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 SAStudio4 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
	 Overview of all HAROGIC documentations HAROGIC instruments connection guide
Quick Start Guide	Driver installation guide
	Introduction for SAStudio4 and API
SAStudio4 User Manual	• Overview the measurement capability of SAStudio4
SAStudio4 Software	• Software for all HAROGIC products.
Instructional video & Application notes	• Examples for analysis modes in SAStudio4 step-by-step.
Product Brochure	• Technical specifications for HAROGIC instruments.
API Programming Guide	 Secondary development guide for HAROGIC SA/NX series Introduction for structure of API Information for every API and related functions
htra_api library & API	• Library for secondary development and the related
Examples	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)
- 2 Analog IF output(MMCX)
- 6 Cooling vent
- 3 Reserved(MMCX)
- 7 Data port (Type-C, USB3.0 recommended)

5 MUXIO multifunction Interface (Boar-to-Line)

- 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.

C:\Windows\System32\cmd.exe		×
HAROGIC USB Driver Installation Plase Hail Until the Whole Process Complete GentWgr Succeeded HAROGIC Certificate Installation Succeeded Installing the USB Driver:HAROGIC_USB		ľ
The operation completed successfully.		

Step 4: Open Device Manager to view the devices that have been successfully

installed, as shown in the figure below.

- > 🍇 Storage controllers
- > ኪ 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)
- RF output(SMA) 2
- 3 RF input(SMA)
- USB2.0 host (Type-C) 4
- GNSS antenna input(MMCX) 5
- Trigger output(MMCX) 6
- 7 Trigger input(MMCX)
- Reserved(MMCX) 8
- MUXIO interface (board to wire connector) 18 1000M LAN connector 9

- 10 4G antenna input(MMCX)
- Reserved(MMCX) 11
- 12 Reserved(MMCX)
- Reserved(MMCX) 13
- Power on/off 14
- HDMI 15
- 16 Power port (Type-C, USB-PD)
- 100M LAN connector 17

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)
- 2 USB2.0 host (Type-C)
- 3 MUXIO interface (board to wire connector) 11
- 4 GNSS antenna input(MMCX)
- 5 Trigger output(MMCX)
- 6 Trigger input(MMCX)
- 7 External reference input(MMCX)
- 8 4G antenna input(MMCX)

- 9 Analog IF output(MMCX)
- 10 Reserved(MMCX)
- 11 Reserved(MMCX)
- 12 Power on/off
- 13 HDMI output
- 14 Power port (Type-C, USB-PD)
- 15 100M LAN connector
- 16 1000M LAN connector

4.3 Accessories







Power adaptor x1

Type C cable x1 F

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 Configurating 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.

Metered connection Some apps might work differ	ently to reduce data usage when you're connected to this network	Off 💽
Set a data limit to help co	ntrol data usage on this network	
IP assignment:	Automatic (DHCP)	Edit
DNS server assignment:	Automatic (DHCP)	Edit
Manufacturer:	Realtek	Сору
Description:	Realtek USB GbE Family Controller	
Driver version:	11.4.211.2022	
Physical address (MAC):	A0-CE-C8-C9-67-42	

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.

Edit IP set	tings
Manual	~
IDv/	
On	
IP address	
192.168.1.2	
Subnet prefix	length
255.255.25	5.0 ×

5. Copy the calibration file

Each device has a unique calibration file, which needs to be placed in the corresponding CalFile folder when using SAStudio4 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 SAStudio4 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 SAStudio4 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 SAStudio4 software, copy the copied calibration file to the SAStudio4\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. SAStudio4 Quick Start

SAStudio4 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 SAStudio4 has four analysis modes which are designed for different applications.

Modes	lity		
SW/D	Panoramic spectrum	Harmonic, Spurious	Phase noise
3000	Spectrum monitoring	Channel power	OBW, ACPR
105	Time domain graph	IQ record	FM/AM demodulation
IUS	Users' application		
DET	Pulse signal observation	Power-time viewing	
RTA	Burst signal observation	Stealth signal discovery	Spectrum dynamic observation

Table 2	main	anal	ysis	mode
---------	------	------	------	------

Please follow the guide below to use SAStudio4.

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 SAStudio4 folder in the flash disk and copy it to the hard disk of the host (SSD is strongly suggested). Open the folder SAStudio4/bin and double click the SAStudio4.exe to execute the software.

;	SAStudio4 > SAStudio4 > bin		~ C	Search bin	م
I.	Name © Qt5PrintSupport.dll	Date modified 7/9/2022 10:21 PM	Type Application extension	Size 304 KB	
	Nt5SerialPort.dll	7/9/2022 10:33 PM	Application extension	68 KB	
	😼 Qt5Svg.dll	7/9/2022 10:38 PM	Application extension	317 KB	
	S Qt5Widgets.dll	7/9/2022 10:18 PM	Application extension	5,404 KB	
	🚳 Qt5Xml.dll	7/9/2022 9:47 PM	Application extension	204 KB	
	RecordPlay.dll	5/11/2023 7:55 PM	Application extension	193 KB	
	SAStudio4	5/11/2023 7:56 PM	Application	102 KB	
	😼 Utils.dll	5/11/2023 7:54 PM	Application extension	307 KB	
	🗟 xlsx.dll	5/5/2023 2:12 PM	Application extension	543 KB	- 1



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.

HAROGIC	File Mode O	System Pres	et Single Cont	tinu. 🔵 Rec	▶ Play B	asic Shortcut H	idden – 🔿	>	×
Spectrum Graph(dBm)	RBW: 300kHz 🖌 Standard Specti	rum (SWP) Hz		Dete	ctor: PosPeak	Basic Mea	s Data	SYS	
0	IQStreaming (IC	25)		-	Trace-1	Frequency			
	Power Detection	(DET)				Center	10.0100045GHz		
-10	Real time Search	DIM (DTA)			:=	Step	10MHz		
	Real-and Spece					Span			
-20	Analog Signal G	enerator (ASG)			M	Start			
					IVI	Stop			
-30					nν	LOOptimization			
					PN				
-40						Full Span			
						Amplitude			
60						Ref.Level			
-50						PreAmplifier			
						GainStrategy			
-60						AnalogIF	100MHz		
						IFGainGrade			
-70						Atten			
						Bandwidth			
-80			to table to a	4		RBWMode			
فيقادعهم البرا الألبان المتقداله والتربيد بالمالتين والمتلاد والتبيير والسيب الما	. Julia da la companya da la	And a find the state of		analali Miller an	Akt Badelow	RBW			
	and the first of the state of the	Los Liker (The state of the s		Hit Laker	VBWMode	VBW = 10*RBW		
Hold III and the desire the defined of the second second			Artal Arta Arta			VBW			
						Detector			
-100 Start: 9kHz Span: 20.019991	GHz Center: 10.010004	5GHz Speed:	431.811GHz/s	St	top: 20.02GHz	SWTMode	minSWT		

4: Configurate 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.

onfiguration:	Active(Debug)	V Platform: Ar	ctive(Win32)	~	Configuration Manag	er
Configuration	n Properties	Debugger to launch:				
General Advanced		Local Windows Debugger				
Debugging	1					
VC++ Direc	ctories	Command	S(TargetPath)			
> C/C++		Command Arguments				
> Linker		Working Directory	S(ProjectDir)			
Manifest To	ool	Attach	No			
> XML Docum	ment Generator	Debugger Type	Auto			
Browse Info	ormation	Environment	Path=\htra_api;			
Build Event	ts	Merge Environment	Yes			
Custom Bui	ild Step	SQL Debugging	No			
Code Analy	/sis	Amp Default Accelerator	WARP software accelerator			
		Command				
		The debug command to execute.				

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

Effinclude <stdie.h></stdie.h>					
Tine SWPMode_Standard Property Pages	Dation Ar	ti a RAlio 221		Configuratio	7 ×
Configuration Properties General Debugging VC-1 Directories - CC++ Optimization Preprocessor Code Generation Language Precompled Headers Optimization Precompled Headers Advanced All Options Common Line Environ Hoformation Environ Hoformation Environ Proceedings Advanced All Options Common Line Environ Prove Information Environ Park Document Generator Proves Information Environ Park Decument Generator Proves Information Environ Park Decument Generator Parks Events E Custom Build Events	Additional Include Directories Additional Auring Directories Additional Mark Directories Additional Mark Directories Additional Mark Directories San Sources for Matuke Dependentic Additional Header Unit Dippendi Debug information Format Support Just Ny Cold Debuggi Common Language RunTime Sta Suppress Satzing Banner Warning Level Trast Warning Level Trast Warning Level Diagnostics Format SDL checks Multi-processor Compilation Enable Addres Support Elsperime Enable Addres Support Elsperime Specifies one or more directories to (righanti)		And Contin column)	ue (/Zli ∵ if more than	one.

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

onfiguration: Active(Debug)	 Platform: Ac 	tive(Win32)	~	Configuration Manager	
General Advanced Debugging VC++ Directories < C/C++ General Optimization Preprocessor Code Generation Language Precompiled Headers Output Files Browse Information External Includes Advanced All Options Command Line Bunker Nemeric Tool Nemeric Sectors Stresson Commandon	Output File Show Progress Version Enable Incremental Linking Incremental Linking Suppress Startup Banner Ignore Import Library Register Output Per-user Redirection Additional Ulbrary Directories Link Library Dependency Inputs Link Status Prevent Dil Binding Treat Linker Warning As Errors Force File Output Create Hot Patchable Image Specify Section Attributes	\$(OutDir)\$(TargetName)\$(Targ Not Set \$(mtDir)\$(TargetName).ilk \$(mtDir)\$(TargetName).ilk Yes (NOLOGO) No No No \\\\\\\\\\\\\\\\\\\\\\\\\\\	etExt)		
Build Events Custom Build Step Code Analysis	Output File The /OUT option overrides the default name and location of the program that the linker creates.				

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)

SWPMode_Stand	dard Property Pages				? ×
Configuration:	Active(Debug)	Platform: Ac	tive(Win32)	~	Configuration Manager
Configuration General Advanced Debugging VC++ Direc VC++ Direc VC++ Configuration VC++ Direc VC++ Direc Voltage	n Properties	Additional Dependencies Ignore All Default Libraries Ignore Specific Default Libraries Module Definition File Add Module to Assembly Embed Managed Resource File Force Symbol References Delay Loaded Dits Assembly Link Resource	htra api.lib;kernel3	e. [i.e. kernel32.lib;	di 32.lib;vinspool.lib;comdi
				ОК	Cancel Apply

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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Service Mail: info@harogic.com

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