

HAROGIC SA/NX SERIES

Quick Start Guide

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1. Introduction for the Quick Start Guide

This Quick Start Guide provides users with basic instructions on how to operate the instruments and how to acquire documents and help. HAROGIC SA/NX series real time spectrum analyzers are complex systems thus it is highly recommended that you fully study the documents and related videos from HAROGIC to perform a perfect measurement. Chapter 2 contains the user documentation introduction for HAROGIC SA/NX series and the way to find the documentation. Please read this chapter carefully when you use HAROGIC SA/NX series for the first time.

Before starting to operate the instrument, please connect it to the host (PC, embedded systems etc.) and install the driver. You can find guide on how to connect HAROGIC SA series instrument in Chapter 3. For HAROGIC NX series connection guide, please refer to Chapter 4.

After driver installation and instrument connection, you can further read Chapter 5 for SASstudio4 application manual and Chapter 6 for API programming guide.

2. Introduction for HAROGIC documentation and service

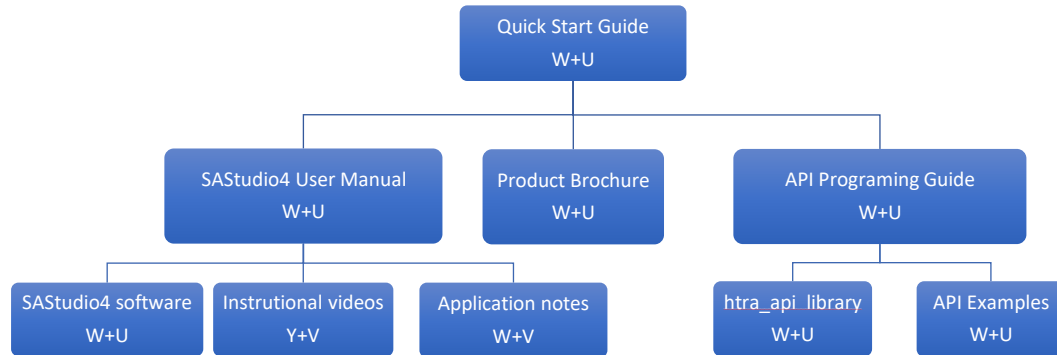


Figure 1 overview for HAROGIC documentations

Notes: W for HAROGIC official website; U for flash disk; Y for YouTube official platform; V for HAROGIC official WeChat account.

Table 1 main topics covered in HAROGIC documentations

Documentation	Main topics
Quick Start Guide	<ul style="list-style-type: none"> ● Overview of all HAROGIC documentations ● HAROGIC instruments connection guide ● Driver installation guide ● Introduction for SASStudio4 and API
SASStudio4 User Manual	<ul style="list-style-type: none"> ● Overview the measurement capability of SASStudio4
SASStudio4 Software	<ul style="list-style-type: none"> ● Software for all HAROGIC products.
Instructional video & Application notes	<ul style="list-style-type: none"> ● Examples for analysis modes in SASStudio4 step-by-step.
Product Brochure	<ul style="list-style-type: none"> ● Technical specifications for HAROGIC instruments.
API Programming Guide	<ul style="list-style-type: none"> ● Secondary development guide for HAROGIC SA/NX series ● Introduction for structure of API ● Information for every API and related functions
htra_api_library & API Examples	<ul style="list-style-type: none"> ● Library for secondary development and the related examples for library functions.

3. SA series (USB interface)

3.1 Interface (SAN-45, SAN-60 M2, SAM-60 M3, SAM-80)



Figure 2 schematic diagram of SAM-60 M3 physical interfaces.

- | | |
|------------------------------|--|
| 1 RF input(SMA) | 4 Power port (Type-C, 5V2A) |
| 2 RF output(SMA) | 5 Data port (Type-C, USB3.0 recommended) |
| 3 Reference clock input(MCX) | 6 MUXIO Multifunction interface (Type-C) |

3.2 Inputs and outputs (SAE-90, SAE-200, SAN-400)



Figure 3 schematic diagram of SAE-200 physical interfaces.

- | | |
|-------------------------------|--|
| 1 RF input(2.92mm) | 5 MUXIO multifunction Interface (Boar-to-Line) |
| 2 Analog IF output(MMCX) | 6 Cooling vent |
| 3 Reserved(MMCX) | 7 Data port (Type-C, USB3.0 recommended) |
| 4 Reference clock input(MMCX) | 8 Power port (Type-C, 5V2A) |

3.3 Accessories



- Power adaptor x1 Type C cable x2 Flash disk x1

3.4 Physical connecting to host

Step 1: Connect the Type-C power supply of your device to the power adapter using a USB cable. The power adapter should already be plugged into an outlet. USB devices will switch on automatically when powered on.

Step 2: Connect your device to your computer or embedded device using a USB cable with Type-C data.

Step 3: Connect either the antenna or the test cable (both provided by you) to the RF signal input port of your device. Once the connection is complete, you will see it displayed in the figure below.



Figure 4 schematic diagram for a typical setup of SAE-200.

3.5 Installing USB driver

When using the SA series device for the first time, it's essential to install the appropriate version of the USB driver. The USB flash drive or www.harogic.com that came with your device contains drivers for different Windows versions. Please follow the instructions below to install the drivers:

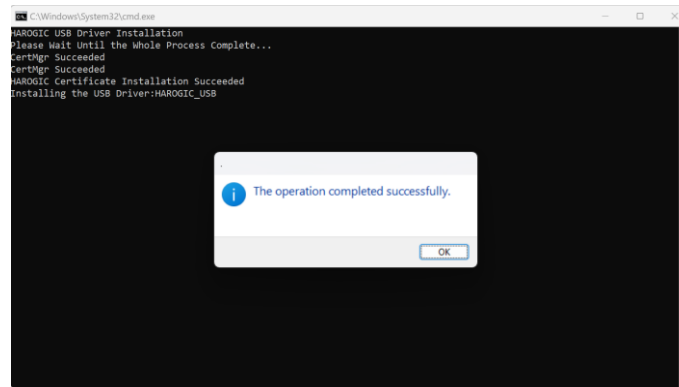
Step 1: Confirm the Windows version and number of digits of your computer.

Then, open the Windows\HTRA_Driver folder in the USB flash drive and select the driver version that corresponds to your computer system to install.

Win7_x64	5/4/2023 9:36 AM	File folder
Win7_x86	5/4/2023 9:36 AM	File folder
Win8.1_x64	5/4/2023 9:36 AM	File folder
Win8.1_x86	5/4/2023 9:36 AM	File folder
Win10_x64	5/4/2023 9:36 AM	File folder
Win10_x86	5/4/2023 9:36 AM	File folder

Step 2: To install the appropriate driver version, please open it and run the Install_Driver.bat file as an administrator.

Step 3: After the driver is successfully installed, the result is as shown in the following figure.



Step 4: Open Device Manager to view the devices that have been successfully installed, as shown in the figure below.

- > Storage controllers
- > System devices
- ▼ Universal Serial Bus controllers
 - HAROGIC SAE
 - Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
 - Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
 - USB Composite Device
 - USB Root Hub (USB 3.0)
 - USB Root Hub (USB 3.0)
 - USB4(TM) Host Router (Microsoft)

4. NX series (Ethernet interface)

4.1 Inputs and outputs (NXM-60, NXM-80, NXN-45, NXN-60)

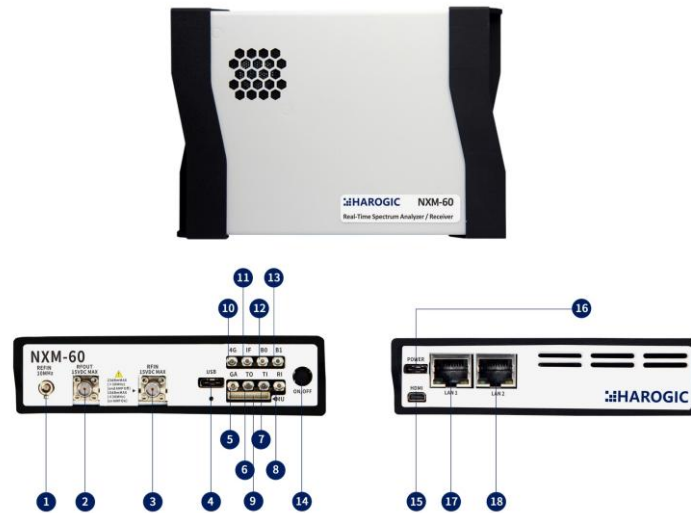


Figure 5 schematic diagram of NXM-60 physical interfaces.

- | | |
|---|--------------------------------|
| 1 Reference clock input(MCX) | 10 4G antenna input(MMCX) |
| 2 RF output(SMA) | 11 Reserved(MMCX) |
| 3 RF input(SMA) | 12 Reserved(MMCX) |
| 4 USB2.0 host (Type-C) | 13 Reserved(MMCX) |
| 5 GNSS antenna input(MMCX) | 14 Power on/off |
| 6 Trigger output(MMCX) | 15 HDMI |
| 7 Trigger input(MMCX) | 16 Power port (Type-C, USB-PD) |
| 8 Reserved(MMCX) | 17 100M LAN connector |
| 9 MUXIO interface (board to wire connector) | 18 1000M LAN connector |

4.2 Inputs and outputs (NXE-90, NXE-200, NXN-400)

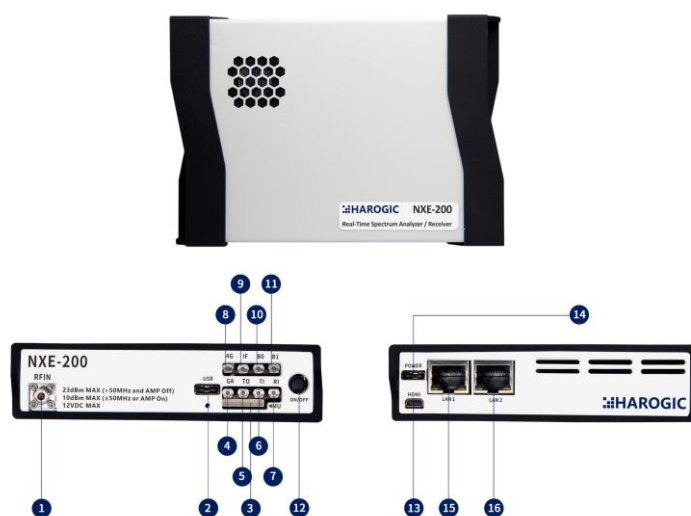


Figure 6 schematic diagram of NXE-200 physical interfaces.

- | | |
|---|--------------------------------|
| 1 RF input(2.92mm) | 9 Analog IF output(MMCX) |
| 2 USB2.0 host (Type-C) | 10 Reserved(MMCX) |
| 3 MUXIO interface (board to wire connector) | 11 Reserved(MMCX) |
| 4 GNSS antenna input(MMCX) | 12 Power on/off |
| 5 Trigger output(MMCX) | 13 HDMI output |
| 6 Trigger input(MMCX) | 14 Power port (Type-C, USB-PD) |
| 7 External reference input(MMCX) | 15 100M LAN connector |
| 8 4G antenna input(MMCX) | 16 1000M LAN connector |

4.3 Accessories



Power adaptor x1 Type C cable x1 Flash disk x1

4.4 Physical connecting to host

1: Connect the power adapter to the power port of the instrument with Type-C cable.

2: Press the power button on the front panel of the instrument.

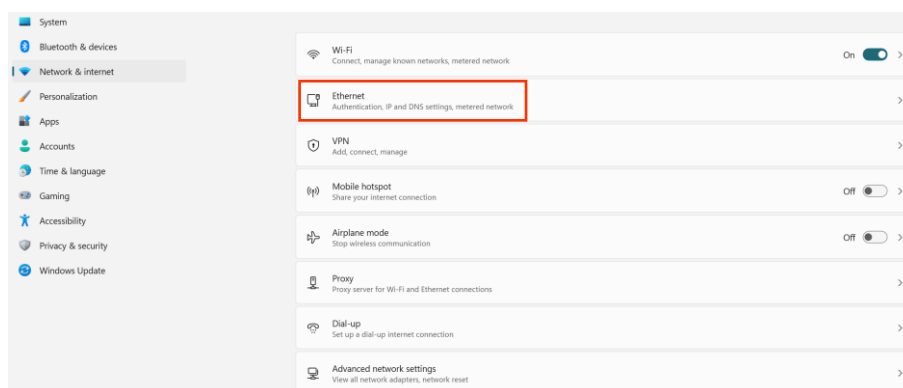
3: Connect either the 1000M LAN connector or 100M LAN connector of the NX instrument to the host or network device with RJ-45 cable (user prepared).

4: Connect antenna (user prepared) or RF cable (user prepared) to the RF input of the NX instrument.

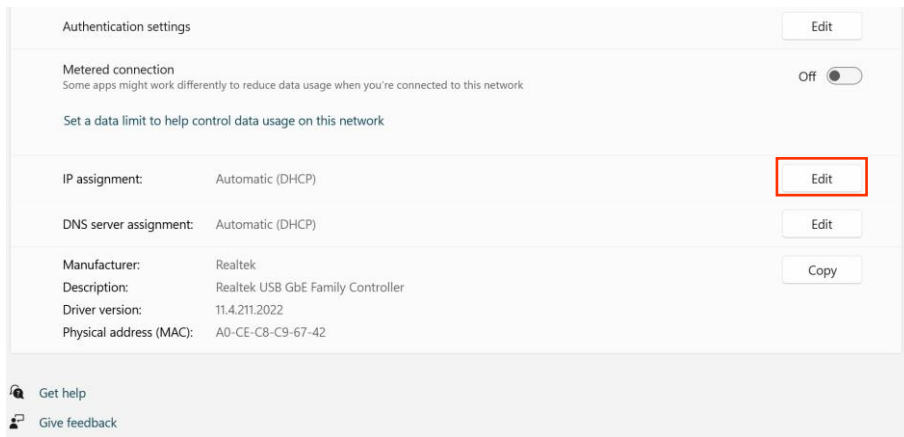
4.5 Configuring the IP address of the host

Network node products come with a default IP address when they are shipped from the factory. When you use the device for the first time, you need to set the IP address and network settings of the host to match the default IP address of the device. In order for the device and the host to communicate, they must have IP addresses in the same network segment. Here are the steps you need to follow:

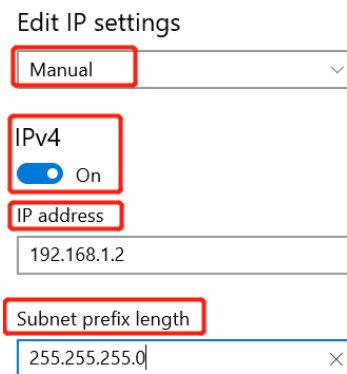
Step 1: Open "Settings" and select "Network & Internet", then choose "Ethernet".



Step 2: Go to Ethernet, find the IP part and click "Edit", as shown in the figure below.



Step 3: Choose “Manual” to configure IP address, open IPv4. Then set the IP address and subnet mask (the IP address is consistent with the IP address on product), as shown in the following figure.



5. Copy the calibration file

Each device has a unique calibration file, which needs to be placed in the corresponding CalFile folder when using SASStudio4 or calling the API for program development. The calibration file of the device is provided in the USB flash drive that comes with the device.

When the device is using SASStudio4 or the API sample from the included USB stick, there is no need for the user to copy the calibration file. If the device is not using SASStudio4 or the API sample from the included USB stick, copy the device's calibration file according to the instructions below.

Step 1: Open the USB flash drive that comes with the device, open the CalFile folder, and select all the files in it to copy. If the calibration file name corresponds to

the UID of the device, you can determine whether it is the calibration file corresponding to the device based on the UID.

Step 2: If using SASstudio4 software, copy the copied calibration file to the SASstudio4\bin\CalFile folder.

Step 3: If you are using an API program, copy the copied calibration file to htra_api\CalFile in the folder where the program is located.

6. SASudio4 Quick Start

SASudio4 is an application software developed by HAROGIC for spectrum and signal analysis. It features with the clear UI logic and convenient operation. All HAROGIC instruments including SA/NX series are compatible with this software. The SASudio4 has four analysis modes which are designed for different applications.

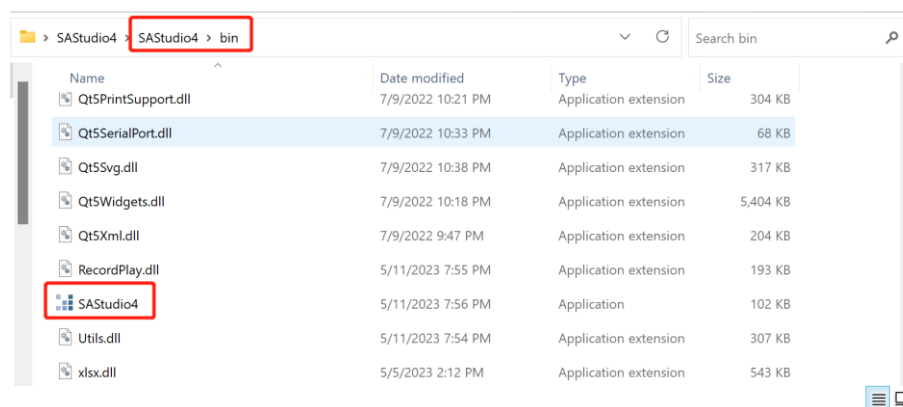
Table 2 main analysis mode

Modes	Measurement capability		
SWP	Panoramic spectrum	Harmonic, Spurious	Phase noise
	Spectrum monitoring	Channel power	OBW, ACPR
IQS	Time domain graph	IQ record	FM/AM demodulation
	Users' application		
DET	Pulse signal observation	Power-time viewing	
RTA	Burst signal observation	Stealth signal discovery	Spectrum dynamic observation

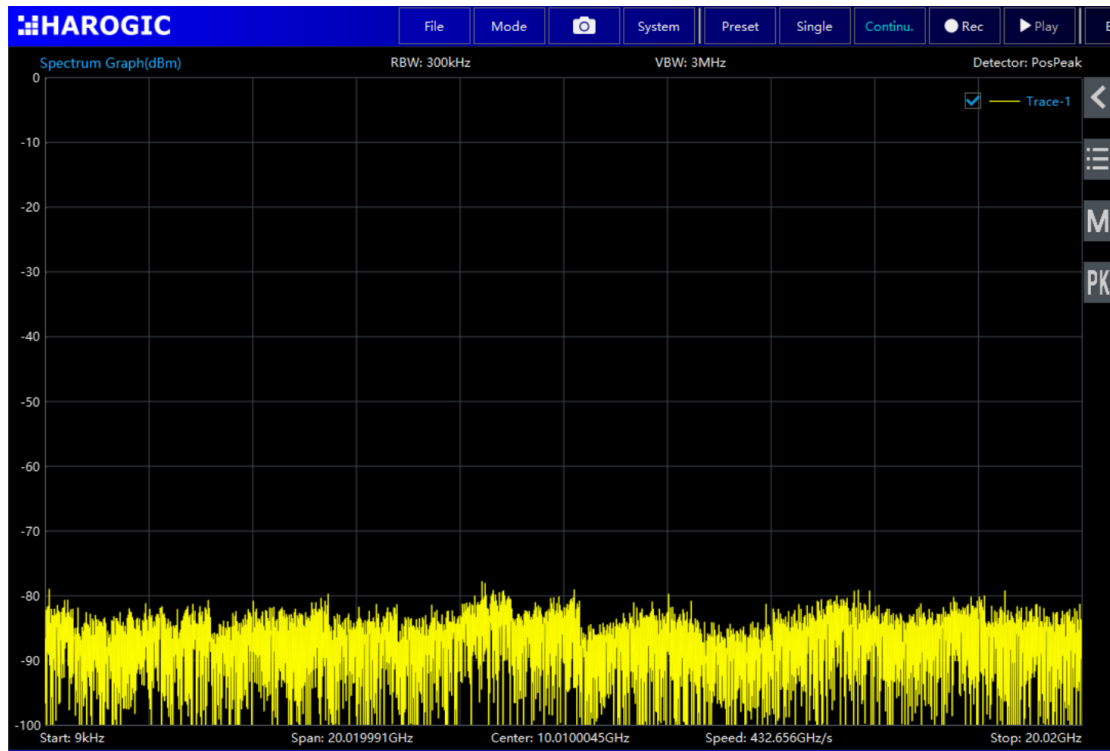
Please follow the guide below to use SASudio4.

1: For HAROGIC SA series, please ensure the physical connection (3.4) and USB driver installation (3.5) have been completed. For HAROGIC NX series, ensure the physical connection (4.4) and IP configuration (4.5) have been completed.

2: Find the SASudio4 folder in the flash disk and copy it to the hard disk of the host (SSD is strongly suggested). Open the folder SASudio4/bin and double click the SASudio4.exe to execute the software.

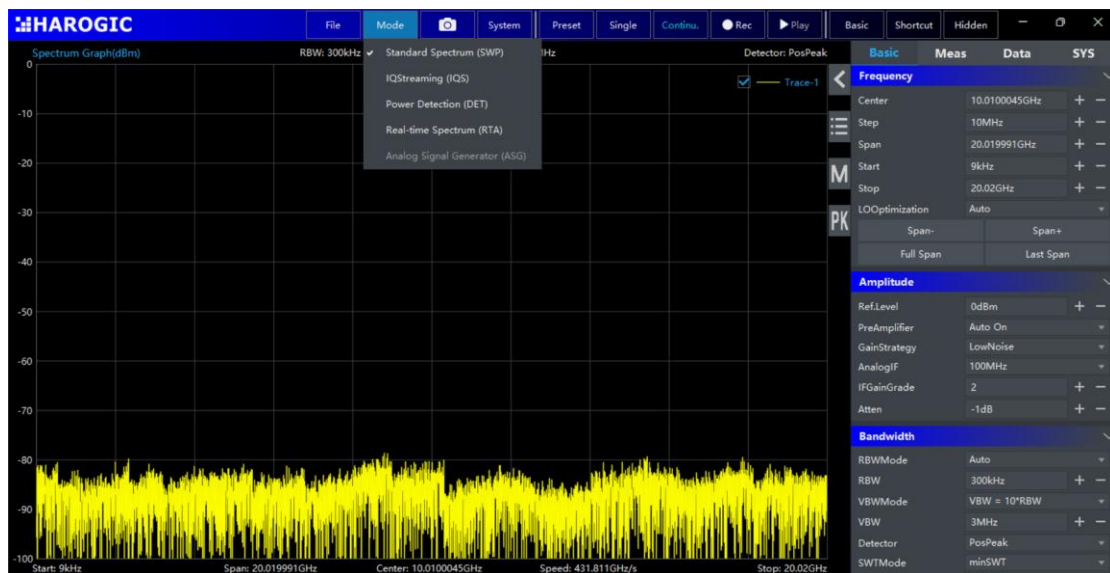


The main interface of SASTudio4 is shown in the following figure.



3: Click "Mode" in the menu bar and select the analysis mode you need.

SASTudio4 starts up in SWP mode by default.



4: Configure parameters according to your measurement target and finish the test. The detailed guide could be found in SASTudio4 application user manual.

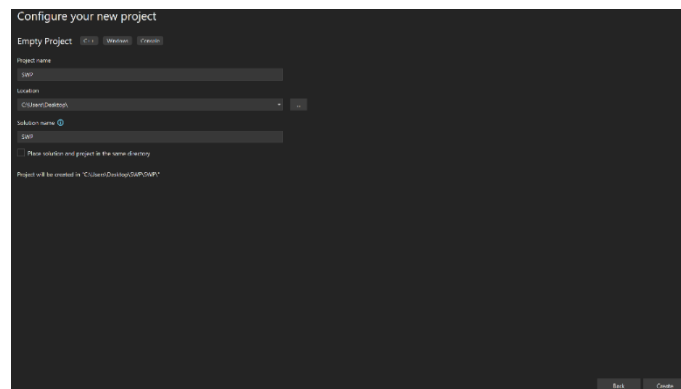
7. Programming with the API

The secondary development is supported employing API for the HAROGIC SA/NX series to achieve users' specific requirements. The Windows and Linux operating systems and C++, C, C#, QT, MATLAB by MathWorks, LabView by NI programming environment is supported.

The API dynamic link library and the documentation "API Programming Guide" are provided in the flash disk. Before proceeding with secondary development, please give an overview of the API Programming Guide and review it as needed during the development process. Choosing analysis mode and setting the parameters according to the application goals helps to quickly build robust and efficient programs and obtain more accurate measurement results. The following is an illustration of the secondary development process using the C++ environment under Windows operating system as an example.

In Windows operating system, please follow the steps below to create a project and complete the programming environment configuration (Visual Studio 2019 by Microsoft).

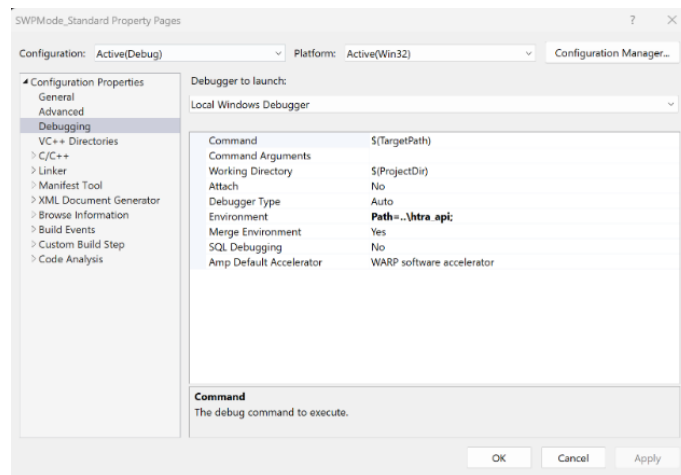
1: Open Visual Studio 2019 and Create a new Project, as shown in the following figure.



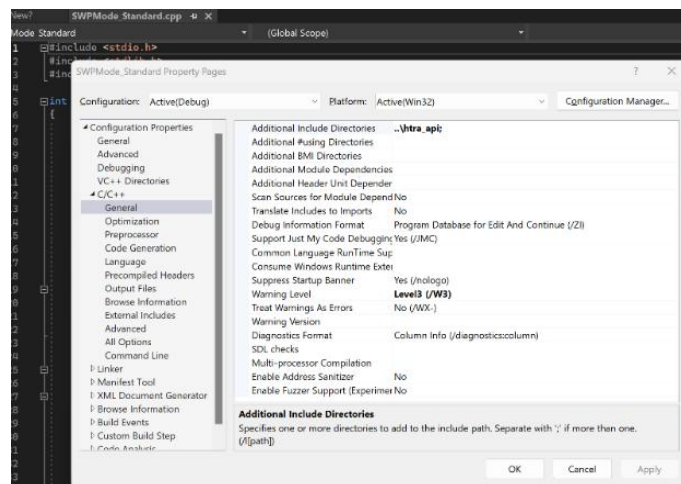
2: After creation, place the \Windows_API\x86\htra_api folder in the USB provided by manufacturer under the project level directory, as shown in the following figure.

htra_api	5/4/2023 9:36 AM	File folder	
SWPMode_Standard	5/4/2023 9:36 AM	File folder	
SWPMode_Standard.sln	11/23/2022 3:19 AM	Visual Studio Solution	1 KB

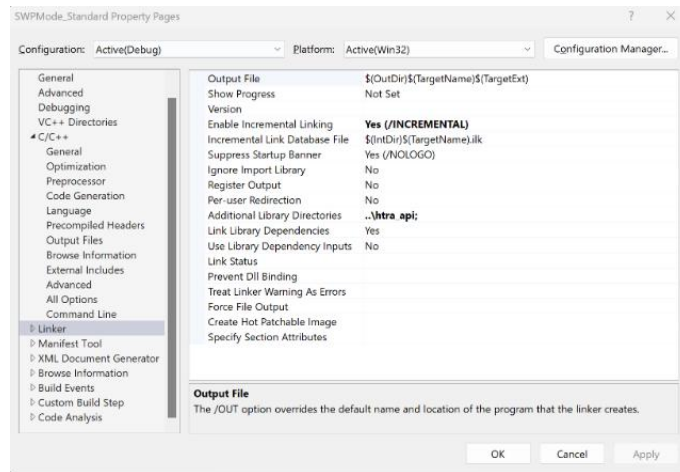
3: Double-click to open SWP.sln, create a new SWP.cpp file in the source file, and then click Project > Properties in the menu bar above, and set the environment in Configuration Properties > Debugging to Path=. \htra_api, as shown in the following figure.



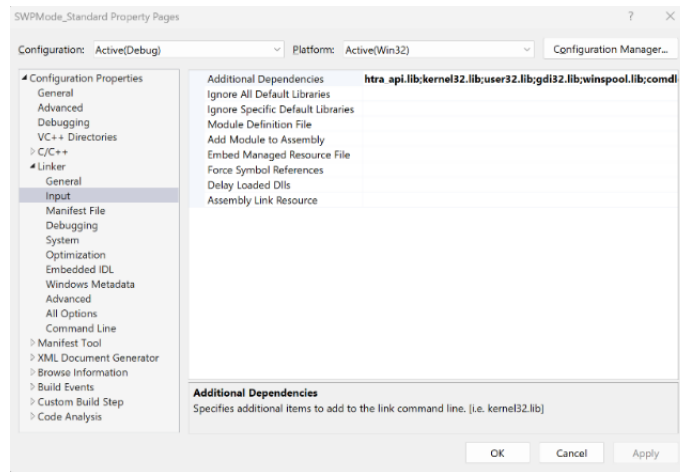
4: Set Additional Include Directories in Configuration Properties > C/C++ > General to . \htra_api, as shown in the following figure.



5: Set the additional library directory in Configuration Properties > Linker > General to . \htra_api, as shown in the following figure.



6: Add htra_api.lib to Additional dependencies in Configuration Properties > Linker > Input, as shown in the following figure. (C/C++ project is configured and ready for programming development)



API related examples is provided in the flash disk, please refer to the examples for quickly starting the development according to your target. The detailed information about API could be found in API Programing Guide.

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