, &AutoRun);
If(TrigMode==5)        // delay trigger
HS_GetAIDelayTriggerParam(hHS,&delaytime,& Reserv);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
short rChCnt = 0;
short rGain =0;
short rTrigMode = 0;
int rsampleRate = 0;
Uint32 rtargetCnt = 0;
short rDataTransMethod = 0;
short rAutoRun = 0;
UInt32 delaytime = 0;
UInt32 Reserv = 0;

hHS = HSDAQNet.Sys.HS_Device_Create("192.168.1.1");
HSDAQNet.HSIO.HS_GetAIScanParam(hHS, ref rChCnt, ref rGain, ref rTrigMode, ref rsampleRate,
ref rtargetCnt, ref rDataTransMethod, ref rAutoRun);
If(rTrigMode ==5)            // delay trigger
HSDAQNet.HSIO.HS_GetAIDelayTriggerParam (hHS,ref delaytime, ref Reserv);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

In the delay trigger mode, Use the HS_SetAIScanParam function to set the triggerMode (4th parameter of HS_SetAIScanParam) to 5.

2.5. Data Logger API

This chapter describes how to use the data logger API in VC/.NET programs.
The High-speed data acquisition module is equipped with a data logger function. The data recorded by the High-speed data acquisition module can be saved as a data logger file with different file types (.bin , .txt, .tdms and etcs).

The HS_StartLogger function is used to start the data logging and save data to the local storage disk of host PC with the specified file type (The default file type is binary file).The HS_StopLogger function is used to stop the data logging.

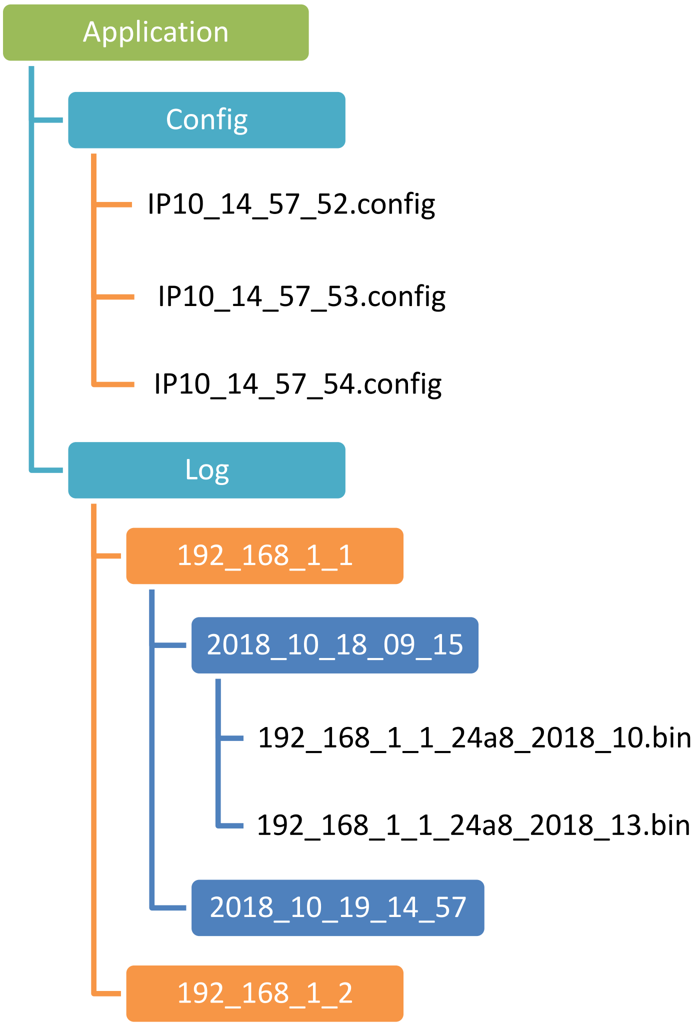
The data log file can be stored in the specified folder or in the application's folder (if no folder is specified), and the data directory structure is

Config - Configuration folder

This folder stores the configuration files. The configuration file (.config) records the sampling rate of the log file; scanning channel and other information belong to the data log file.

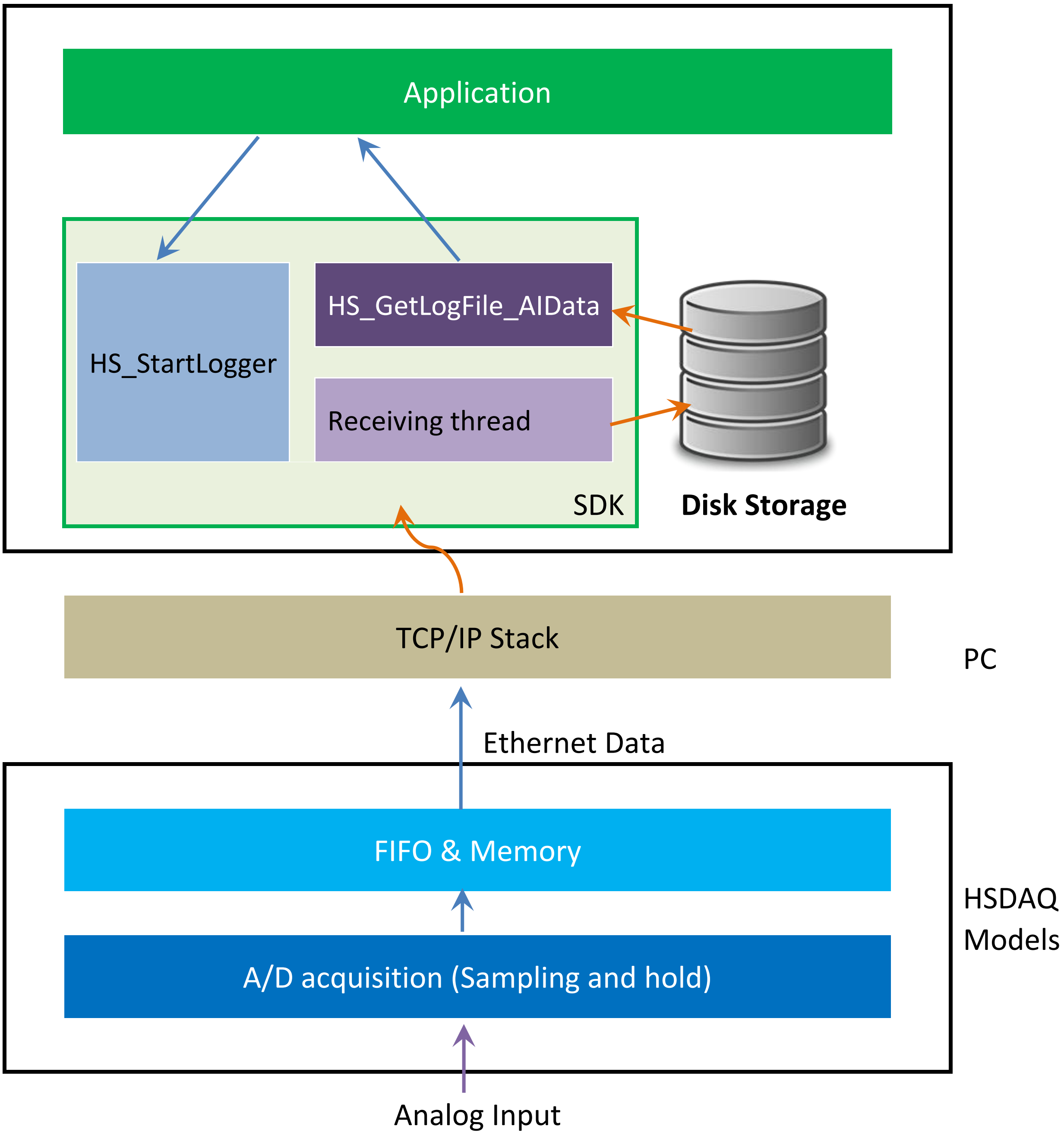
log - Data logger folder

This folder stores data log files. The directory in the folder is divided into three layers. The directory name of the first layer is the ip address of module, the directory name of the second layer is the date and time, and the default format is yyyy-mm-dd-hh-mm (yyyy: year, mm: month, dd: day, hh: hour, mm: minute). This directory name can be changed by calling HS_SetConfig() function. The third layer is used to place the data log file.



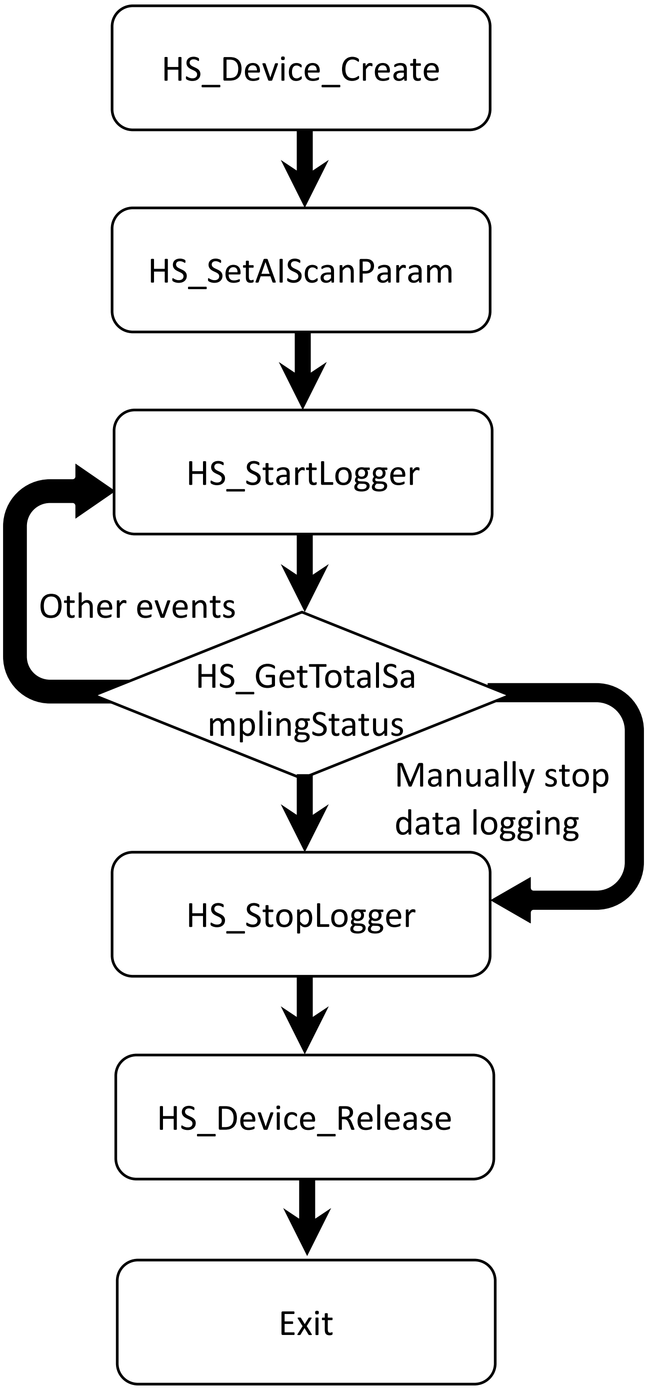
Use HS_StartLogger function to start the data logging and the thread of SDK will handle to receive the data and save them to the specified folder on storage disk of the host PC. Use the HS_GetAllLogFiles/ HS_GetLogFile_AIData/ HS_GetLogFile_AIDataHex functions to quickly find log files and read the log data.

Data Flow Chart



Continuous Mode Acquisition

API function call process chart



Create a connection to the device and initialize the device

Set the AI scan parameter

- Sampling rate <=30 kHz (PET-7H16M)
- Trigger mode = 1 (External CLK AD)

Start data acquisition of scanning AI channel log data

Obtain the acquisition status of the data recording process

An error occurred during the data recording process

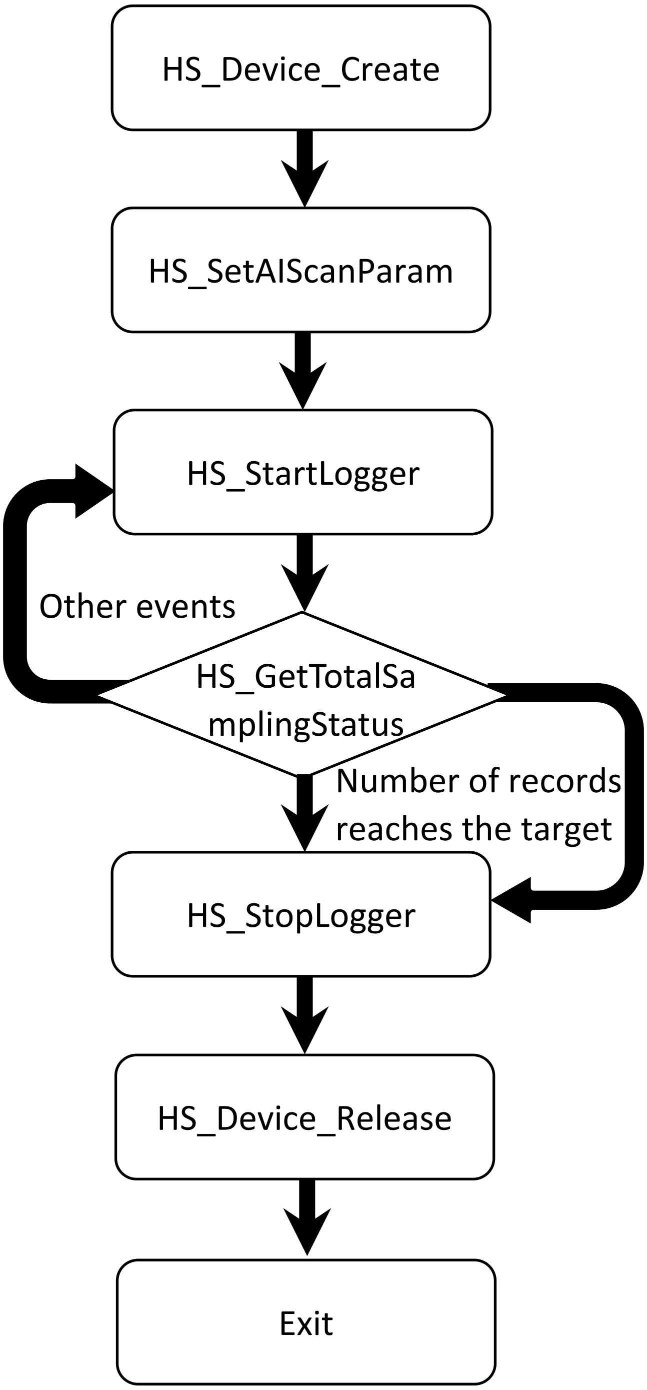
Stop data logging

Release the device from system

Exit

N Sample Mode Acquisition

API function call process chart



Create a connection to the device and initialize the device

Set the AI scan parameter

- Sampling rate: 1 ~ 200 kHz (PET-7H16M)
- Trigger mode = Any (Any trigger mode)

Start data acquisition of scanning AI channel

Obtain the acquisition status of the data recording process

An error occurred during the data recording process

Stop data logging

Release the device from system

Exit

Supported Models

The table below lists available data logger functions and their supported models.

Models APIs	PET-7H16M	PET-7H24M	PET-AR400
HS_StartLogger	√	√	√
HS_StartLoggerW	√	√	√
HS_StopLogger	√	√	√
HS_GetAllLogFiles	√	√	√
HS_LogFile_Open_byIndex	√	√	√
HS_LogFile_Open	√	√	√
HS_LogFile_OpenW	√	√	√
HS_LogFile_Close	√	√	√
HS_GetLogFileInfo	√	√	√
HS_GetLogFile_AIScanConfigInfo	√	√	√
HS_GetLogFile_GainOffset	√	√	-
HS_GetLogFile_AIScanSampleInfo	√	√	√
HS_GetLogFile_AIData	√	√	√
HS_GetLogFile_AIDataHex	√	√	√

Data logger Functions

The table below lists available data logger functions and their short description.

HSDAQ.dll	HSDAQNet.dll	Description
HS_StartLogger	DATALOG.HS_StartLogger	Start the data logging and save data to the specified folder on storage disk of the host PC
HS_StartLoggerW		HS_StartLoggerW is a wide-character version of HS_StartLogger. The specified folder can include wild-character.
HS_StopLogger	DATALOG.HS_StopLogger	Stop the data logging.
HS_GetAllLogFiles	DATALOG.HS_GetAllLogFiles	Search all log files in the specified folder with the specified file type and return the total number of files
HS_LogFile_Open_byIndex	DATALOG.HS_LogFile_Open_byIndex	Open a data log file by the index number searched by HS_GetAllLogFiles
HS_LogFile_Open	DATALOG.HS_LogFile_Open	Open a data log file by the specified path and file name.
HS_LogFile_OpenW		HS_LogFile_OpenW is a wide-character version of HS_LogFile_Open. The specified folder and file name can include wild-character.
HS_LogFile_Close	DATALOG.HS_LogFile_Close	Closes a data log file opened by HS_LogFile_Open.
HS_GetLogFileInfo	DATALOG.HS_GetLogFileInfo	Get the data log file information that include the file version and file size.
HS_GetLogFile_AIScanConfigInfo	DATALOG.HS_GetLogFile_AIScanConfigInfo	Get the data log file information regarding of the sampling rate, scan channels, pacer gain, and trigger mode.
HS_GetLogFile_GainOffset	DATALOG.HS_GetLogFile_GainOffset	Get the data log file information regarding of the gain/offset values for each AI channel.

HSDAQ.dll	HSDAQNet.dll	Description
HS_GetLogFile_AIScanSampleInfo	DATALOG.HS_GetLogFile_AIScanSampleInfo	Get the total sampling counts and the starting time of first triggered sampling data in the data log file
HS_GetLogFile_AIData	DATALOG.HS_GetLogFile_AIData	Reads AI input data from the text file
HS_GetLogFile_AIDataHex	DATALOG.HS_GetLogFile_AIDataHex	Read AI input data(Hex) from the binary file

2.5.1. HS_StartLogger/ HS_StartLoggerW

Start the data logging and save data to the specified folder on storage disk of the host PC.

Syntax

C++

```
bool HS_StartLogger (
    HANDLE hobj,
    char *folderpath,
    int interval,
    int filetype
);

bool HS_StartLoggerW (
    HANDLE hobj,
    TCHAR *folderpath,
    int interval,
    int filetype
);
```

.Net

```
bool HS_ StartLogger (
    IntPtr hobj,
    string folderpath,
    int interval,
    int filetype
);
```

Parameters

hobj

[in] A handle to the HSDAQ model created by HS_Device_Create.

folderpath

[in] The specified folder for saving the data log file. If NULL, The data log file will be saved to the current folder where the application is running

interval

[in] Specifies the interval time for changing to next file , in mintues.

filetype

[in] File type

0: binary file (.bin)

1: text file (.txt)

3: TDMS float file (.tdm)

4: TDMS hex file (.tdm)

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
HS_StartLogger(hHS,NULL,2,0);
// The data log file (binary type) will be saved to the current folder where the application is
running , 2 minutes of interval for changing to next file
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
ulong uiDO =0x33;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.DATALOG.HS_StartLogger (hHS,NULL,2,0);
// The data log file (binary type) will be saved to the current folder where the application is
running , 2 minutes of interval for changing to next file
HSDAQNet.Sys.HS_Device_Release (hHS);
```

Remarks

Use HS_StartLogger function to start the data logging. The data will save to the specified folder on storage disk of the host PC. If file type sets to 0 (binary file), the data will be saved the binary file (raw data) to the specified folder. If set to 1 (text file), the data will be calibrated and then saved to the text file (.txt file) to the specified folder. If set to 3(tdm float file), the data will be calibrated and then saved to the tdms file (.tdm file).If set to 4(tdm hex file), the data will be calibrated hex value and then saved to the tdms file (.tdm file).

2.5.2. HS_StopLogger

Stop the data logging.

Syntax

C++

```
bool HS_StopLogger (
    HANDLE hobj,
);
```

.Net

```
bool HS_ StopLogger (
    IntPtr hobj,
);
```

Parameters

hobj

[in] A handle to the HSDAQ model created by HS_Device_Create.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hHS;
hHS = HS_Device_Create(“192.168.1.1”);
HS_StartLogger(hHS,NULL,2,0);
// The data log file (binary type) will be saved to the current folder where the application is running , 2 minutes of interval for changing to next file
...
HS_StopLogger(hHS);
HS_Device_Release (hHS);
```

[C#]

```
IntPtr hHS;
ulong uiDO =0x33;
hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
HSDAQNet.DATALOG.HS_StartLogger (hHS,NULL,2,0);
// The data log file (binary type) will be saved to the current folder where the application is running , 2 minutes of interval for changing to next file
HSDAQNet.DATALOG.HS_StopLogger (hHS);
HSDAQNet.Sys.HS_Device_Release(hHS);
```

Remarks

-

2.5.3. HS_GetAllLogFiles/ HS_GetAllLogFilesW

Search all log files in the specified folder with the specified file type and return the total number of files.

Syntax

C++

```
int HS_GetAllLogFilesW (
    TCHAR *folderpath,
    int filetype
);
```

.Net

```
int HS_GetAllLogFiles (
    string folderpath,
    int filetype
);
```

Parameters

folderpath

[in] Specify the folder path where the data log files are saved. If NULL, the current folder where the application is running will be the specified for searching.

filetype

[in] File type

0: binary file (.bin)

1: text file (.txt)

3: TDMS float file (.tdm)

4: TDMS hex file (.tdm)

Return Values

If the function succeeds, the return value is total number of the files.

If the function fails, the return value is 0.

Examples

[C]

```
int ind=HS_GetAllLogFilesW(NULL,0);
//Search log files of binary type in the current folder where the application is running
```

[C#]

```
Int ind=HSDAQNet.DATALOG.HS_GetAllLogFiles (NULL,0);
//Search log files of binary type in the current folder where the application is running
```

Remarks

-

2.5.4. HS_LogFile_Open_byIndex/ HS_LogFile_Open_byIndexW

Open a data log file and corresponding configuration settings by the index number searched by HS_GetAllLogFiles() function.

Syntax

C++

```
HANDLE HS_LogFile_Open_byIndexW (
    int index,
    TCHAR *getfullFilename,
);
```

.Net

```
IntPtr HS_LogFile_Open_byIndex (
    int index,
    string getfullFilename
);
```

Parameters

index

[in] The index number searched by HS_GetAllLogFilesW() function.

getfullFilename

[in] Retrieve the full path and name of the log file found by the search index number.

Return Values

If the function succeeds, the return value is an open handle to the specified log file.

If the function fails, the return value is NULL.

Examples

[C]

```
HANDLE hlf;
TCHAR tcgetfulfilelPath[MAX_PATH]={0};
int ind=HS_GetAllLogFilesW(NULL,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
hlf=HS_LogFile_Open_byIndexW(i,tcgetfulfilelPath);
...//user-define code
HS_LogFile_Close(hlf);
}
}
```

[C#]

```
IntPtr hlf;
String path = Directory.GetCurrentDirectory();
int ind= HSDAQNet.DATALOG.HS_GetAllLogFiles (path,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
hlf= HSDAQNet.DATALOG.HS_LogFile_Open_byIndex(i, path);
...//user-define code
HSDAQNet.DATALOG.HS_LogFile_Close(hlf);
}
}
```

Remarks

Before calling this function, It must call HS_GetAllLogFilesW() function to search all log files in the specified folder.

2.5.5. HS_LogFile_Open / HS_LogFile_OpenW

Open a data log file and corresponding configuration settings by the specified path and file name.

Syntax

C++

```
HANDLE HS_LogFile_Open (
    char *fullFilename
);

HANDLE HS_LogFile_OpenW (
    TCHAR *fullFilename,
);
```

.Net

```
IntPtr HS_LogFile_Open (
    string fullFilename
);
```

Parameters

fullFilename

[in] Specify the full path and name of the log file.

Return Values

If the function succeeds, the return value is an open handle to the specified log file.

If the function fails, the return value is NULL.

Examples

[C]

```
HANDLE hlf;
hlf=HS_LogFile_OpenW("D:\\Datalogger\\10_1_107_125\\2018_12_14_13_37\\10_1_107_125
_9d06_2018_12_14_13_37_59.bin")
```

[C#]

```
IntPtr
hLf=HSDAQNet.DATALOG.HS_LogFile_Open("D:\\Datalogger\\10_1_107_125\\2018_12_14_13_
37\\10_1_107_125_9d06_2018_12_14_13_37_59.bin");
```

Remarks

-

2.5.6. HS_LogFile_Close

Close a valid handle of a log file opened by HS_LogFile_Open or HS_LogFile_Open_byIndex

Syntax

C++

```
bool HS_LogFile_Close (
    HANDLE hobj
);
```

.Net

```
bool HS_LogFile_Close (
    IntPtr hobj
);
```

Parameters

hobj

[in] A handle to the specified log file opened by HS_LogFile_Open or HS_LogFile_Open_byIndex.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hlf;
TCHAR tcgetfulfilelPath[MAX_PATH]={0};
int ind=HS_GetAllLogFilesW(NULL,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
    for(int i=0;i<ind;i++)
    {
hlf=HS_LogFile_Open_byIndexW(i,tcgetfulfilelPath);
...//user-define code
HS_LogFile_Close(hlf);
}
}
```

[C#]

```
IntPtr hlf;
String path = Directory.GetCurrentDirectory();
int ind= HSDAQNet.DATALOG.HS_GetAllLogFiles (path,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
    for(int i=0;i<ind;i++)
    {
hlf= HSDAQNet.DATALOG.HS_LogFile_Open_byIndex(i, path);
...//user-define code
HSDAQNet.DATALOG.HS_LogFile_Close(hlf);
}
}
```

Remarks

-

2.5.7. HS_GetLogFileInfo

Get the data log file information that include the file version and file size.

Syntax

C++

```
bool HS_GetLogFileInfo (
    HANDLE hobj,
    DWORD *filesize,
    Int *filetype,
    Int *fileversion
);
```

.Net

```
bool HS_GetLogFileInfo (
    IntPtr hobj,
    ref UInt32 filesize,
    ref int filetype,
    ref int fileversion
);
```

Parameters

hobj

[in] A handle to the specified log file opened by HS_LogFile_Open or HS_LogFile_Open_byIndex

filesize

[out] The size in bytes of the specified log file

filetype

[out] The file type of the specified log file

fileversion

[out] The version of the specified log file

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hlf;
TCHAR tcgetfulfilelPath[MAX_PATH]={0};
int ind=HS_GetAllLogFilesW(NULL,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
hlf=HS_LogFile_Open_byIndexW(i,tcgetfulfilelPath);
DWORD filesize;
int filetype;
int fileversion;
HS_GetLogFileInfo(hlf,&filesize,&filetype,&fileversion);
HS_LogFile_Close(hlf);
}
}
```

[C#]

```
IntPtr hlf;
String path = Directory.GetCurrentDirectory();
int ind= HSDAQNet.DATALOG.HS_GetAllLogFiles (path,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
hlf= HSDAQNet.DATALOG.HS_LogFile_Open_byIndex(i, path)
Uint32 filesize;
int filetype;
int fileversion;
HSDAQNet.DATALOG.HS_GetLogFileInfo(hlf,ref filesize,ref filetype,ref fileversion);
HSDAQNet.DATALOG.HS_LogFile_Close(hlf);
}
}
```

Remarks

-

2.5.8. HS_GetLogFile_AIScanConfigInfo

Get the AI scan information of the data log file regarding of the sampling rate, scan channels, pacer gain, and trigger mode.

Syntax

C++

```
bool HS_GetLogFile_AIScanConfigInfo (
    HANDLE hobj,
    short * pacerChCnt,
    short * pacerGain,
    short * triggerMode,
    long * sampleRate,
    short * DataTransMethod,
);
```

.Net

```
bool HS_GetLogFile_AIScanConfigInfo (
    IntPtr hobj,
    ref short pacerChCnt,
    ref short pacerGain,
    ref short triggerMode,
    ref long sampleRate,
    ref short DataTransMethod
);
```

Parameters

hobj

[in] A handle to the specified log file opened by HS_LogFile_Open or HS_LogFile_Open_byIndex

pacerchCnt

[out] Get the AI scan channels that logged in the specified log file.

The AI scan channel range for PET-7H16M is 1~8.

The AI scan channel range for PET-7H24M/PET-AR400 is 1~4.

pacerGain

[out] Get the AI input type that logged in the specified log file

The gain range for PET-7H16M is

0: +/- 5V

1: +/- 10V

The gain range for PET-7H24M is

0: +/- 10V

1: +/- 5V

2: +/- 2.5V

3: +/- 1.25V

4: +/- 0.625V

5: +/- 300mV

6: +/- 150mV

7: +/- 75mV

8: +/- 40mV

9: +/- 20mV

The gain range for PET-AR400 is

0: +/- 10V

triggermode

[out] Get the AI scan trigger mode that logged in the specified log file

For PET-7H16M:

0: disable external trigger (software AD),

1: external clock trigger,

2: external post-trigger,

3: external pre-trigger

For PET-7H24M/PET-AR400:

0: disable external trigger (software AD) ,

1: analog input trigger

sampleRate

[out] Get the AI scan sampling rate that logged in the specified log file

The range of the AI scan sampling rate for PET-7H16M is 1~ 200 KHz.

The range of the AI scan sampling rate for PET-7H24M is 20 ~ 128 KHz.

The range of the AI scan sampling rate for PET-AR400 is 12.8k/16k/32k/64k/128 KHz.

DataTransMethod

[out] Get the data transmission method that logged in the specified log file

0: TCP socket

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hlf;
TCHAR tcgetfulfilelPath[MAX_PATH]={0};
short gchCnt=0;
short guseGain=0;
short gextriggMode=0;
long gsampleRate=0;
short gDataTransMethod;

int ind=HS_GetAllLogFilesW(NULL,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
hlf=HS_LogFile_Open_byIndexW(i,tcgetfulfilelPath);
HS_GetLogFile_AIScanConfigInfo(hlf,&gchCnt,&guseGain,&gextriggMode,&gsampleRate,&gDataTransMethod
HS_LogFile_Close(hlf);
}
}
```

[C#]

```
IntPtr hlf;
short gchCnt=0;
short guseGain=0;
short gextriggMode=0;
long gsampleRate=0;
short gDataTransMethod;

String path = Directory.GetCurrentDirectory();
int ind= HSDAQNet.DATALOG.HS_GetAllLogFiles (path,0);

//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
hlf= HSDAQNet.DATALOG.HS_LogFile_Open_byIndex(i, path)
HSDAQNet.DATALOG.HS_GetLogFile_AIScanConfigInfo(hlf,ref gchCnt,ref guseGain,ref
gextriggMode,ref gsampleRate,ref gDataTransMethod
HSDAQNet.DATALOG.HS_LogFile_Close(hlf);
}
}
```

Remarks

-

2.5.9. HS_GetLogFile_GainOffset

Get the information of the data log file regarding of the gain/offset values of the specified AI channel.

Syntax

C++

```
bool HS_GetLogFile_GainOffset(
    HANDLE hobj,
    int ch,
    unsigned short *gainVal,
    short *offsetVal,
);
```

.Net

```
bool HS_GetLogFile_GainOffset (
    intPtr hobj,
    int ch,
    ref short gainVal,
    ref short offsetVal
);
```

Parameters

hobj

[in] A handle to the specified log file opened by HS_LogFile_Open or HS_LogFile_Open_byIndex

ch

[in] Specifies the AI channel.

The AI channel for PET-7H16M is 0~7.

The AI channel for PET-7H24M is 0~3.

gainVal

[out] Get the gain value of the specified AI channel for calibrating the analog data that logged in the specified log file

offsetVal

[out] Get the offset value of the specified AI channel for calibrating the analog data that logged in the specified log file

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hlf;
TCHAR tcgetfulfilelPath[MAX_PATH]={0};
int ind=HS_GetAllLogFilesW(NULL,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
hlf=HS_LogFile_Open_byIndexW(i,tcgetfulfilelPath);
unsigned short gainVal=0;
short offsetVal=0;
for(int j=0;j<gchCnt;j++)
{
HS_GetLogFile_GainOffset(hlf,j, &gainVal, &offsetVal);
  ...
}
HS_LogFile_Close(hlf);
}
}
```

[C#]

```
IntPtr hlf;
String path = Directory.GetCurrentDirectory();
int ind= HSDAQNet.DATALOG.HS_GetAllLogFiles (path,0);

//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
    for(int i=0;i<ind;i++)
    {
ushort gainVal=0;
short offsetVal=0;

hlf= HSDAQNet.DATALOG.HS_LogFile_Open_byIndex(i, path)
for(int j=0;j<gchCnt;j++)
{
HSDAQNet.DATALOG.HS_GetLogFile_GainOffset(hlf,j, ref gainVal, ref offsetVal);
  …
}

HSDAQNet.DATALOG.HS_LogFile_Close(hlf);
}
}
```

Remarks

-

2.5.10. HS_GetLogFile_AIScanSampleInfo

Get the total sampling counts and the starting time of first triggered sampling data in the data log file.

Syntax

C++

```
bool HS_GetLogFile_AIScanSampleInfo(
    HANDLE hobj,
    DWORD *sampleCount,
    char *StartDate,
    char *StartTime,
);
```

.Net

```
bool HS_GetLogFile_AIScanSampleInfo(
    IntPtr hobj,
    ref UInt32 sampleCount,
    ref byte[] StartDate,
    ref byte[] StartTime
);
```

Parameters

hobj

[in] A handle to the specified log file opened by HS_LogFile_Open or HS_LogFile_Open_byIndex

sampleCount

[out] Get the total sampling count in the specified log file.

StartDate

[out] Get the date of first triggered sampling data in the specified log file.

StartTime

[out] Get the time of first triggered sampling data in the specified log file.

Return Values

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE. To get extended error information, call HS_GetLastError.

Examples

[C]

```
HANDLE hlf;
TCHAR tcgetfulfilelPath[MAX_PATH]={0};
int ind=HS_GetAllLogFilesW(NULL,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
hlf=HS_LogFile_Open_byIndexW(i,tcgetfulfilelPath);
DWORD samplecount;
char startdate[32],starttime[32];
HS_GetLogFile_AIScanSampleInfo(hlf,&samplecount,startdate,starttime);
HS_LogFile_Close(hlf);
}
}
```

[C#]

```
IntPtr hlf;
String path = Directory.GetCurrentDirectory();
int ind= HSDAQNet.DATALOG.HS_GetAllLogFiles (path,0);

//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
uint samplecount=0;
string startdate =””;
string starttime =””;

hlf= HSDAQNet.DATALOG.HS_LogFile_Open_byIndex(i, path)
HSDAQNet.DATALOG.HS_GetLogFile_AIScanSampleInfo(hlf,ref samplecount,ref startdate,ref
starttime);
HSDAQNet.DATALOG.HS_LogFile_Close(hlf);
}
}
```

Remarks

-

2.5.11. HS_GetLogFile_AIData

Read AI input data from the text file and TDMS file.

Syntax

C++

```
DWORD HS_GetLogFile_AIData(
    HANDLE hobj,
    int    StartIndex,
    DWORD count,
    float *fAIData,
);
```

.Net

```
UInt32 HS_GetLogFile_AIData(
    IntPtr hobj,
    int StartIndx,
    UInt32 count,
    float fAIData
);
```

Parameters

hobj

[in] A handle to the specified log file opened by HS_LogFile_Open or HS_LogFile_Open_byIndex

StartIndex

[out] The first sampling data to read from the log file.

count

[out] The number of sampling data to read from the log file.

fAIData

[out] The array contains the AI values (float value) that read back from the log file.

Return Values

The return value is the total number of sampling data actually read from the log file

Examples

[C]

```
HANDLE hlf;
TCHAR tcgetfulfilelPath[MAX_PATH]={0};
int ind=HS_GetAllLogFilesW(NULL,1);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
    for(int i=0;i<ind;i++)
    {
hlf=HS_LogFile_Open_byIndexW(i,tcgetfulfilelPath);
DWORD samplecount;
char startdate[32],starttime[32];
HS_GetLogFile_AIScanSampleInfo(hlf,&samplecount,startdate,starttime);
float *fdatabuff=( float *)malloc(sizeof(float)*samplecount);
HS_GetLogFile_AIData(hlf, 0, samplecount, fdatabuff);
HS_LogFile_Close(hlf);
}
}
```

[C#]

```
IntPtr hlf;
String path = Directory.GetCurrentDirectory();
int ind= HSDAQNet.DATALOG.HS_GetAllLogFiles (path,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
uint samplecount=0,targetCnt=1000;
string startdate ="";
string starttime ="";
hlf= HSDAQNet.DATALOG.HS_LogFile_Open_byIndex(i, path)
Uint32 samplecount;
float[] fdatabuff = new float[targetCnt];
HSDAQNet.DATALOG.HS_GetLogFile_AIScanSampleInfo(hlf,ref samplecount,ref startdate,ref
starttime);

HSDAQNet.DATALOG.HS_GetLogFile_AIData(hlf, 0, targetCnt, fdatabuff);
HSDAQNet.DATALOG.HS_LogFile_Close(hlf);
}
}
```

Remarks

-

2.5.12. HS_GetLogFile_AIDataHex

Read AI input data(Hex) from the binary file and TDMS file.

Syntax

C++

```
DWORD HS_GetLogFile_AIDataHex(
    HANDLE hobj,
    int    StartIndex,
    DWORD count,
    WORD *AIData,
);
```

.Net

```
UInt32 HS_GetLogFile_AIDataHex(
    IntPtr hobj,
    int StartIndx,
    UInt32 count,
    UInt32 AIData
);
```

Parameters

Hobj

[in] A handle to the specified log file opened by HS_LogFile_Open or HS_LogFile_Open_byIndex

StartIndex

[out] The first sampling data to read from the log file.

count

[out] The number of sampling data to read from the log file.

AIData

[out] The array contains the AI values (Hexadecimal value) that read back from the log file.

Return Values

The return value is the total number of sampling data actually read from the log file

Examples

[C]

```
HANDLE hlf;
TCHAR tcgetfulfilelPath[MAX_PATH]={0};
int ind=HS_GetAllLogFilesW(NULL,1);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
    for(int i=0;i<ind;i++)
    {
hlf=HS_LogFile_Open_byIndexW(i,tcgetfulfilelPath);
DWORD samplecount;
char startdate[32],starttime[32];
HS_GetLogFile_AIScanSampleInfo(hlf,&samplecount,startdate,starttime);
WORD *databuff=(WORD *)malloc(sizeof(WORD)*samplecount);
HS_GetLogFile_AIDataHEX(hlf, 0, samplecount, databuff);
HS_LogFile_Close(hlf);
}
}
```

[C#]

```
IntPtr hlf;
String path = Directory.GetCurrentDirectory();
int ind= HSDAQNet.DATALOG.HS_GetAllLogFiles (path,0);
//Search log files of binary type in the current folder where the application is running
if(ind>0)
{
   for(int i=0;i<ind;i++)
   {
uint samplecount=0,targetCnt=1000;
string startdate =””;
string starttime =””;
hlf= HSDAQNet.DATALOG.HS_LogFile_Open_byIndex(i, path)
Uint32 samplecount;
UInt32[] hdatabuff = new Uint32[targetCnt];
HSDAQNet.DATALOG.HS_GetLogFile_AIScanSampleInfo(hlf,ref samplecount,ref startdate,ref
starttime);

HSDAQNet.DATALOG.HS_GetLogFile_AIDataHEX(hlf, 0, targetCnt, hdatabuff);
HSDAQNet.DATALOG.HS_LogFile_Close(hlf);
}
}
```

Remarks

-

2.6. Error Handling API

The error handling functions enable you to receive and display error information for your application.

Supported Models

The table below lists available error handling functions and their supported models.

Models APIs	PET-7H16M	PET-7H24M	PET-AR400
HS_GetLastError	√	√	√
HS_SetLastError	√	√	√
HS_GetLastErrorMessage	√	√	√
HS_ClearLastError	√	√	√

Error Handling Functions

The table below lists available error handling functions and their short description.

HSDAQ.dll	HSDAQNet.dll	Description
HS_GetLastError	ErrHandling.GetLastError	Retrieve the last-error code value.
HS_SetLastError	ErrHandling.SetLastError	Set the last-error code.
HS_GetLastErrorMessage	ErrHandling.GetErrorMessage	Retrieve a message string.
HS_ClearLastError	ErrHandling.ClearLastError	Clear the last-error code.

2.6.1. HS_GetLastError

Retrieve the last-error code value.

Syntax

C++

```
DWORD HS_GetLastError();
```

.Net

```
uint GetLastError ();
```

Parameters

This function has no parameters.

Return Values

The Return Value section of each function page notes the conditions under which the function sets the last-error code.

Examples

-

Remarks

You should call the HS_GetLastError function immediately when a function's return value indicates that such a call will return useful data. That is because some functions call HS_SetLastError(0) when they succeed, wiping out the error code set by the most recently failed function.

For an example, please refer to HS_GetErrorMerrage in this chapter.

To obtain an error string for the error codes, use the HS_GetErrorMessage function. For a complete list of error codes, see Appendix A. System Error Code.

The following table lists the system error codes ranges for each function reference.

Error type	Description	Range
HS_ERR_SUCCESS	No error, success	0x00000
HS_ERR_UNKNOWN	A error which is undefined	0x00001
System	System API Error and WSAGetLastError	0x10000 ~
Memory	About memory access	0x14000 ~
DATA log	About Data logger	0x14100 ~
Watchdog	About watchdog	0x15000 ~
Device	About Device open and clos	0x17000 ~
IO	About IO modules	0x18000 ~
Users	For user	0x20000 ~

2.6.2. HS_SetLastError

Set the last-error code.

Syntax

C++

```
void HS_SetLastError(
    DWORD errno
);
```

.Net

```
void SetLastError (
    uint errno
);
```

Parameters

errno

[in] Specifies the last-error code.

Return Values

-

Examples

-

Remarks

Applications can optionally retrieve the value set by this function by using the HS_GetLastError function.

The error codes are defined as DWORD values. If you are defining an error code, ensure that your error code does not conflict with any defined error codes.

We recommend that your error code should be greater than 0x20000.

For more information about the definition of error codes, please refer to HS_GetLastError in this document.

2.6.3. HS_GetErrorMessage

Retrieve a message string.

Syntax

C++

```
void HS_GetErrorMessage(
    DWORD dwMessageID,
    LPTSTR lpBuffer
);
```

.Net

```
void GetErrorMessage (
    uint dwMessageID,
    string lpBuffer
);
```

Parameters

dwMessageID

[in] Specifies the 32-bit message identifier for the requested message.

lpBuffer

[out] A pointer to a buffer that receives the error message.

Return Values

-

Examples

[C]

```
HANDLE hHS;
float fAI=0;
BOOL err;
char strErr[32];

hHS = HS_Device_Create(“192.168.1.1”);
err = HS_ReadAI(hHS,0,&fAI);
if(err == FALSE)
{
   HS_GetErrorMessage(HS_GetLastError(), strErr);
printf("Read SRAM failure!. The error code is %x\n", HS_GetLastError());
}
...
```

[C#]

```
bool err;
IntPtr hHS;
float fAI=0;

hHS = HSDAQNet.Sys.HS_Device_Create(“192.168.1.1”);
err=HSDAQNet.IO.ReadAI(hHS,0,ref fAI);
if (err == false)
{
   Console.WriteLine(HSDAQNet.ErrHandling.GetErrorMessage(HSDAQNet.ErrHandling.GetLastE
rror()) + ". The error code is " +
   HSDAQNet.ErrHandling.GetLastError().ToString() + "\n");
}
...
```

Remarks

The HS_GetErrorMessage function can be used to obtain error message strings for the error codes returned by HS_GetLastError, as shown in the following example.

```
TCHAR Buffer[32];
HS_GetErrorMessage(HS_GetLastError(), Buffer);
MessageBox( NULL, Buffer, L"Error", MB_OK | MB_ICONINFORMATION );
```

2.6.4. HS_ClearLastError

Clear the last-error code.

Syntax

C++

```
void HS_ClearLastError();
```

.Net

```
void ClearLastError ();
```

Parameters

-

Return Values

-

Examples

-

Remarks

The HS_ClearLastError function clears the last error, that is, the application is treated as success.

Appendix

A. System Error Codes

This following table provides a list of system error code that is intended to be used by programmers so that the software they write can better deal with errors.
The error codes/error messages are returned by the HS_GetLastError/HS_GetErrorMessage function when one of the High-speed data acquisition module services functions fail.

The table below lists the system error codes and error messages. They are returned by the HS_GetLastError and HS_GetErrorMessage functions when many functions fails.

Error Message	Error Code	Description
HS_ERR_UNKNOWN	0x00001	Unknown Error
HS_ERR_UNKNOWN_MODULE	0x13003	Unknown Module
HS_ERR_FUNCTION_NOT_SUPPORT	0x13006	Function not supported
HS_ERR_MODULE_UNEXISTS	0x13007	Module doesn't exist
HS_ERR_FUNCTION_REPEAT_CALLED	0x13009	Function repeat call error
HS_ERR_INVALID_HANDLE_VALUE	0x13010	Invalid handle
HS_ERR_INVALID_PARAMETER	0x13012	Invalid parameter
HS_ERR_MEMORY_ALLOCATED	0x13014	Memory allocation error
HS_ERR_MEMORY_INVALID_SIZE	0x14008	Invalid memory size
HS_ERR_DATALOG_CONFIGFILE_NOFOUND	0x15002	Invalid configuration file or the configuration not found
HS_ERR_DEVICE_READ_TIMEOUT	0x17002	Read data from the device timeout
HS_ERR_DEVICE_RESPONSE	0x17003	Response from the device error
HS_ERR_DEVICE_UNDER_INPUT_RANGE	0x17004	Under input range
HS_ERR_DEVICE_EXCEED_INPUT_RANGE	0x17005	Exceed input range
HS_ERR_DEVICE_OPEN_FAILED	0x17006	Open the device fail
HS_ERR_DEVICE_INVALID_VALUE	0x17008	The input value is invalid

Error Message	Error Code	Description
HS_ERR_DEVICE_SEND	0x17010	Send data to the device error
HS_ERR_DEVICE_DATA_CONNECT	0x17011	Create a connection fail
HS_ERR_IO_NOT_SUPPORT	0x18001	The device is not supported
HS_ERR_IO_ID	0x18002	The device is not supported
HS_ERR_IO_SLOT	0x18003	Slot's value exceeds its range
HS_ERR_IO_CHANNEL	0x18004	Channel's value exceeds its range
HS_ERR_IO_GAIN	0x18005	Gain's value exceeds its range
HS_ERR_IO_VALUE_OUT_OF_RANGE	0x18007	I/O value is out of the range
HS_ERR_IO_CHANNEL_OUT_OF_RANGE	0x18008	I/O channel is out of the range
HS_ERR_IO_DO_CANNOT_OVERWRITE	0x18010	DO channel can't overwrite
HS_ERR_IO_AO_CANNOT_OVERWRITE	0x18011	AO channel can't overwrite
HS_ERR_IO_OPERATION_MODE	0x18012	Invalid I/O operation mode

B. Configuration Parameter Values

This following table provides a list of configuration type and the corresponding parameter values. The HS_GetConfig /HS_SetConfig functions are used to set the parameter value of configuration type for PET-7H16M/PET-7H24M.

Configuration Type	Parameter Values	Description
BOARD_CONFIG	-	Set the device configuration
IO_CONFIG	-	Set I/O configuration
HSDAQ_CONFIG	HSDAQ_CONNECT_TIMEOUT	Set TCP connection timeout
	AI_FILTER_AVERAGING	Set Oversample(only PET-7H16M)
DATALOG_CONFIG	LOGFOLDERTYPE	Set folder type for data logger
	LOGFILEMAXSIZE	Set maximum size of log file
DATA_RESPONSE_CONFIG	RMS_SOURCE_BASE	Set source base(45~500Hz)
RMS_EXT_DEVICE_GAIN	Channel	Set the external device gain

C. How to Read the Exported TDM File?

HSDAQ has rudimentary support for creating TDM files.
The TDM files can be created by using the HS_StartLogger/ HS_StartLoggerW function.

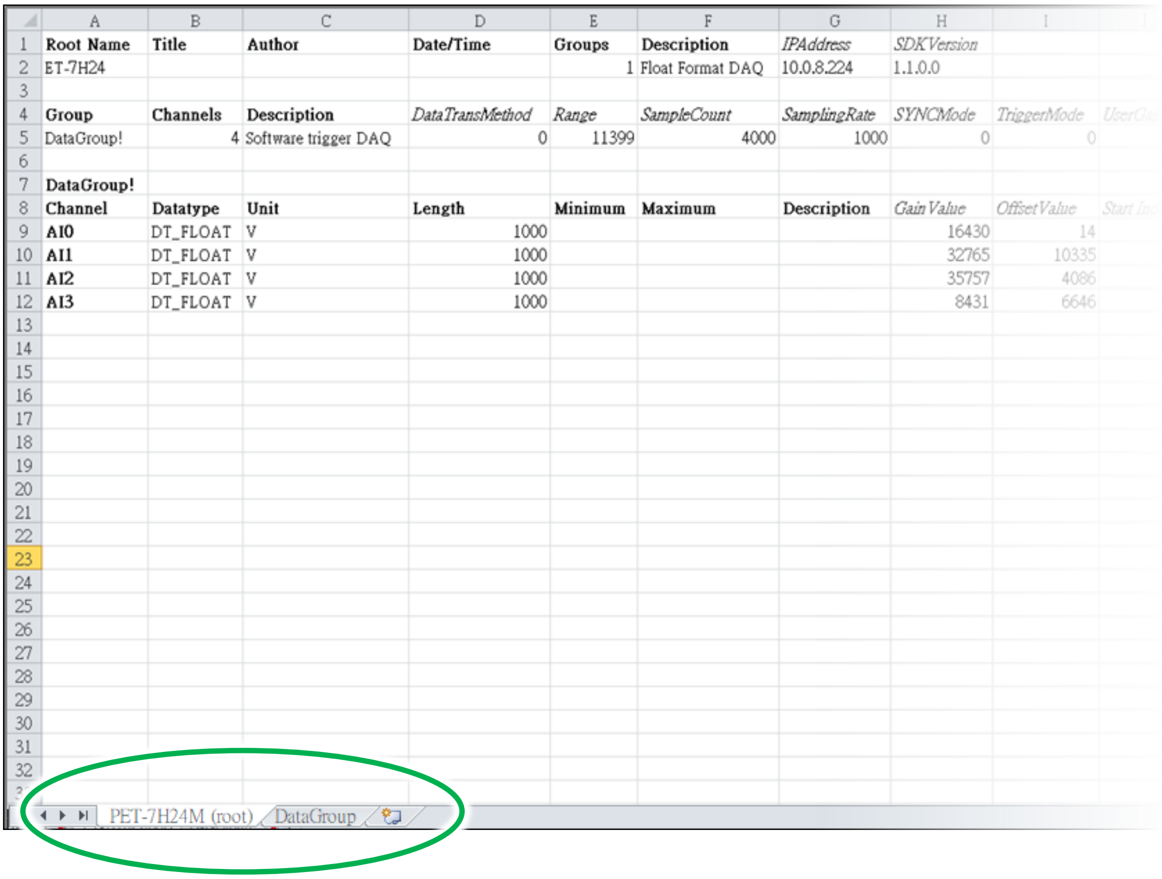
What is TDM Files?

Test Data Exchange Format (TDM) is a hybrid file format developed by National Instruments that combines binary storage and XML formatted ASCII data. The TDM file format saves the raw data that the measurement hardware acquires and the meta data in separate files. Meta data can be the name and unit of a measurement channel, the name of the author, and other information. The meta data is in the XML format with the .tdm extension. The raw data is in a compact binary format with the .tdx extension.

Reading TDM Files

.tdm and .tdx files are a pair. Both are required to be opened the files successfully. The TDM files can be found in the default path under the HSDAQ utility installation folder \HSDAQ_Utility\Log\"Module IP Address"

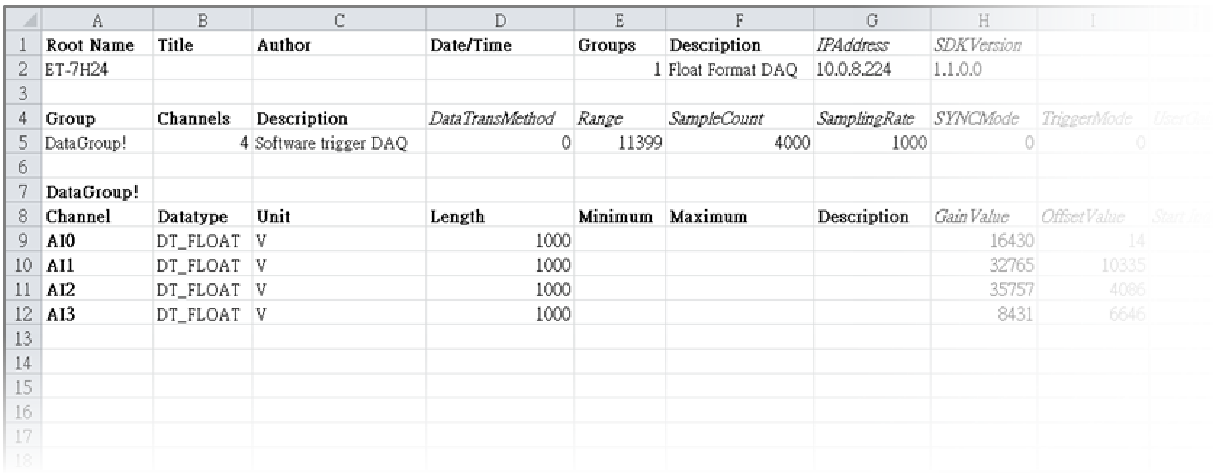
You can load the .tdm file into Excel. Each file has two data sheets, one is named "model name" (root) and another one is name Data Group!



	A	B	C	D	E	F	G	H	I	J
1	Root Name	Title	Author	Date/Time	Groups	Description	IPAddress	SDKVersion		
2	ET-7H24				1	Float Format DAQ	10.0.8.224	1.1.0.0		
3										
4	Group	Channels	Description	DataTransMethod	Range	SampleCount	SamplingRate	SYNCMode	TriggerMode	UserGa
5	DataGroup!	4	Software trigger DAQ	0	11399	4000	1000	0	0	
6										
7	DataGroup!									
8	Channel	Datatype	Unit	Length	Minimum	Maximum	Description	Gain Value	OffsetValue	Start In
9	AI0	DT_FLOAT	V	1000				16430	14	
10	AI1	DT_FLOAT	V	1000				32765	10335	
11	AI2	DT_FLOAT	V	1000				35757	4086	
12	AI3	DT_FLOAT	V	1000				8431	6646	

Viewing the File content

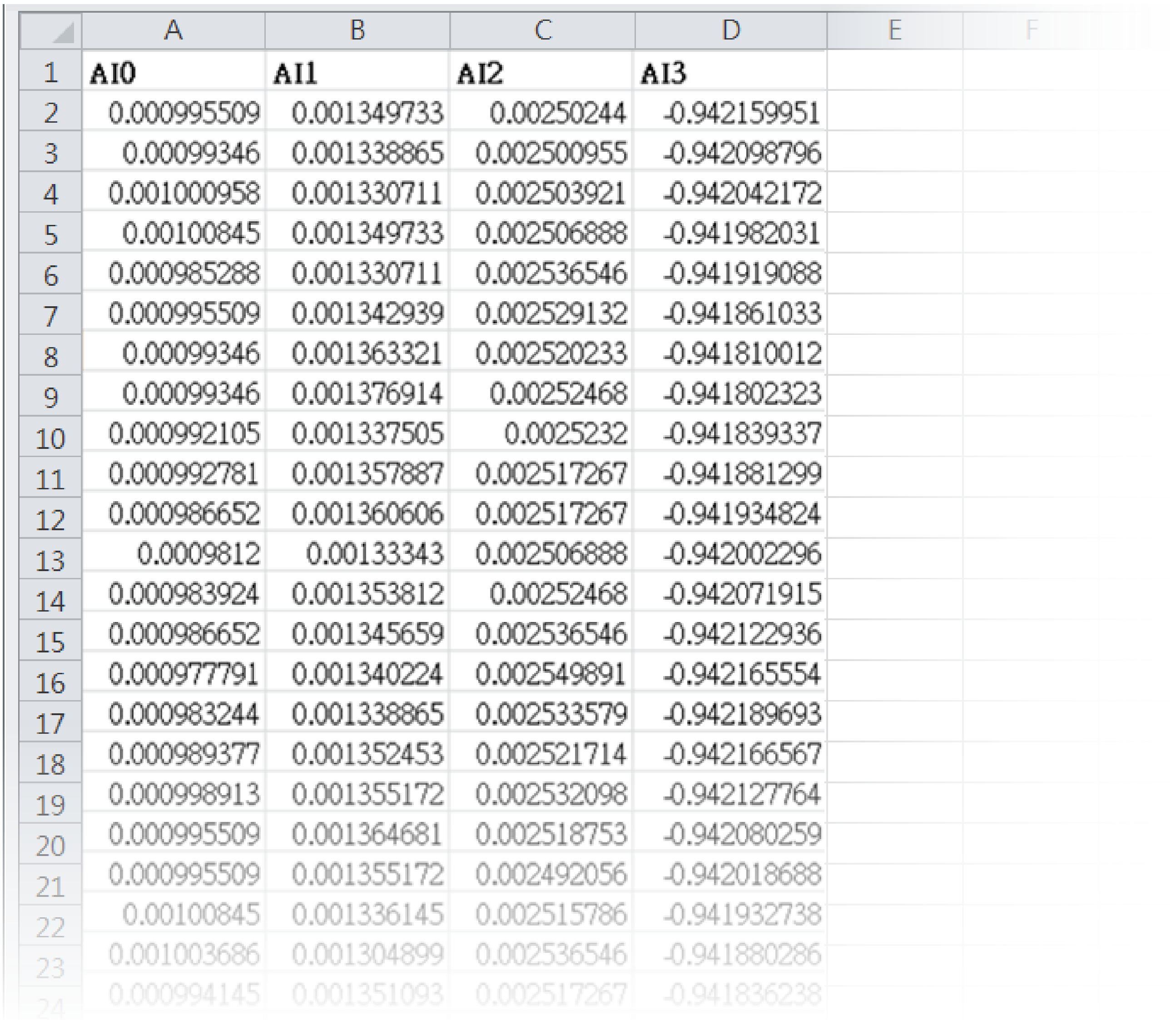
The first sheet displays the model information and the properties for each channel etc.



	A	B	C	D	E	F	G	H	I	J
1	Root Name	Title	Author	Date/Time	Groups	Description	IPAddress	SDKVersion		
2	ET-7H24				1	Float Format DAQ	10.0.8.224	1.1.0.0		
3										
4	Group	Channels	Description	DataTransMethod	Range	SampleCount	SamplingRate	SYNCMode	TriggerMode	UserGa
5	DataGroup!	4	Software trigger DAQ	0	11399	4000	1000	0	0	
6										
7	DataGroup!									
8	Channel	Datatype	Unit	Length	Minimum	Maximum	Description	Gain Value	OffsetValue	Start In
9	AI0	DT_FLOAT	V	1000				16430	14	
10	AI1	DT_FLOAT	V	1000				32765	10335	
11	AI2	DT_FLOAT	V	1000				35757	4086	
12	AI3	DT_FLOAT	V	1000				8431	6646	
13										
14										
15										
16										
17										
18										

Settings	Explanation
Root Name	Connect Module Name
Description(F1)	Data Format
IPAddress	Connect Module IP
SDKVersion	HSDAQ.dll version used
Channels	Number of channels used
Description(C4)	Trigger mode used
Samplecount	Total number of samples
SamplingRate	Sampling rate
UserGain	AI input type
Datatype	Type of data 1. DT_FFLOAT is float data 2. DT_SHORT is hex data for PET-7H16M 3. DT_LONG is hex data for PET-7H24M/PET-AR400
Unit	Data unit
GainValue	Gain value of current UserGain
OffsetValue	Offset value of current UserGain

The second sheet for each channel group with the channel measurements.



	A	B	C	D	E	F
1	AI0	AI1	AI2	AI3		
2	0.000995509	0.001349733	0.00250244	-0.942159951		
3	0.00099346	0.001338865	0.002500955	-0.942098796		
4	0.001000958	0.001330711	0.002503921	-0.942042172		
5	0.00100845	0.001349733	0.002506888	-0.941982031		
6	0.000985288	0.001330711	0.002536546	-0.941919088		
7	0.000995509	0.001342939	0.002529132	-0.941861033		
8	0.00099346	0.001363321	0.002520233	-0.941810012		
9	0.00099346	0.001376914	0.00252468	-0.941802323		
10	0.000992105	0.001337505	0.0025232	-0.941839337		
11	0.000992781	0.001357887	0.002517267	-0.941881299		
12	0.000986652	0.001360606	0.002517267	-0.941934824		
13	0.0009812	0.00133343	0.002506888	-0.942002296		
14	0.000983924	0.001353812	0.00252468	-0.942071915		
15	0.000986652	0.001345659	0.002536546	-0.942122936		
16	0.000977791	0.001340224	0.002549891	-0.942165554		
17	0.000983244	0.001338865	0.002533579	-0.942189693		
18	0.000989377	0.001352453	0.002521714	-0.942166567		
19	0.000998913	0.001355172	0.002532098	-0.942127764		
20	0.000995509	0.001364681	0.002518753	-0.942080259		
21	0.000995509	0.001355172	0.002492056	-0.942018688		
22	0.00100845	0.001336145	0.002515786	-0.941932738		
23	0.001003686	0.001304899	0.002536546	-0.941880286		
24	0.000994145	0.001351093	0.002517267	-0.941836238		

D. How to Use Multiple Modules in Program Development

In program development, multiple modules are used to connect to a PC. Please pay attention to the memory usage in programming.
x86 (32-bit) programs can only use up to 4GB of memory due to system limitations.

The following table specifies the limits on physical memory for Windows 10./7

Windows 10

Version	Limit on X86	Limit on X64
Windows 10 Enterprise	4 G	6 TB
Windows 10 Pro		2 TB
Windows 10 Home		128 GB

Windows 7

Version	Limit on X86	Limit on X64
Windows 7 Ultimate	4 G	192 GB
Windows 7 Enterprise		
Windows 7 Professional		
Windows 7 Home Basic		8 GB

For actual operating data, an x86 program needs to connect 15 or more modules at the same time and collect 30 million pieces of data.

The memory buffer that will be allocated in the SDK dll will be greater than the set value, it will use a memory size of 30000000 * 15 * 20 = 8.4GB, and it will not be able to allocate memory.

When developing programs to connect 15 or more modules at the same time, please use x64 SDK library and programs.