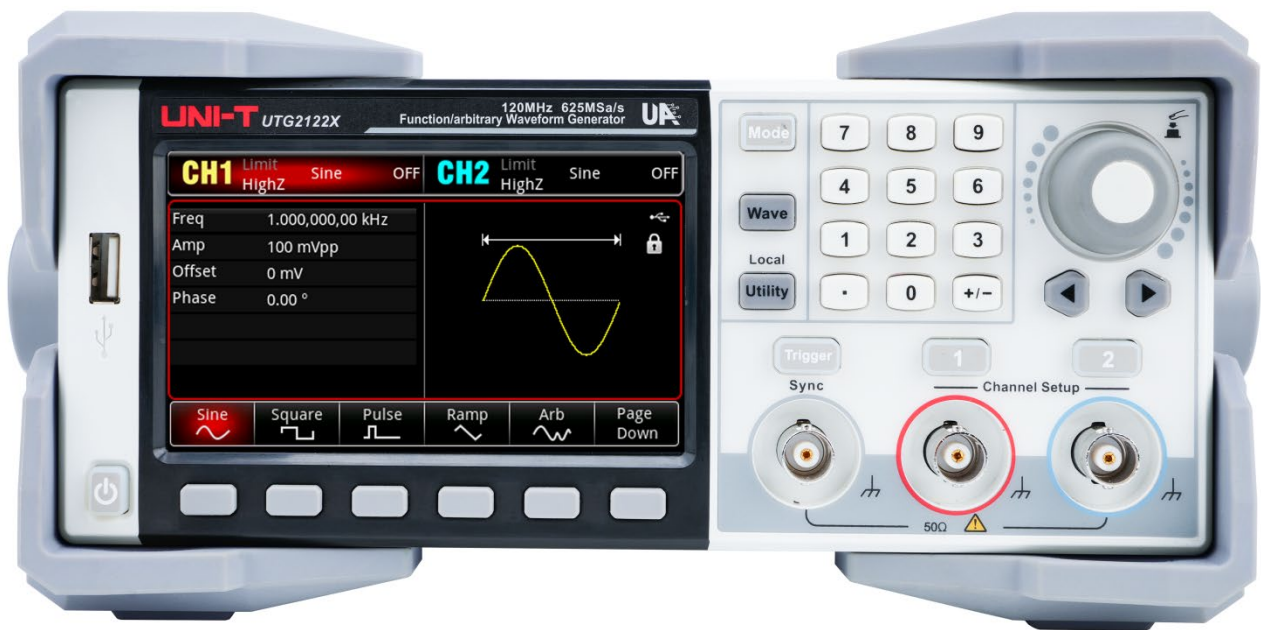


UNI-T®

Instruments.uni-trend.com



UTG2000X Series

Function/Arbitrary Waveform Generators

Data Sheet

V 1.3

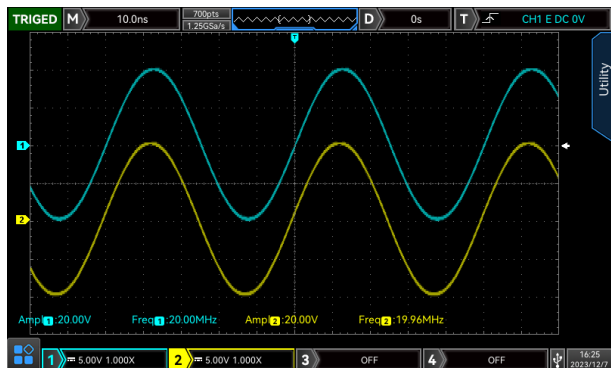
November 2025

Product Features

- Dual channel with the maximum frequency output 120 MHz, the maximum output amplitude 20 Vpp
- 625 MSa/s sample rate and 16-bit vertical resolution
- Multiple analog and digital modulation function: AM, PM, FM, DSB-AM, ASK, PSK, BPSK, QPSK, FSK, 3FSK, 4FSK, QAM, OSK, PWM, SUM
- Square wave with the maximum frequency 50 MHz, low jitter
- Wide dynamic and high-precision pulse wave with adjustable edge time, which can achieve fine edge time adjustment and has extremely high adjustment resolution and range
- Excellent performance with low harmonic distortion
- Supports sweep frequency and burst output
- A low-jitter waveform can be generated point by point, with an arbitrary waveform length ranging from 8 points to 64 megapoints (Mpts)
- Supports channel copying, following, and stacking settings
- Can generate arbitrary waveform through arbitrary waveform editor on the upper computer
- 7-bit hard frequency counter
- Built-in 200 arbitrary waves
- Standard USB Host, USB Device, and LAN interface
- Support SCPI (programmable instrument standard commands)
- 4.3 inch TFT LCD capacitive touch display screen

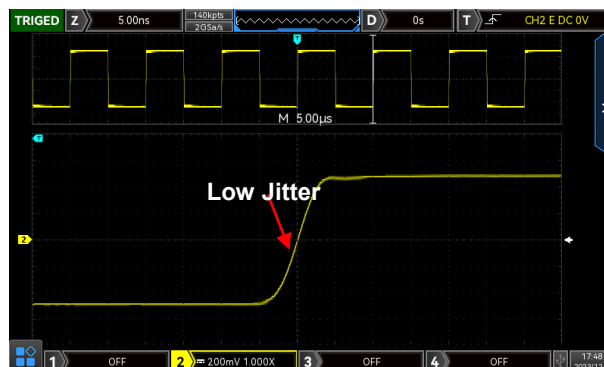
Design Features

Equivalent performance of double channel output

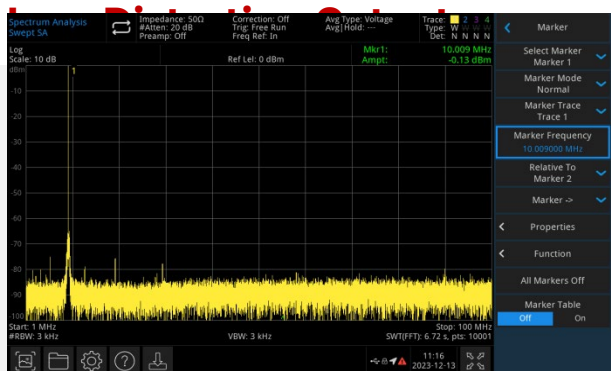


Low Jitter

Large output under the high frequency: double channel with full amplitude output of 20 Vpp can be output under the frequency of 20 MHz.



The excellent digital sampling technology makes the output waveform jitter much lower.

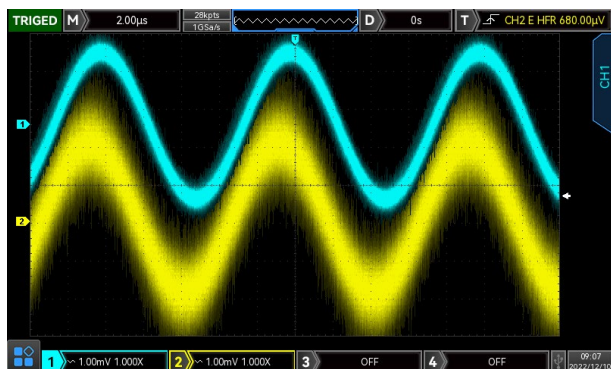


Outstanding harmonic distortion



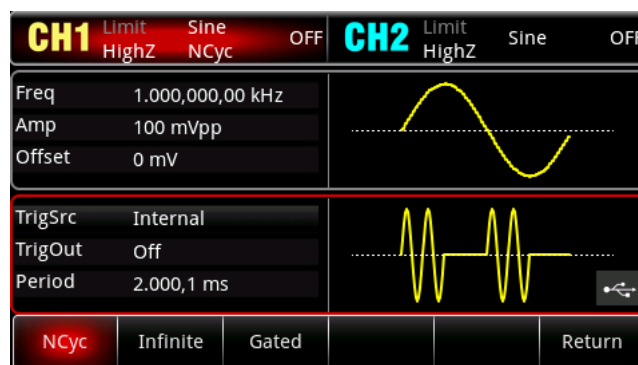
-80dBc spurious free dynamic range

High Signal to Noise Ratio



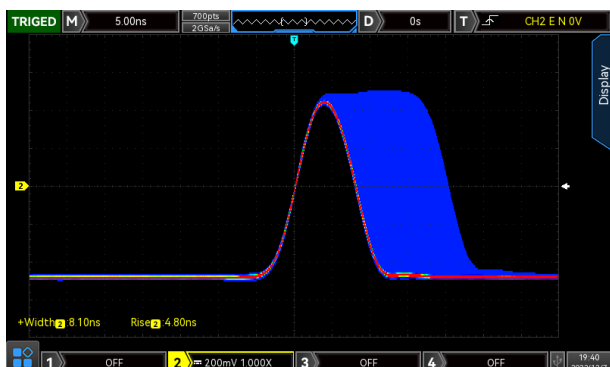
A small signal superimposed with a large DC results in a lower output noise and a higher SNR.

Burst



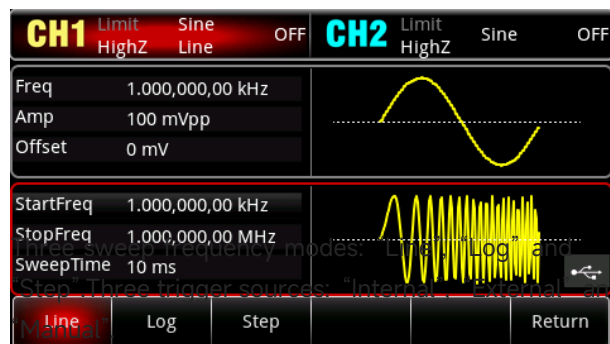
Three types of bursts: "N cycle", "Infinite" and "Gate". Three trigger sources: "Internal", "External" and "Manual".

Pulse Wave and Edge Time

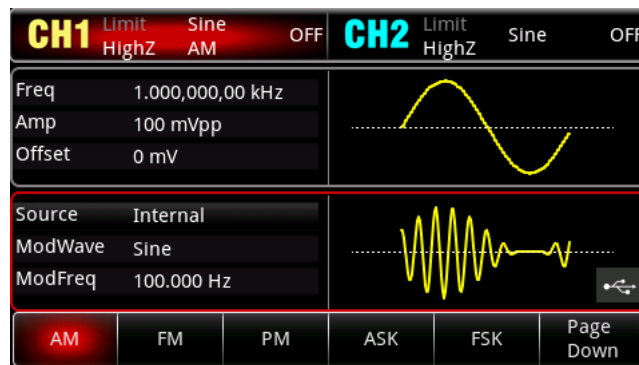


The new generation of wide dynamic high precision edge time adjustable pulse wave has a minimum pulse width of 8 ns. The pulse width can be fine adjusted and the minimum step is 100 ps. In addition, it can produce higher harmonic component, which has the feature of a dedicated pulse generator. The edge time can be set to a minimum of 5 ns independently.

Sweep Frequency



Multiple Modulation Function



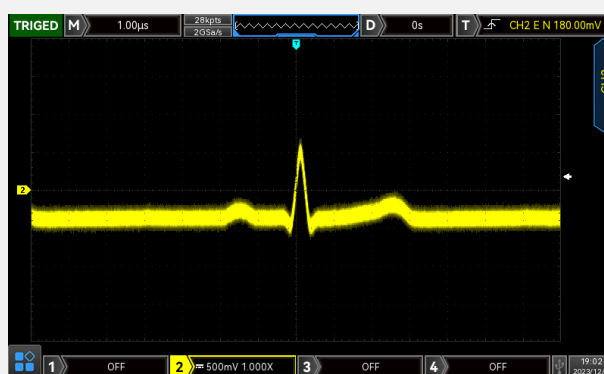
Modulation output (15 types): AM, FM, PM, DSB-AM, ASK, FSK, PSK, 3FSK, 4FSK, BPSK, QPSK, OSK, SUM, QAM and PWM.

Frequency Counter



The high precision hardware frequency counter can measure the frequency range of 100 mHz to 200 MHz.

Channel Merge



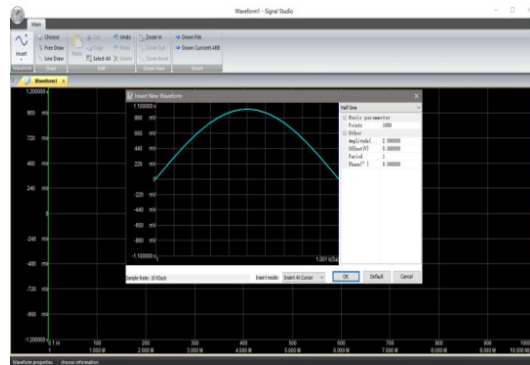
Channel merging can be realized with SUM or channel stacking functions, generating signals with adjustable signal-to-noise ratios and dual-tone multi-frequency signals. Up to four signals can be summed and coupled on two

channels, and SUM enables the output of two-tone or multi-tone signals.

Channel Tracking



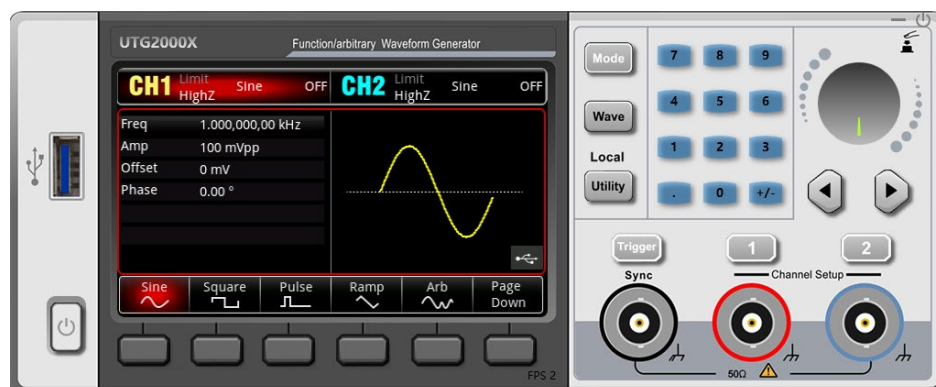
Channel tracking simplifies the operation of dual channels. The phase, amplitude and frequency of both channels can be controlled by a single parameter, making it easy to create deviation or tracking signals.



The arbitrary waveform editor has diversified generating method. The arbitrary waveform can be generated by insert the standard waveform or freely drawing.

Arbitrary Waveform Editor

Remote Control



The instrument can connect to the computer via USB and LAN port and it supports remote control.

The user can use the control software for remote operation and control, and realize automatic testing and remote monitoring.

4.3 inch Capacitive Touch Screen



4.3-inch high-definition display, touch operation, so that the instrument control faster and more convenient.

Definition and Condition

- "Technical Index" provide a detailed description of the performance of the parameters which involved in the product warranty. Unless otherwise specified, these specifications are applicable to the temperature range from 18 °C to 28 °C.
- "Typical Value" refers to other product performance information which not covered in the product warranty. When the performance exceeds the technical index, 80% of the units can exhibit 95% confidence in the temperature range of 18 °C to 28 °C. Typical performance does not include uncertainty of measurement.
- "Nominal Value" means the expected performance or describes the performance of the product that is useful in the application of the product but is not included in the scope of the product warranty.

Under the following conditions, it can achieve its technical indicators:
In the calibration cycle and has been warmed up for at least 30 minutes. If the device is stored in an environment that is within the allowable storage temperature range but exceed the allowable operating temperature range, the instrument must be placed within the allowable operating temperature range for at least two hours

Basic Waveform Characteristics

All analog channel output related specifications is suitable for channel 1 and channel 2

Basic characteristics			
Model	UTG2062X	UTG2082X	UTG2122X
Channel	Dual channel		
Sampling rate	625 MSa/s (1.25 GSa/s, 2 x interpolation)		

Vertical resolution	16-bit
Working modes	Continuous, Modulation, Frequency sweep, Burst, Counter
Wave	Sine, Square, Ramp, Pulse, Noise, DC, Arb, Harmonic, PRBS, Expression, Multi Pulse
Modulation	AM, FM, PM, DSB-AM, ASK, FSK, PSK, 3FSK, 4FSK, BPSK, QPSK, OSK, SUM, QAM, PWM
Frequency sweep	Lin, Log, Step
Burst	N-cycle, Gated, Infinite
Counter	100 mHz to 200 MHz, 7 digits
LCD	4.3 inch TFT LCD capacitive touch display screen, WVGA(480×272)

Frequency characteristic

Sine wave	1 μ Hz to 60 MHz	1 μ Hz to 80 MHz	1 μ Hz to 120 MHz
Square wave	1 μ Hz to 30 MHz	1 μ Hz to 40 MHz	1 μ Hz to 50 MHz
pulse wave	1 μ Hz to 30 MHz	1 μ Hz to 40 MHz	1 μ Hz to 50 MHz
Ramp wave	1 μ Hz to 5 MHz		
Arbitrary wave	1 μ Hz to 50 MHz		
Harmonic	1 μ Hz to 30 MHz	1 μ Hz to 40 MHz	1 μ Hz to 50 MHz
Expression	1 μ Hz to 25 MHz		
PRBS	1 μ bps to 50 Mbps		
Gauss noise	1 MHz to 60 MHz	1 MHz to 80 MHz	1 MHz to 120 MHz
Resolution	1 μ Hz		
Reference frequency	Frequency:10.0000 MHz		
	Initial accuracy:±0.5 ppm, 25°C		
	Temperature stability:±0.5 ppm, 0°C to 40°C		
	Annual aging rate:±1 ppm, First year aging rate		

Sine wave

Frequency	1 μHz to 60 MHz	1 μHz to 80 MHz	1 μHz to 120 MHz
Harmonic distortion	Typical value (0dBm)	DC to 1 MHz: -70 dBc	
		1 MHz to 10 MHz: -65 dBc	
		10 MHz to 40 MHz: -60 dBc	
		40 MHz to 80 MHz: -55 dBc	
		80 MHz to 120 MHz: -50 dBc	
THD	< 0.07% (DC to 20 kHz, 1 Vpp)		
Spurious signal (anharmonic)	Typical value (0 dBm)	≤10 MHz ,< -70 dBc	
		> 10 MHz ,<-70 dBc+6 dB/octave	
Phase noise(typical)	10 MHz: ≤-125 dBc/Hz (typical, 0 dBm, 10 kHz deviation)		

Square wave

Frequency	1 μ Hz to 30 MHz	1 μ Hz to 40 MHz	1 μ Hz to 50 MHz
Rise/fall time (1 Vpp, 50 Ω)	<5 ns (typical, 1 kHz)		
Overshoot (100kHz, 1 Vpp)	< 2% (typical, 50 Ω)		
Duty ratio	0.001% to 99.999% (limited by current frequency)		
Symmetry (duty ratio=50%)	1% of period + 4 ns		
Jitter(RMS) (1 Vpp, 50 Ω)	Typical (1 MHz, 1 Vpp, 50 Ω)	≤ 5 MHz:2 ppm + 200 ps > 5 MHz:200 ps	

Ramp wave

Frequency	1 μ Hz to 5 MHz
Non-linearity	< 1% of peak output (typical value, 1 kHz, 1 Vpp, symmetry 100%)
Symmetry	0.0% to 100.0%

Pulse wave

Frequency	1 μ Hz to 30 MHz	1 μ Hz to 40 MHz	1 μ Hz to 50 MHz
Minimum pulse width	8 ns		
Variable edge	5 ns to 10 s		
Duty ratio	0.001% to 99.999% (limited by current frequency)		
Overshoot	< 2% (typical, 1 Vpp 50 Ω)		
Jitter	150 ps		

Arbitrary wave

Frequency (DDS)	1 μ Hz to 50 MHz	
Wave length	DDS	8 kpts (Regular)
	Point by point	8 pts to 32 Mpts (Up to 64 Mpts for single channel output)
Vertical resolution	16-bit (symbol included)	
Sampling rage	DDS	625 MSa/s (DDS)
	Point by point	1 μ Sa/s to 312.5 MSa/s
Minimum rise/fall time	<5 ns (typical, 1 Vpp, 50 Ω)	
Jitter (playback mode)	150 ps	
Nonvolatile storage	200 waves	

PRBS

Bit rate	1 μ bps to 50 Mbps
Edge time	5 ns to 1,000 s
Symbol	PN3, PN5, PN7, PN9, PN11, PN13, PN15, PN17, PN19, PN21, PN23, PN25, PN27, PN29, PN31

Expression properties

Frequency	1 μ Hz to 25 MHz
Function	Sin, cos, tan, sinc, abs, ln, sqrt, acos, asin, atan, sinh, tanh, ceil, exp, fabs, floor, lg, cosh
Operation	+ , - , * , / , ^
Variable value	°, rad

Harmonic

Frequency	1 μ Hz to 30 MHz	1 μ Hz to 40 MHz	1 μ Hz to 50 MHz
Harmonic order	2 to 16		
Type	Odd, Even, All, User Defined		
Amplitude	1 mV to 10 Vpp (50 Ω)		
	Set the amplitude based on the selected harmonic sequence number		
Phase	-360° to 360°		
	Set the phase based on the selected harmonic sequence number		

Multi Pulse

Trigger Source	Internal, external, manual
Delay	0 to 100 s
Total number	2 to 30
Minimum pulse width	20 ns
Variable edge	5 ns to 500 s
Pulse gap	20 ns to 1 ks

Output Characteristic

Output

Amplitude (50 Ω)	≤20 MHz: 1 mVpp to 10 Vpp
	≤60 MHz: 1 mVpp to 5 Vpp
	≤120 MHz: 1 mVpp to 2 Vpp
Amplitude (High resistance)	≤20 MHz: 2 mVpp to 20 Vpp
	≤60 MHz: 2 mVpp to 10 Vpp
	≤120 MHz: 2 mVpp to 4 Vpp

Accuracy	Typical value(1kHz, sine wave, 0V, deviation, > 10 mVpp)	$\pm (1\% \text{ of set value}+1 \text{ mVpp})$
Amplitude flatness	Typical value (1kHz, sine wave, 1 Vpp)	$\leq 60 \text{ MHz: } \pm 0.2 \text{ dB}$
		$\leq 80 \text{ MHz: } \pm 0.4 \text{ dB}$
		$\leq 120 \text{ MHz: } \pm 0.6 \text{ dB}$
DC offset		
Range(peak AC+DC)	$\pm 5 \text{ V (} 50 \text{ }\Omega \text{)}$	
	$\pm 10 \text{ V (High resistance)}$	
Accuracy of offset	Offset set value $\pm 1\% \pm$ amplitude set value $0.5\% \pm 2 \text{ mV}$	
Waveform output		
Impedance	50 Ω typical value	
Protection	Overvoltage protection, overload automatically disabling waveform output	

Modulation Types

Model	UTG2062X	UTG2082X	UTG2122X
AM			
Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave, pulse wave		
Source	Internal/External		
Modulation wave	Sine wave, square wave, ramp wave, noise, arbitrary wave		
Modulation depth	0% to 120%		
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)		
FM			
Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave, pulse wave		
Source	Internal/External		
Modulation wave	Sine wave, square wave, ramp wave, noise, arbitrary wave		
Frequency deviation	DC to 30 MHz	DC to 40 MHz	DC to 60 MHz
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)		
PM			
Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave		
Source	Internal/External		
Modulation wave	Sine wave, square wave, ramp wave, noise, arbitrary wave		
Phase deviation	0 to 360°		
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)		

DSB-AM

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave, pulse wave
Source	Internal/External
Modulation wave	Sine wave, square wave, ramp wave, noise, arbitrary wave
Modulation depth	0% to 100%
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)

ASK

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave, pulse wave
Source	Internal/external
Modulation wave	Square wave (Duty ratio 50%)
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)

FSK

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave, pulse wave
Source	Internal/external
Modulation wave	Square wave (Duty ratio 50%)
Hopping frequency	Carrier Frequency
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)

PSK

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave
Source	Internal/external
Modulation wave	Square wave (Duty ratio 50%)
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)
Phase	-360° to 360°

3FSK

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave, pulse wave
Source	Internal
Modulation wave	Square wave (Duty ratio 50%)
Hopping frequency	Carrier Frequency
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)

4FSK

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave, pulse wave
Source	Internal
Modulation wave	Square wave (Duty ratio 50%)
Hopping frequency	Carrier Frequency
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)

BPSK

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave
Source	Internal
Symbol	PN3, PN5, PN7, PN9, PN11, PN13, PN15, PN17, PN21, PN23, PN25, PN27, PN29, PN31
Symbol bit rate	2 mbps to 1 Mbps (The modulation source is internal)
Phase	-360° to 360°

QPSK

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave
Source	Internal
Symbol	PN3, PN5, PN7, PN9, PN11, PN13, PN15, PN17, PN21, PN23, PN25, PN27, PN29, PN31
Symbol bit rate	2 mbps to 1 Mbps (The modulation source is internal)
Phase	-360° to 360°

OSK

Carrier wave	Sine wave
Source	Internal/external
Oscillation time	5 ns to 250 s
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)

SUM

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave, pulse wave, harmonics, noise
Source	Internal/External
Modulation wave	Sine wave, square wave, ramp wave, noise, arbitrary wave
Modulation depth	0% to 100%
Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)

QAM

Carrier wave	Sine wave
Constellation mapping	QAM4, QAM8, QAM16, QAM32, QAM64, QAM128, QAM256
Symbol	PN3, PN5, PN7, PN9, PN11, PN13, PN15, PN17, PN21, PN23, PN25, PN27, PN29, PN31
Symbol bit rate	2 mbps to 1 Mbps

PWM

Carrier wave	Pulse
Source	Internal/external
Modulation wave	Sine wave, square wave, ramp wave, noise, arbitrary wave
PWM range	0% to 49.99%

Modulation frequency	2 mHz to 1 MHz (The modulation source is internal)
----------------------	--

Sweep

Frequency sweep

Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave, pulse wave
Type	Linear, Logarithmic, Stepwise
Trigger Source	Internal, external, manual
Trigger Edge	Rising edge, falling edge
Trigger Output	On, off
Frequency sweep time	1 ms to 500 s $\pm$ 0.1% (Lin, Log)
Residence time	1 ms to 500 s $\pm$ 0.1% (step)
Step number	2 to 2,048 step

Burst

Burst

Waveform	Sine wave, square wave, ramp wave, pulse, arbitrary wave
Mode of pulse train	N cycle, infinite, gated
Initial and stop phase	-360° to 360°
Source	Manual, external, internal
Trigger edge	Rising edge/falling edge
Trigger Output	On, off
Internal cycle	1 μ s to 500 s $\pm$ 0.1%
Recurring number	1 to 50,000
Polarity	Positive and negative (TTL level input)

Auxiliary functions

Channel settings

Channel output	On, off
Channel reverse	On, off
Synchronous output	CH1, CH2, Off
Load	50 Ω , 75 Ω , HighZ, Custom (1 Ω to 999999 Ω)
Amplitude limitation	On, off
Upper limit of amplitude	-9.998 V to 10 V (HighZ)

Lower limit of amplitude -10 V to 9.998 V (HighZ)

Channel replication

Channel 1 replication CH1→CH2

Channel 2 replication CH2→CH1

Channel Follow

Follow type Parameter following, channel tracking

Parameter follow Frequency following, amplitude following, phase following

Follow type Deviation, Ratio

Channel stacking

Channel 1 overlay On, off

Channel 2 overlay On, off

System settings

Language English, Chinese, Deutsch

Phase synchronization Independent, synchronized

Voice On, off

Number separator Comma, space, none

Backlight 10%, 30%, 50%, 70%, 90%, 100%

Screen saver Off, 5 minutes, 15 minutes, 30 minutes, 1 hour

Frequency meter

Measurement frequency range 100 mHz to 200 MHz

Input Level Range TTL compatibility

Measurement accuracy 7 digits

Interface and Display

Interface

Standard configuration USB Host, USB Device, LAN

Synchronous signal output

Output level TTL compatible

Frequency 1 μ Hz to 10 MHz

Output Impedance 50 Ω (Typical)

Coupling method DC

External modulation input

Input frequency <50 KHz

Depth ± 5 Vpk=100%

Impedance	5 k Ω (Typical)
External reference input	
Input frequency	10 MHz $\pm$ 50Hz
Input level	TTL compatible
Impedance	10 k Ω (Typical value, DC coupling)
Lock time	<1 s
Internal reference output	
Input frequency	10 MHz
Input level	TTL compatible
Impedance	50 Ω (Typical value, DC coupling)
Trigger Input	
Input level	TTL compatible
Slope	Rising or falling
Pulse width	> 100 ns
Impedance	10 k Ω (Typical value, DC coupling)
Response time	<1 μ s (Typical value)
Trigger Output	
Input level	TTL compatible
Pulse width	> 400 ns (Typical value)
Impedance	50 Ω (Typical value)
Display screen	
Display type	4.3 inches TFT LCD Capacitive Touch Screen
Display resolution	WVGA(480 $\times$ 272)

General Technical Specifications

Specifications	
Supply voltage	100 to 240 VAC (Fluctuations: $\pm$ 10%), 50 Hz/60Hz; 100 to 120 VAC (Fluctuations: $\pm$ 10%), 400 Hz
Power consumption	< 50 W
Fuse	2.5 A, Class T, 250 V
Environment	
Temperature range	Operation: +10 $^{\circ}$ C to +40 $^{\circ}$ C Non operational: -20 $^{\circ}$ C to +60 $^{\circ}$ C
Cooling method	Natural cooling
Humidity range	+35 $^{\circ}$ C Below: $\leq$ 90% relative humidity

	+35 °C to +40 °C: ≤60% relative humidity
Altitude	Operating below 2, 000 m
	Non-operating below 15, 000 m
Class of pollution	2
Operating environment	indoor

Mechanical specifications

Dimensions	215mm×103mm×316mm (Width x Height x Length)
Net weight	2.5 kg
Calibration cycle	The recommended calibration circle is one year

Regulatory standards

EMC	Compliance with EMC directives (2014/30/EU), conform to or better than IEC 61326-1:2021/EN61326-1:2021,IEC 61326-2-1:2021/EN61326-2-1:2021	
Conductive disturbance	CISPR 11/EN 55011	CLASS B group 1,150kHz-30MHz
Radiation disturbance	CISPR 11/EN 55011	CLASS B group 1,30MHz-1GHz
Electrostatic discharge (ESD)	IEC 61000-4-2/EN 61000-4-2	±4.0 kV (Contact), ±8.0 kV (Air)
Radio frequency electromagnetic field immunity	IEC 61000-4-3/EN 61000-4-3	3 V/m (80 MHz to 1 GHz) 1 V/m (1.4 GHz to 6 GHz)
Electrical fast transient burst (EFT)	IEC 61000-4-4/EN 61000-4-4	±1 kV (AC input port)
Surge	IEC 61000-4-5/EN 61000-4-5	±0.5 kV (Live line to zero line) ±1 kV (Fire/zero line to ground)
Immunity to RF continuous conduction	IEC 61000-4-6/EN 61000-4-6	3 V, 0.15-80 MHz
Voltage dips and short interruptions	IEC 61000-4-11/EN 61000-4-11	Voltage dip: 0% UT during 0.5 cycle 0% UT during 1 cycles 70% UT during 25/30 cycles Short Interruption: 0% UT during 250/300 cycles

Safety regulations

EN 61010-1:2010+A1:2019
 EN IEC61010-2-030:2021+A11:2021
 UL 61010-1:2012 Ed.3+ R:19 Jul2019
 UL 61010-2-030:2018 Ed.2
 CSA C22.2#61010-1:2012 Ed.3+U1;U2;A1

CSA C22.2#61010-2-030:2018 Ed.2

Ordering Information

	Description	Order No.
Models	Maximum output frequency 60 MHz	UTG2062X
	Maximum output frequency 80 MHz	UTG2082X
	Maximum output frequency 120 MHz	UTG2122X
Standard accessories	Power cord x 1	
	USB cable x 1	UT-D14
	BNC-BNC x 1	UT-L45
	BNC--red and black alligator clip cable x1	UT-L02A
Recommended options	10 W Power amplifier option	UT-M14

Remarks: All mainframe, accessories, optional can order from the local UNI-T distributor.

Limited Warranty and Liability

UNI-T guarantees that the Instrument product is free from any defect in material and workmanship within three years from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination, or improper handling. If you need a warranty service within the warranty period, please contact your seller directly. UNI-T will not be responsible for any special, indirect, incidental, or subsequent damage or loss caused by using this device. For the probes and accessories, the warranty period is one year. Visit instrument.uni-trend.com for full warranty information.



Learn more at: www.uni-trend.com



Register your product to confirm your ownership. You will also get product notifications, update alerts, exclusive offers and all the latest information you need to know.

UNI-T is the licensed trademark of UNI-TREND TECHNOLOGY (CHINA) CO., Ltd.

UNI-T products are protected under patent laws in China and internationally, covering both granted and pending patents. Licensed software products are the properties of UNI-Trend and its subsidiaries or suppliers, all rights reserved. This manual contains information that replaces all earlier published versions. The product information in this document subject to update without notice. For more information on UNI-T Test & Measure Instrument products, applications, or service, please contact UNI-T instrument for support, the support center is available on www.uni-trend.com -> instruments.uni-trend.com

<https://instruments.uni-trend.com/ContactForm/>

Headquarter

UNI-TREND TECHNOLOGY (CHINA)
CO., Ltd.
Address: No.6, Industrial North 1st
Road, Songshan Lake Park, Dongguan
City, Guangdong Province, China
Tel: (86-769) 8572 3888

Europe

UNI-TREND TECHNOLOGY EU GmbH
Address: Steinerne Furt 62, 86167
Augsburg, Germany
Tel: +49 (0)821 8879980

North America

UNI-TREND TECHNOLOGY US INC.
Address: 2692 Gravel Drive,
Building 5, Fort Worth, Texas 76118
Tel: +1-888-668-8648