RIGOL

SUA8000 Series

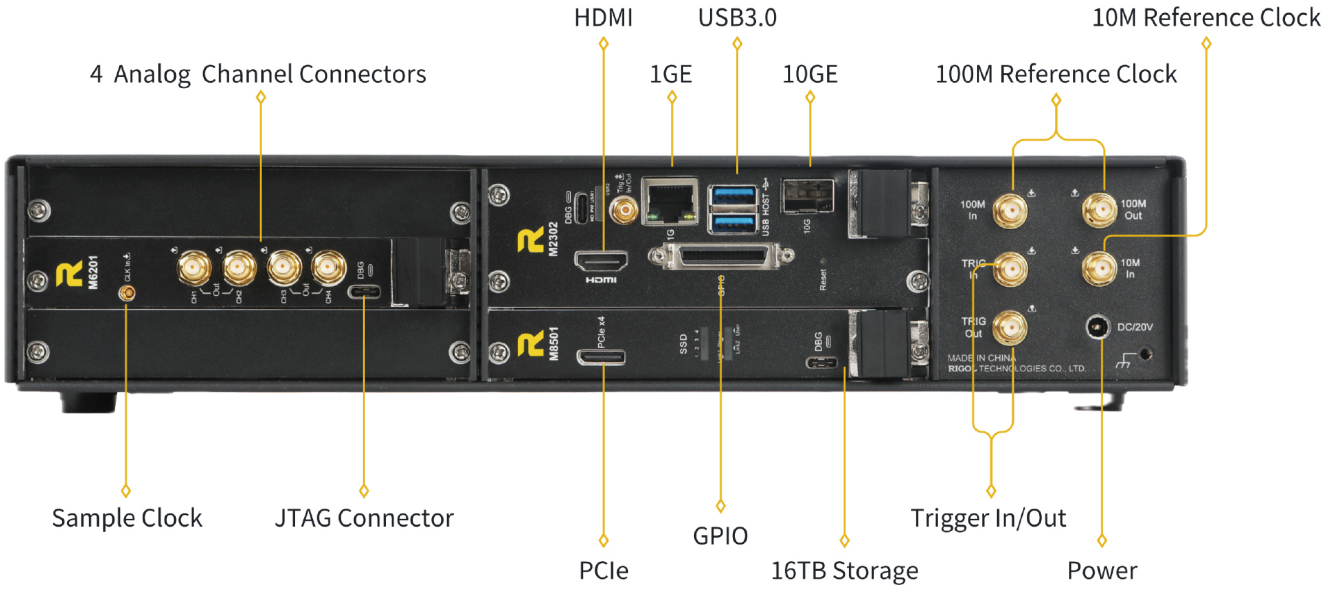
Digital Transceiver

Data Sheet

DSK01100-1110

Jun. 2025

SUA8000 Series
Multi-channel Digital Transceiver



Specifications

Transmit
8GSa/s Sample Rate
14bit Vertical Resolution

Receive
4GSa/s Sample Rate
14bit Vertical Resolution

Stability
≤1ps In-device
≤10ps Inter-device

Control Type Selectable
CPU High Performance
GPU High Computing Power

8 Channels
For a single device

1Gpts/ch
Memory Depth

10 Gigabit Ethernet
Standard

16TB
Waveform Recording

Benefits

Multi-channel, Multi-function

Supports up to 8 channels for a single device and is equipped with multiple functions such as AWG, digitizer, and waveform recorder

High-Rate Interface

Standard 10 Gigabit Ethernet control and digital transmission interface for high-bandwidth digital transmission

High-stability Synchronization

Supports more than 100 devices with hundreds of channels working synchronously to enable highly stable waveform acquisition and generation

Advanced Sequence Play

Supports up to 3,000 waveform segments, fast loading via high-speed interface, complex waveform sequences such as loops, jumps, nesting, etc.

Array Operating Console

User remote control available on the array operating console, such as multi-device management, waveform editing and waveform display storage

User-customized Development

Provides a variety of device-driven interface functions, supporting remote and local customized/secondary development to get it quickly integrated into the user's business system

CPU/GPU-Controlled Selectable

CPU-controlled test adopts the high-performance V2000 processor, and the GPU AI-controlled test uses the Orin AGX processing platform

Compact Size with Highly-integrated Functions

The compact size of the device enables users to install it in their system or mounted in a standard rack

Application

Large-Scale Scientific Facility

Large-scale array data acquisition and analysis

Remote Sensing

Multi-channel receiving/transmitting and intelligent detection

Radio Astronomy

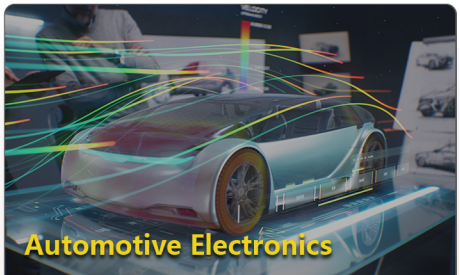
High-bandwidth acquisition and transmission of cosmic rays

Product Line Testing

With multiple functions highly integrated, easy for customized development

LEO Satellite

SDR technology combined with GPU AI master-controlled



Automotive Electronics

Control unit simulation and collision warning signal simulation

Features

The SUA8000 series digital transceiver combines arbitrary waveform generation, signal acquisition and waveform recording, designed for complex signal applications. The series features a modular architecture but is offered in standard configurations, ensuring a convenient out-of-the-box experience with superior reliability and consistency. With the combination of digital receiving/transmitting technology and AI algorithm, it can not only efficiently generate, acquire and analyze high-speed signals, but also support users to develop customized/secondary business systems and flexibly scale applications. The powerful software platform provides an open interface for customers to build automated test processes or customized solutions in remote sensing, industrial measurement, automotive electronics, and more. With leading-edge hardware performance and intelligence features, the series enables more accurate and efficient R&D validation and business applications, accelerating the innovation process.

AWG

- Up to 8 GSa/s sample rate
- 14-bit vertical resolution
- -70 dBc SFDR
- Supports importing the external waveforms
- Supports advanced sequence to define outputs of various types of complex waveforms
- Analog bandwidth (DC-3.5 GHz)

Digitizer

- Up to 4 GSa/s sample rate
- 14-bit vertical resolution
- -55 dBc SFDR
- Supports RingBuffer and Streaming operating modes
- Analog bandwidth (DC-1.5 GHz)

1 Gpts Waveform Memory Depth for Each Channel

Supports 16TB Expandable Storage Option

High Stability Synchronization (12h)

- Time-delay stability in any two channels: <1 ps
- Time-delay stability in any two devices: <10 ps

Master Control Selectable

- CPU, 25 W TDP, 3.95 GHz, high performance
- GPU, 200 TOPS high computing power

Multiple External Interfaces: 10 G/1 G LAN, USB3.0, HDMI

Specifications Overview

		SUA8104	SUA8204	SUA8208	SUA8304
Number of Channels	AWG Channels	4	-	-	2
	Digitizer Channels	-	4	8	2
AWG Parameters	Sample Rate	8 GSa/s	-	-	8 GSa/s
	Vertical Resolution	14-bit	-	-	14-bit
	Bandwidth	DC-3.5 GHz	-	-	DC-3.5 GHz
	Arbitrary Waveform Length	1 Gpts/CH	-	-	1 Gpts/CH
	Output Type	50 Ω, Single-ended	-	-	50 Ω, Single-ended
	Max. Output Amplitude	500 mVpp	-	-	500 mVpp
	Phase Noise	-117 dBc/Hz @ 1GHz offset 10 kHz	-	-	-117 dBc/Hz @ 1GHz offset 10 kHz
	Channel Stability	±1 ps@12 h			±1 ps@12 h
	Sequence Mode (Option)	Support	-	-	Support
	Number of Sequence	3000/CH	-	-	3000/CH

		SUA8104	SUA8204	SUA8208	SUA8304
Digitizer Parameters	Sample Rate	-	4 GSa/s	4 GSa/s	4 GSa/s
	Vertical Resolution	-	14-bit	14-bit	14-bit
	Bandwidth	-	DC-1.5 GHz	DC-1.5 GHz	DC-1.5 GHz
	Digital Pre-processing	-	DDC, Decimation, Truncation	DDC, Decimation, Truncation	DDC, Decimation, Truncation
	Cache Bandwidth	-	32 GB/s		
	Cache Depth	-	1 Gpts/CH	512 Mpts/CH	1 Gpts/CH
	Output Type	-	50 Ω, Single-ended		
	Input Amplitude	-	1 Vpp		
	Measurement Accuracy	-	±5‰		
	Acquisition Mode		Ring Buffer Mode, Streaming Mode		
Master Control Parameters	Master Control Type	CPU-controlled test			
	CPU	AMD V2516, 6 core, 2.1 GHz-3.95 GHz			
	GPU	-			
	Memory and Storage	32 GB DDR4-3200, non-ECC, 512 GB SSD			
	Network	10 GbE SFP+, 1 GbE RJ45			
	Interface	HDMI, USB3.0 x2			
	Operating System	Linux			
Dimensions	Width x Depth x Height	340 mm (W) x 235.5 mm (D) x 68 mm (H)			
Optional		-	16 TB Waveform Recording Extension		

		SUA8104G	SUA8204G	SUA8208G	SUA8304G
Number of Channels	AWG Channels	4	-	-	2
	Digitizer Channels	-	4	8	2
AWG Parameters	Sample Rate	8 GSa/s	-	-	8 GSa/s
	Vertical Resolution	14-bit	-	-	14-bit
	Bandwidth	DC-3.5 GHz	-	-	DC-3.5 GHz
	Arbitrary Waveform Length	1 Gpts/CH	-	-	1 Gpts/CH
	Output Type	50 Ω, Single-ended	-	-	50 Ω, Single-ended
	Max. Output Amplitude	500 mVpp	-	-	500 mVpp
	Phase Noise	-117 dBc/Hz @ 1GHz offset 10 kHz	-	-	-117 dBc/Hz @ 1GHz offset 10 kHz
	Channel Stability	±1 ps@12 h			±1 ps@12 h
	Sequence Mode (Option)	Support	-	-	Support
	Number of Sequence	3000/CH	-	-	3000/CH

		SUA8104G	SUA8204G	SUA8208G	SUA8304G
Digitizer Parameters	Sample Rate	-	4 GSa/s	4 GSa/s	4 GSa/s
	Vertical Resolution	-	14-bit	14-bit	14-bit
	Bandwidth	-	DC-1.5 GHz	DC-1.5 GHz	DC-1.5 GHz
	Digital Pre-processing		DDC, Decimation, Truncation	DDC, Decimation, Truncation	DDC, Decimation, Truncation
	Cache Bandwidth		32 GB/s		
	Cache Depth	-	1 Gpts/CH	512 Mpts/CH	1 Gpts/CH
	Output Type	-	50 Ω, Single-ended		
	Input Amplitude	-	1 Vpp		
	Measurement Accuracy	-	±5‰		
	Acquisition Mode		Ring Buffer Mode, Streaming Mode		
Master Control Parameters	Master Control Type	GPU AI-controlled			
	CPU	NVIDIA ORIN AGX, Carmel Armv8.2 64-bit 8 core, 2.2 GHz			
	GPU	1792-core NVIDIA Ampere architecture GPU with 56 Tensor Cores, 200TOPS AI Performance			
	Memory and Storage	32 GB 256-bit LPDDR4x, 32 GB eMMC 5.1, 4TB NVMe SSD			
	Network	10 GbE SFP+, 1 GbE RJ45			
	Interface	HDMI, USB3.0 x2			
	Operating System	Linux			
Dimensions	Width x Depth x Height	340 mm (W) x 235.5 mm (D) x 68 mm (H)			
Optional		-	16 TB Waveform Recording Extension		

Specifications

Specifications describe the warranted performance of calibrated instruments that have been stored for a minimum of 2 hours within the operating temperature range of 0 to 50°C, and a 40-minute warm-up period. Unless otherwise stated, the specifications in this manual include the measurement uncertainty.

Typical: characteristic performance, which 80% of the measurement results will meet at room temperature (approximately 25℃). This data is not warranted and does not include the measurement uncertainty.

Nominal: the expected mean or average performance or a design attribute (such as the 50 Ω connector). This data is not warranted and is measured at room temperature (approximately 25℃)

NOTE:

All charts in this manual are the measurement results from several instruments at room temperature unless otherwise noted.

Playback Channels

Analog Output	
Sample Rate	Max. 8 GSa/s
Amplitude Range	500 mVpp
Amplitude Accuracy	±2 % of setting
Analog Bandwidth	DC-3.5 GHz
Rise/Fall Time (20% to 80%)	＜ 120 ps @500 mVpp
Number of Channels	2/4 Channels
Output Coupling	DC
Output Impedance	50 Ω ±2%
Connector	SMA

Spurious Free Dynamic Range (Typ)

SFDR is measured @ 250 mVpp, excluding harmonics.

	In-band Performance		Adjacent Band Performance	
Output Signal	Measured Range	Specifications	Measured Range	Specifications

Spurious Free Dynamic Range (Typ)				
DC-1 GHz	DC-4 GHz	-70 dBc	4 GHz-8 GHz	-60 dBc
1 GHz-1.5 GHz		-55 dBc		-60 dBc
1.5 GHz-3 GHz		-45 dBc		-45 dBc
3 GHz-3.5 GHz		-40 dBc		-45 dBc (image signal is not included)

Harmonics		
Harmonic distortion measurement @250 mVpp		
SHG	DC-1 GHz	<-45 dBc
	1 GHz-2 GHz	<-38 dBc
	2 GHz-3.5 GHz	<-33 dBc
THG	DC-1 GHz	<-55 dBc
	1 GHz-2 GHz	<-40 dBc
	2 GHz-3.5 GHz	<-36 dBc

Phase Noise		
Output Phase Noise (Typ)	fc=100 MHz	-138 dBc/Hz @ offset 10 KHz
	fc=1 GHz	-117 dBc/Hz @ offset 10 KHz

IMD	
IMD is measured @ 250 mVpp	
100 MHz ± 1 MHz	-70 dBc
1 GHz ± 1 MHz	-50 dBc

Waveform		
Waveform File Import Capacity	*.dat file format	Stored in binary format, int16 data type, with a range from -32768 to 32767.
		Stored in binary format, float/double data type, with a range from -1 to +1.
	*.csv file format	The data range is from -1 to +1
Waveform Sequence		Supports to build complex waveform sequences with the NSWave programming language.

Waveform Generator		
Number of Waveform Segment	1 to 3,000	
Waveform Segment Length	Waveform length: 16 KSa to 512 MSa; Minimum waveform granularity: 32 Sa	
Output Sequence	Executes the steps of the sequence in specific order.	
Loop	Executes 1 to 2^32 times or infinite times in a loop.	
Jump	Direct: immediately executes the step in the sequence. Wait: waits for internal or external trigger to play the step in the sequence. Delay: supports the time delay for jump between sequence steps.	
DUC		
Mixer Local Oscillator Frequency Accuracy	Less than 0.1 Hz	
Interpolation Ratio	8 GSa/s	1x 2x 4x 5x 10x 20x
	4 GSa/s	1x 2x 4x 5x 10x 20x
	2 GSa/s	1x 2x 5x 10x

Acquisition Channel

Analog Input	
Sample Rate	Max. 4 GSa/s
Vertical Resolution	14-bit
Max. Input Voltage Range	1 Vpp
DC Accuracy	±5‰
Analog Bandwidth	DC-1.5 GHz
Number of Channels	2/4/8-channel
Input Impedance	50 Ω ±2%
Coupling Mode	DC
Connector	SMA/RF integrated connector

Spurious Free Dynamic Range (Typ)		
SFDR is measured @ 1 Vpp, excluding harmonics.		
DC-1500 MHz	-55 dBc	
Harmonics (@1 Vpp)		
Harmonic distortion is measured @ 1 Vpp		
SHG	DC-1 GHz	-60 dBc
	1 GHz-1.5 GHz	-55 dBc
THG	DC-1 GHz	-70 dBc
	1 GHz-1.5 GHz	-65 dBc
ENOB		
ENOB is measured @ -1 dBFs		
DC-1500 MHz	8-bit	

Acquisition

Ring Buffer

Ring Buffer			
Trigger Mode	External input trigger, internal trigger, analog channel trigger		
8-bit Quantization Mode	Max. 4 GSa/s per channel	Total Trigger Depth	2/4 channels: 2 GSa 8-channel: 1 GSa
		Number of pre-trigger sample points	2/4 channels: 32 KSa-2 GSa 8-channel: 32 KSa-1 GSa Minimum granularity: 32 KSa
		Number of post-trigger sample points	2/4 channels: 32 KSa-2 GSa 8-channel: 32 KSa-1 GSa Minimum granularity: 32 KSa

Ring Buffer			
14-bit Quantization Mode	2/4 channels: Max. 4 GSa/s per channel 8-channel: Max. 2 GSa/s per channel	Total Trigger Depth	2/4 channels: 1 GSa 8-channel: 512 MSa
		Number of pre-trigger sample points	2/4 channels: 16 KSa-1 GSa 8-channel: 16 KSa-512 MSa Minimum granularity: 16 KSa
		Number of post-trigger sample points	2/4 channels: 16 KSa-1 GSa 8-channel: 16 KSa-512 MSa Minimum granularity: 16 KSa

Streaming

Streaming			
Continuous Trigger	External input trigger, internal trigger, analog channel trigger		
Continuous Trigger Sample Points	8-bit Quantization Mode	Max. 4 GSa/s per channel	Total continuous trigger depth	2/4 channels: 2 GSa 8-channel: 1 GSa
			Single trigger depth	2/4/8 channels: 64 KSa
			Pre-trigger sample points for a single trigger	64 Sa-64 KSa Minimum granularity: 64 Sa
			Post-trigger sample points for a single trigger	2/4 channels: 64 Sa-2 GSa 8-channel: 64 Sa-1 GSa Minimum granularity: 64 Sa
	14-bit Quantization Mode		Total continuous trigger depth	2/4 channels: 1 GSa 8-channel: 512 MSa
			Single trigger depth	2/4/8 channels: 32 KSa
			Pre-trigger sample points for a single trigger	32 Sa-32 KSa Minimum granularity: 32 Sa
			Post-trigger sample points for a single trigger	2/4 channels: 32 Sa-1 GSa 8-channel: 32 Sa-512 MSa Minimum granularity: 32 Sa

Streaming	
Continuous Acquisition	Supports a 16 TB memory option, offers 8-bit and 14-bit quantization memory, and has a total data bandwidth of 2.4 GB/s.

DDC		
Mixer Local Oscillator Frequency Accuracy	Less than 0.1 Hz	
Decimation Ratio	4 GSa/s	1x 2x 4x 5x 10x 20x
	2 GSa/s	1x 2x 5x 10x
	1 GSa/s	1x 5x

Trigger

Trigger System	
Trigger Source	Analog channel (1-8), external trigger, internal trigger
Trigger Modes	Single, continuous
External Trigger Input	Level: TTL 5 V, SMA connector
Trigger Output	Level: TTL 5 V, SMA connector

Clock

Clock System	
Clock Source	10 MHz external input, 100 MHz external input, 100 MHz internal clock, external sample clock
Internal Clock	100 MHz
	Accuracy: ±1 ppm
	Temperature stability (-20-70°C): ±0.5 ppm
	Aging: ±1 ppm/year
100 MHz Clock Output	Power: 0 dBm-5 dBm
	SMA connector, 50 Ω (nom)
100 MHz Clock Input	Power: 0-10 dBm
	SMA connector, 50 Ω (nom)
10 MHz Clock Input	Power: 0 dBm-10 dBm
	SMA connector, 50 Ω (nom)

Clock System	
External Sample Clock	Frequency: 1 GHz-8 GHz
	Power: 0-10 dBm
	SMB connector, 50 Ω (nom)

Processor System

GPU Processor	
AI Performance	200 TOPS
GPU	1792-core NVIDIA Ampere c GPU with 56 Tensor Cores
GPU Max. Frequency	930 MHz
CPU	8-core Arm® Cortex® -A78AE v8.2 64-bit CPU 2 MB L2 + 4 MB L3
CPU Max. Frequency	2.2 GHz
Video Memory	32 GB 256-bit LPDDR5 204.8 GB/s
CPU Processor	
Clock Speed	2.1 GHz base frequency, 3.95 GHz maximum frequency
Core Count	6 cores
Memory	32 GB DDR4-3200 MT/s

Instrument Characteristics

Instrument Characteristics	
Operating System	Linux
Display	2.8″ basic status display

General Specifications

Interface	
LAN Interface	Electrical port: 1, RJ45 Ethernet interface, 10/100/1000 BASE-T interface
	Optical port: 1, 10 Gigabit, SFP+ interface
Web Control	Support Web Control (input the IP address of the product into the Web browser to display the operation interface)

Interface		
HDMI	1, HDMI 1.4b, A plug; used to connect to an external monitor	
USB 3.0	2, Type A interface	
GPIO	1 RS232, 1 RS422, used to interconnect with the processor serial port	
Power Supply		
Input Interface	5.5 mm round hole	
Input Voltage	DC 19.5 V, 11.8 A	
Power Consumption	180 W (typ)	
Environment		
Temperature Range	Operating	0℃ to +50℃
	Non-operating	-40℃ to +70℃
Humidity Range	Operating	Up to +30℃, ≤90% RH (non-condensing)
		+30℃ to +40℃, ≤75% RH (non-condensing)
		+40℃ to +50℃, ≤45% RH (non-condensing)
	Non-operating	Up to 65℃, ≤90% RH (non-condensing)
Altitude	Operating	Up to 3,000 meters
	Non-operating	Up to 15,000 meters
Calibration Interval		
Recommended Calibration Interval	12 months	

Regulation Standards		
Electromagnetic Compatibility	Compliant with EMC Directive (2014/30/EU), compliant with or higher than the standards specified in EN 61326-1: 2013, EN 61326-2-1:2013, EN IEC 61000-3-2:2019+A1, EN 61000-3-3:2013+A1:2019	
	CISPR 11:2009+A1 Class A	
	EN IEC 61000-3-2:2019+A1	Harmonics, Class A
	EN 61000-3-3:2013+A1:2019	Voltage flicker
	EN 61000-4-2:2009	±4.0 kV (contact discharge), ±8.0 kV (air discharge)
	EN 61000-4-3:2006+A1+A2	10 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 6 GHz)
	EN 61000-4-4:2004+A1	2 kV power cord
	EN 61000-4-5:2006	1 kV (phase-to-neutral voltage); 2 kV (phase-to-earth voltage); 2 kV (neutral-to-earth voltage)
	EN 61000-4-6:2009	10V, 0.15 MHz to 80 MHz
	EN 61000-4-11:2004	Voltage dip: 0% UT during half cycle; 0% UT during 1 cycle; 70% UT during 25 cycles
		Short interruption: 0% UT during 250 cycles
Safety	EN 61010-1:2010+A1:2019 IEC 61010-1:2010+A1:2016 UL 61010-1: 2012 R6.23 CAN/CSA-C22.2 NO. 61010-1-12 + GI1 + GI2 (R2017) + A1	
Vibration	Compliant with GB/T 6587, class 2 random, compliant with MIL-PRF-28800F and IEC60068-2-6, class 3 random	
Shock	Compliant with GB/T 6587-2012, class 2 random, compliant with MIL-PRF-28800F and IEC 60068-2-27, class 3 random (in non-operating conditions: 30 g, half-sine wave, 11 ms duration, 3 oscillations/axis along the main axis, a total of 18 vibrations)	
Mechanical Characteristics		
Dimensions	340 mm (W) x 68 mm (H) x 230 mm (D)	
Weight	≤4.5Kg	
Rack Mount	Mounting accessories (optional)	

Order Information and Warranty Period

Order Information

Order Information	Order No.
Model	
4-channel AWG, 8 GSa/s sample rate, 3.5 GHz bandwidth, 14-bit vertical resolution, CPU master-controlled	SUA8104
4-channel Digitizer, 4 GSa/s sample rate, 1.5 GHz bandwidth, 14-bit vertical resolution, CPU master-controlled	SUA8204
8-channel Digitizer, 4 GSa/s sample rate, 1.5 GHz bandwidth, 14-bit vertical resolution, CPU master-controlled	SUA8208
2-channel AWG and 2-channel digitizer, 4 GSa/s sample rate, 1.5 GHz bandwidth, 14-bit vertical resolution, CPU master-controlled	SUA8304
4-channel AWG, 8 GSa/s sample rate, 3.5 GHz bandwidth, 14-bit vertical resolution, GPU AI-controlled	SUA8104G
4-channel digitizer, 4 GSa/s sample rate, 1.5 GHz bandwidth, 14-bit vertical resolution, GPU AI-controlled	SUA8204G
8-channel digitizer, 4 GSa/s sample rate, 1.5 GHz bandwidth, 14-bit vertical resolution, GPU AI-controlled	SUA8208G
2-channel AWG and 2-channel Digitizer, 4 GSa/s sample rate, 1.5 GHz bandwidth, 14-bit vertical resolution, GPU AI-controlled	SUA8304G
Standard Accessories	
Power adapter (based on destination country)	-
Options	
16 TB waveform recording extension option	M8501
AWG advanced sequence mode	SUA8000-SQ

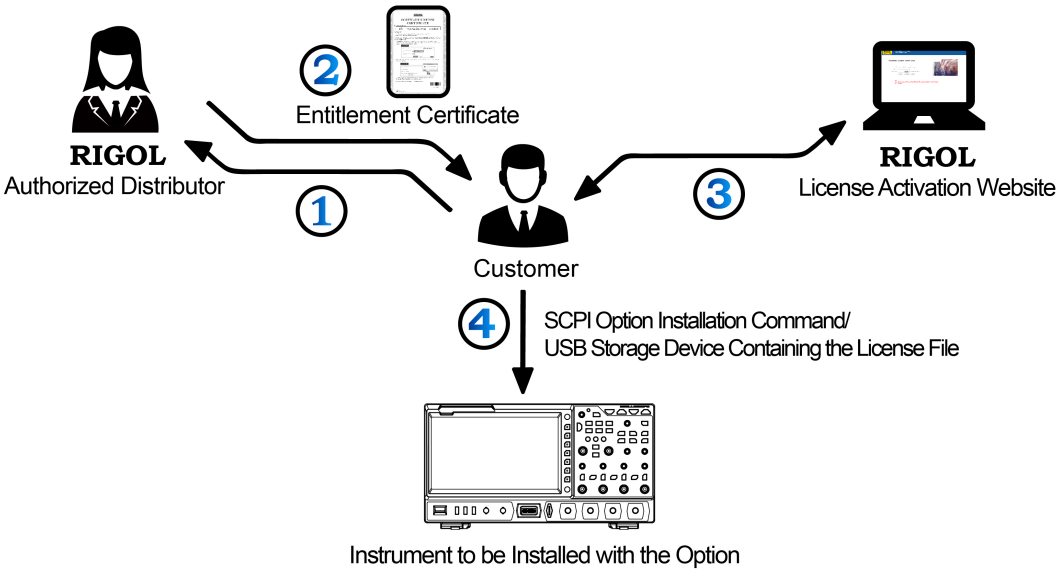
NOTE:

For all the hosts, accessories, and options, please contact the local office of RIGOL.

Warranty Period

Three years for the mainframe, excluding the accessories.

Option Ordering and Installation Process



1. According to the usage requirements, please purchase the specified function options from **RIGOL Sales Personnel**, and provide the serial number of the instrument that needs to install the option.
2. After receiving the option order, the **RIGOL** factory will mail the paper software product entitlement certificate to the address provided in the order.
3. Log in to **RIGOL** official website for registration. Use the software key and instruments serial number provided in the entitlement certificate to obtain the option license code and the option license file.
4. Install the option by running the SCPI command concerning the option installation. You can also save the option license file to the root directory of the USB storage device. Then insert it to the instrument. After being recognized, follow the instructions to install the option.

NOTE:

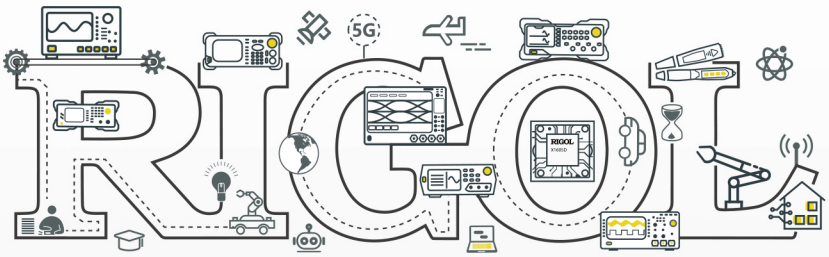
If any problems occur during the option installation process, please contact **RIGOL** technical team.

Boost Smart World and Technology Innovation

Industrial Intelligent Manufacturing

Semiconductors

Education& Research



Communication

System Integration

New Energy

- Cellular-5G/WIFI
- UWB/RFID/ ZIGBEE
- Digital Bus/Ethernet
- Optical Communication

- Digital/Analog/RF Chip
- Memory and MCU Chip
- Third-Generation Semiconductor
- Solar Photovoltaic Cells

- New Energy Automobile
- PV/Inverter
- Power Test
- Automotive Electronics

Provide Testing and Measuring Products and Solutions for Industry Customers

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