Data Sheet

UTG1000X Series Function/Arbitrary Waveform Generator

Product Features

■ *Two channels with the maximum frequency output 40 MHz, the maximum output amplitude 20 Vpp*

■ *200MSa/s sampling rate and 16-bit vertical resolution*

■ *Square wave with the maximum frequency 20 MHz, low jitter*

■ *Multiple analog and digital modulation function: AM, FM, PM, ASK, FSK, PSK and PWM*

■ *Supporting sweep frequency and pulse string output*

■ *Arbitrary wave can generate by the upper software computer*

■ *Built-in power pre-amplifier, the maximum power output 4 W (only for-PA model)*

■ *7 bit hard frequency meter*

■ *Built-in 200 arbitrary waves*

■ *Standard USB Host and USB Device*

■ *4.3 inch high resolution TFT LCD*

Dual-channel Output with Same Function
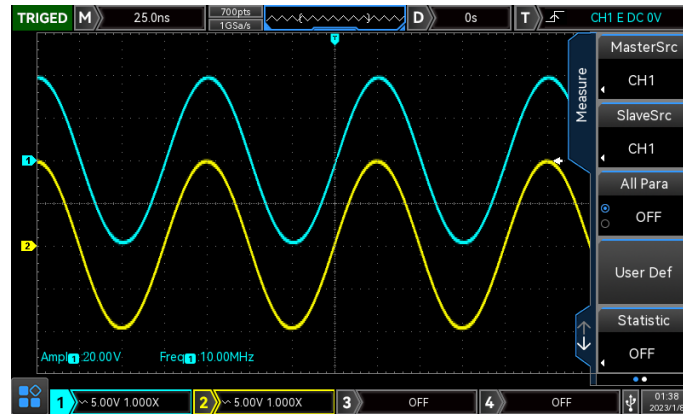
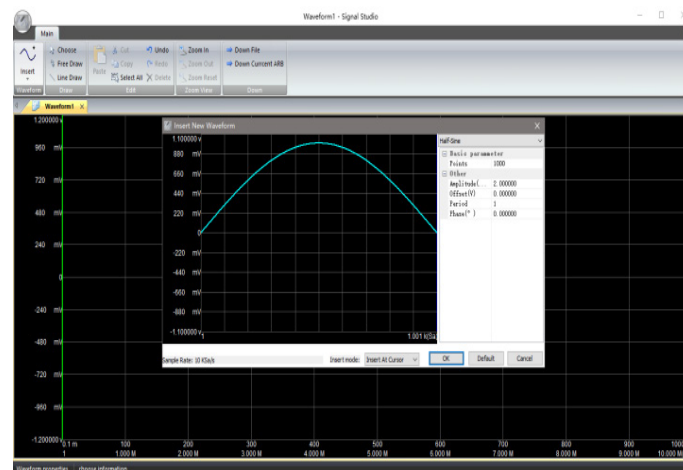Large output capability at high frequency: 20 Vpp full amplitude output of dual-channel can still be guaranteed at 10 MHz frequency.
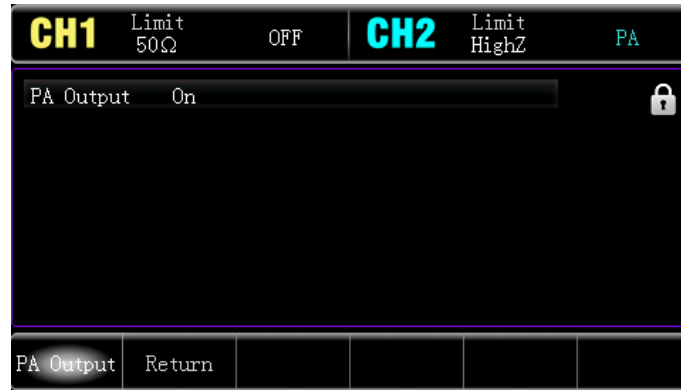
Low-distortion Output
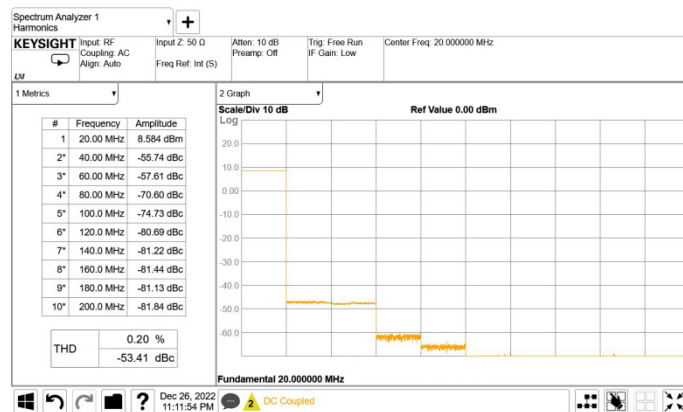
THD（total harmonic distortion）in output amplitude 0 dBm is less than 0.2%; Harmonic wave and stray in full frequency band are all less than -50 dBc.

Editing Interface of Arbitrary Wave

Generate arbitrary waveform through arbitrary waveform editor of upper computer.

Power Amplifier Output

The weight power bandwidth of built-in power amplifier can output up to 100 kHz, the maximum output power 4 W, and output slew rate greater than 18 V/µs.

Low Jitter
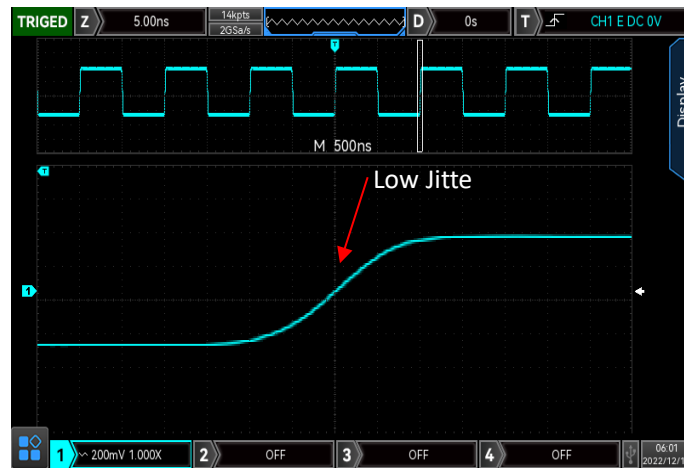
Excellent digital sampling technology to make output wave jitter more lower.

High Signal to Noise Ratio
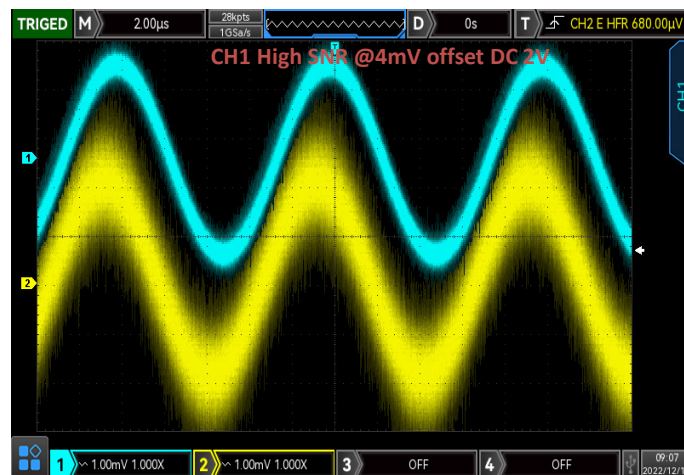
Set small signal superimposed large DC, UTG1000X output noise is lower, with higher SNR.

Multiple Modulation Function
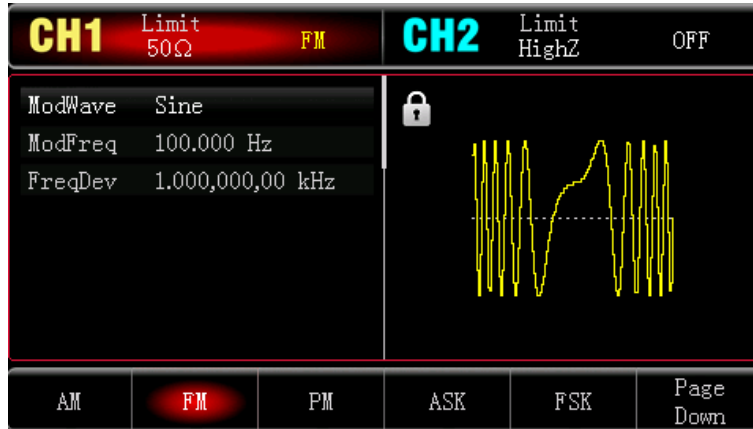
Support multiple analog and digital modulation AM, FM, PM, FSK, ASK, PSK and PWM.

Pulse String Function
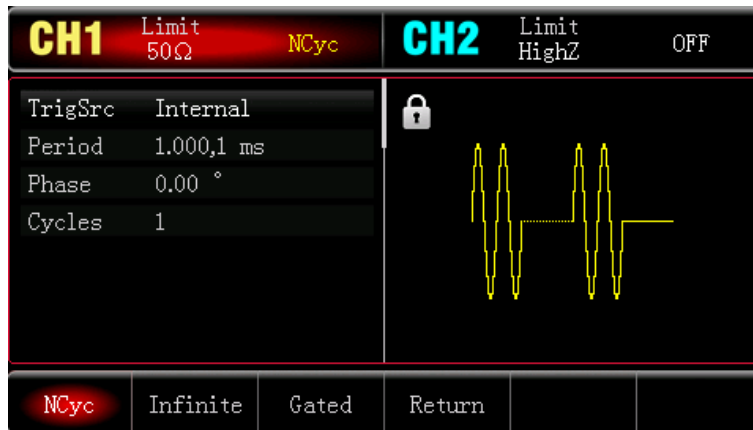
Support pulse string mode: "N cycle", "Gating", "Infinite"
Two modulation signal sources: "Internal" and "External".

Frequency Sweep
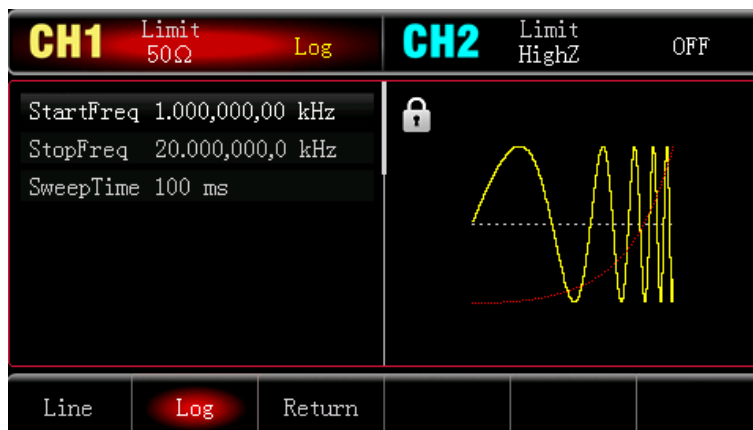
Support two frequency sweep modes: "Linear" and "Logarithmic".

Frequency Meter

High precision frequency meter, frequency range within 100 mHz~200 MHz can be measured.

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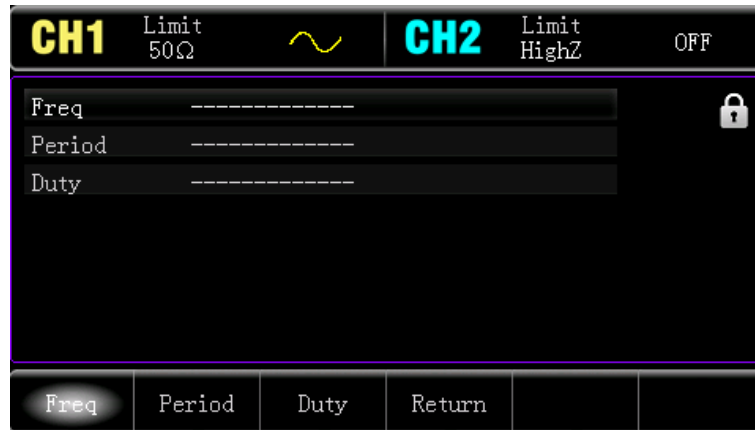% of the units can exhibit 95% confidence in the temperature range of 20 °C to 30 °C. Typical performance does not include uncertainty of measurement.*
- *"Nominal Value" means the expected performance or describes the performance of the product that is useful in the application of the product but is 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

Product Function and Model Comparison Table

Mode	UTG1022X	UTG1022X-PA	UTG1042X
Power amplifier	×	●	×

Remarks: ● indicates standard   × indicates not support

Basic Waveform Characteristics

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

Fundamental wave characteristic		
Model	UTG1022X/-PA	UTG1042X
Channel	Dual channel	
Sampling rate	200 MSa/s	
Vertical resolution	16-bit	
Waveform characteristic	6 standard waveforms, 200 built-in arbitrary waveforms	
Waveform	Sine, Square, Ramp, Pulse, Noise, DC, Arb, AM, FM, PM, ASK, FSK, PSK, PWM，frequency sweep, burst	
Working modes	Output gating, continuous, modulation, frequency sweep	
LCD	4.3" TFT LCD, WVGA(480×272)	
Frequency characteristic		
Sine wave	1 μHz～20 MHz	1 μHz～40 MHz
Square wave	1 μHz～10 MHz	1 μHz～20 MHz
pulse wave	1 μHz～10 MHz	1 μHz～20 MHz
Ramp wave	1 μHz～400 kHz	1 μHz～1 MHz
Gauss noise	40 MHz（-3dB）（typical value）	
Resolution	1 μHz	
Reference frequency	Initial accuracy	< 30ppm
	Temperature stability	±2 ppm/°C， 0°C～40°C
	Aging rate	±50 ppm， First year aging rate
Sine wave		
Harmonic distortion	Typical value (0dBm)	DC ~ 1 MHz: -60 dBc
		1 MHz ~10 MHz: -55 dBc
		10 MHz ~40 MHz: -50 dBc
THD	< 0.2％(DC～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)	1 MHz ≤-125 dBc/Hz（typical, 0 dBm, 10 kHz deviation）	

Square wave		
Rise/fall time(1Vpp，50Ω)	< 16 ns	
Overshoot(100kHz，1Vpp，50Ω)	< 2% （typical, 50Ω）	
Duty ratio	0.000% ~ 100.00% (limited by current frequency)	
Symmetry (duty ratio=50%)	1% of period + 4 ns	
Shake(RMS)(1Vpp，50Ω)	Typical（1 MHz，	≤5 MHz：2 ppm + 200 ps
	1 Vpp，50Ω）	＞5 MHz：200 ps
Ramp wave		
Nonlinearity	< 1% of peak output (typical value, 1 kHz, 1 Vpp, symmetry 100%)	
Symmetry	0.0%～100.0%	
pulse wave		
Minimum pulse width	22 ns	
Variable edge	15 ns～10 s	
Overshoot	< 2% （typical,1Vpp）	
Shake	150 ps	
Arbitrary wave		
Frequency	1 μHz～5 MHz	1 μHz～10 MHz
Wave length	4 kpts	
Vertical resolution	16-bit（symbol included）	
Sampling rage	200 MSa/s（DDS）	
Nonvolatile storage	200 waves	

Output Characteristic

Output			
Amplitude（50Ω）	≤20 MHz:1 mVpp～10 Vpp		
	≤40 MHz:1 mVpp～5 Vpp		
Amplitude（HighZ）	≤20 MHz:2mVpp～20Vpp		
	≤40 MHz:2mVpp～10 Vpp		
Accuracy	Typical value(1kHz,sine wave，0V,deviation，＞10 mVpp)	±（1% of set value+2 mVpp）	
Amplitude flatness	Typical value (sine wave,0 dBm)	≤20 MHz：±0.3 dB	
		≤40 MHz：±0.5 dB	
Power output			
Model	UTG1022X	UTG1022X-PA	UTG1042X
Frequency	×	1 μHz～100 kHz	×
Output power	×	4 W	×
DC offset			
Range(peak AC+DC)	±5 V（50Ω）		
	±10 V（high resistance）		
Accuracy of offset	Offset set value ±1% ± amplitude set value 2%±2mV		
Waveform output			
Impedance	50Ω typical value		
Protection	Short circuit protection, overload automatically disables waveform output		

Modulation Types

AM	
Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave
Source	Internal
Modulation wave	Sine wave, square wave, ramp wave, noise, arbitrary wave
Modulation depth	0%～120%
Modulation frequency	2 mHz～1 MHz
FM	
Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave
Source	Internal
Modulation wave	Sine wave, square wave, ramp wave, noise, arbitrary wave
Frequency deviation	DC～10 MHz DC～20 MHz
Modulation frequency	2 mHz～1 MHz
PM	
Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave
Source	Internal
Modulation wave	Sine wave, square wave, ramp wave, noise, arbitrary wave
Phase deviation	0～360°
Modulation frequency	2 mHz～1 MHz
ASK	

Carrier wave	*Sine wave, square wave, ramp wave, arbitrary wave*
Source	*Internal/external*
Modulation wave	*Square wave (Duty ratio 50%)*
Modulation frequency	*2 mHz～100 kHz*
FSK	
Carrier wave	*Sine wave, square wave, ramp wave, arbitrary wave*
Source	*Internal/external*
Modulation wave	*Square wave (Duty ratio 50%)*
Modulation frequency	*2 mHz～100 kHz*
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～100 kHz*
PWM	
Carrier wave	*Pulse*
Source	*Internal/external*
Modulation wave	*Sine wave, square wave, ramp wave, noise, arbitrary wave*
PWM range	*0%～50.00%*
Modulation frequency	*2 mHz～1 MHz*
Frequency sweep	
Carrier wave	*Sine wave, square wave, ramp wave, arbitrary wave*
Type	*Linear or logarithmic*
Frequency sweep time	*1 ms～500 s ± 0.1%*
Trigger source	*Internal*
Burst	
Mode of pulse train	*N cycle, infinite, gated*
Waveform	*Sine wave, square wave, ramp wave, pulse, noise and arbitrary wave*
Source	*Internal/external*
Trigger edge	*Rising edge/falling edge*
Internal cycle	*1μs～500 s*
Recurring number	*1～50000*
Polarity	*Positive and negative (TTL level input)*
Initial and stop phase	*0～360°*
Frequency meter	
Range of input frequency	*100 mHz～200 MHz*
Input level	*TTL compatible*
Accuracy	*7-bit*

Interface and Display

Interface	
Standard configuration	*USB Host、 USB Device、 Power Output（only-PA）*
Display screen	
Display Type	*4.3 inches TFT LCD*
Display resolution	*WVGA(480×272)*

General Technical Specifications

Specifications	
Supply voltage	100～240 VACrms（Fluctuations：±10%）,50 Hz/60Hz； 100～120 VACrms（Fluctuations：±10%）, 400 Hz
Power consumption	＜20 W
Fuse	2 A, Class T，250 V
Environment	
Temperature range	operation：+10 ℃～+40 ℃ Non operational：-20 ℃～+60 ℃
Cooling method	Natural cooling
Humidity range	+35 ℃ Below：≤90% relative humidity +35 ℃～+40 ℃：≤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	2.2 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	0 V/m（80 MHz to 1 GHz）； 3 V/m（1.4 GHz to 2 GHz）； 1 V/m（2.0 GHz to 2.7GHz）
Electrical fast transient burst (EFT)	IEC 61000-4-4/EN 61000-4-4	2 kV（AC input port）
Surge	IEC 61000-4-5/EN 61000-4-5	1 kV（Live line to zero line） 2 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 1 cycle; 40% UT during 10/12 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
	BS EN61010-1:2010+A1:2019
	BS 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 20 MHz	UTG1022X
	Maximum output frequency 40 MHz	UTG1042X
	Maximum output frequency 20 MHz ,4 W PA	UTG1022X-PA
Standard accessories	Power cord x 1	
	USB cable x 1	UT-D04
	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.

Contact Us

UNI-T Technical Support Hotline: 400-876-7822

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