Data Sheet

Function/Arbitrary Waveform Generator

- ◆ DDS technology, dual-channel output
- ◆ 125MSa/s sample rate, 14bit vertical resolution.
- ◆ 5 types of standard output waveform, built-in 48 arbitrary waveforms
- ◆ Complete set of modulation functions: AM, FM, PM, FSK, ASK, PWM, linear/logarithmic sweep, burst
- ◆ Abundant input/output: waveform output,
- ◆ Synchronous signal output, External modulation source input, 10MHz clock input, external trigger input, internal trigger output etc
- ◆ Channel coupling and duplication function
- ◆ Built-in accurate frequency counter enables to measure ranges 100MHz-200MHz (single channel)
- ◆ Standard interfaces: USB Device, USB Host
- ◆ High precision clock(1ppm & 10ppm)is optional
- ◆ Supplied with powerful arbitrary editing software
- ◆ Remote control support

outstanding performance

3.5 inch TFT-LCD display; Built-in Chinese/English language; Online help function; Support USB and internal storage, facilitate files management; Special connection terminal for grounding

Application fields:

- ◆ Analog sensor
- ◆ Simulation environment signals
- ◆ Circuit function test
- ◆ IC test
- ◆ Researching and training

Edit arbitrary waveform

Enables edition of 14-bit 16kpts arbitrary output waveforms, Arbitrary editing software EasyWave provides 9 standard waveforms: Sine, Square, Ramp, Pulse, ExRise, ExpFall, Sinc, Noise and DC, which meets all engineers' basic needs; In addition, it provides plenty of ways of manual drawing, point-to-point line drawing and arbitrary point drawing. It facilitates to create complex waveforms; Multi-file screen management helps users to edit multiple-waveform simultaneously. It provides 10 Storage in non-volatile RAM. You can edit and store more waveforms by EasyWave.

Arbitrary waveform output

Built-in 48 arbitrary waveforms, including math, engineering and other commonly-used waveforms

Complete set of modulation functions, sweep output, burst output

- ◆ Complete set of modulation functions: AM, DSB-AM, FM, PM, FSK, ASK, PWM, the modulation waveform can be observed directly, which it is suitable for education and training;
- ◆ Sweep output: change output frequency from starting frequency to ending one within sweeping time, Sweeping time range: 1ms~500s. The carrier can be Sine, Square, Triangle and Arbitrary waveforms.
- ◆ Burst output: It can periodically generate pulse sequence. Internal counter and external control signal are available to control burst output.

Dual-channel Coupling, Duplicating function

- ◆ Channel coupling: after setting base channel and coupling frequency/ phase difference, the frequency/phase of the other channel will change according to base channel, keeping set coupling frequency/phase difference fixed.
- ◆ Channel duplicating: allows to duplicate parameters from one channel to the other.

Built-in frequency counter

Wide frequency range: 100mHz~200MHz. Measurable parameters: frequency, period, duty-cycle, positive pulse width, negative pulse width

Setting: it can set DC/AC coupling, trigger level and high frequency rejection.

Specification

Max. output frequency	5MHz	10MHz	20MHz	25MHz	50MHz
Output channels	2				
Sample rate	125MSa/s				
Arbitrary waveform length	16kpts				
Frequency resolution	1μHz				
vertical resolution	14bits				
Waveform	Sine, Square, Ramp, Pulse, Gaussian Noise. 48built-in arbitrary waveforms(include DC)				
Modulation	AM, DSB-AM, FM, PM, FSK, ASK, PWM, Sweep, Burst				
Frequency counter	Frequency range:100mHz~200MHz				
Standard interface	USB Host & Device				
Dimension	W x H x D=229mm x 105mm x 281mm				

Attention:

To satisfy these specifications, the following conditions must be met first:

1. The instrument has been operating continuously for more than 30 minutes within specified operating temperature range (18ºC~28°C.
2. The temperature variation does not exceed 5℃.

Note: all specifications are guaranteed unless where noted 'typical'.

Frequency Specification					
Bandwidth	5MHz	10MHz	20MHz	25MHz	50MHz
Waveform	Sine, Square, Ramp, Pulse, Noise, Arbitrary				
Sine	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~ 20MHz	1μHz ~ 25MHz	1μHz ~ 50MHz
Square	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~ 20MHz	1μHz ~ 25MHz	1μHz ~ 25MHz
Pulse	500μHz ~ 5MHz	500μHz ~ 5MHz	500μHz ~ 5MHz	500μHz ~ 5MHz	500μHz ~ 5MHz
Ramp/Triangular	1μHz ~ 300kHz	1μHz ~ 300kHz	1μHz ~ 300kHz	1μHz ~ 300kHz	1μHz ~ 300kHz
Gaussian white noise	>5MHz (-3dB)	>10MHz (-3dB)	>20MHz (-3dB)	>25MHz (-3dB)	50MHz (-3dB)
Arbitrary	1μHz ~ 5MHz	1μHz ~ 5MHz	1μHz ~ 5MHz	1μHz ~ 5MHz	1μHz ~ 5MHz
Resolution	1μHz				
Accuracy	Within 90daysv±50ppm within 1 year ±100ppm 18°C~28°C				
Temperature coefficient	<5ppm/°C				

Sine Spectrum Purity	
Harmonic Distortion	CH1/CH2
DC~1MHz	-60dBc
1MHz~5MHz	-53dBc
5MHz~25MHz	-35dBc
25MHz~50MHz	-32dBc
Total harmonic waveform distortion	DC~20kHz,1Vpp<0.2%
Spurious signal(non-harmonic)	DC~1MHz<-70dBc 1MHz~10MHz<-70dBc+6dB/spectrum phase
Phase noise	10kHz Offset,–108dBc/Hz(typical value)

Square		
Rise/fall time		<12ns(10% ~ 90%)
Overshoot		<5%(typical,1kHz,1Vpp)
Duty Cycle	1μHz ~10MHz	20%~80%
	10MHz(exclude)~20MHz	40%~60%
	20MHz(exclude))~25MHz	50%
Asymmetric(50% Duty Cycle)		1% of period+20ns(typical,1kHz,1Vpp)
Jitter		0.1% of period(typical,1kHz,1Vpp)

Ramp/Triangle	
Linearity	<0.1% of Peak value output(typical,1kHz,1Vpp,100% symmetric)
Symmetry	0%~100%

Pulse	
Pulse width	1800s, Max. 16 ns, Min. 8 ns resolution
Rise/Fall time (10% ~ 90%,typical,1 kHz,1Vpp)	7ns
Duty Cycle	0.1%Resolution
Overshoot	<5%
Jitter(pk-pk)	8ns

Arbitrary	
Waveform length	16k points
Vertical resolution	14bits
Sample rate	125MSa/s
Min. Rise/Fall time	7ns(typical)
Jitter(pk-pk)	8ns(typical)
Storage in non-volatile RAM memory (10 in total)	10waveforms

Output Specification		
Output	CH1	CH2
Amplitude	2mVpp~10Vpp(50Ω,≤10MHz) 2mVpp~5Vpp(50Ω,>10MHz) 4mVpp~20Vpp(high impedance,≤10MHz) 4mVpp~10Vpp(high impedance,>10MHz)	2mVpp~3Vpp(50Ω) 4mVpp~6Vpp(high impedance)
Vertical accuracy (100 kHz sine)	±(0.3dB+1mVpp of setting value)	±(0.3dB+1mVpp of setting value)
Amplitude flatness (compared to 100 kHz sine,5Vpp)	±0.3 dB	
Channel phase deviation	<400ps (classic value,sine,50MHz,4vpp)	
Cross talk	<-70dBc	

DC Offset

Range(DC)	±5V(50Ω) ±10V(high impedance)	±1.5V(50Ω) ±3V(high impedance)
Offset accuracy	±(|setting offset value|*1%+3mV)	±(|setting offset value|*1%+3mV)

Waveform Output

Impedance	50Ω (typical)	50Ω (typical)
Protection	short-circuit protection	short-circuit protection

AM Modulation(CH1/CH2)

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary (2mHz ~ 20kHz)
Modulation depth	0% ~ 120%

FM Modulation(CH1/CH2)

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary(2mHz~20kHz)
Frequency deviation	0 ~0.5*bandwidth 10μHz resolution

PM Modulation(CH1/CH2)

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary(2mHz~20kHz)
Phase Deviation	0~360° ,0.1°Resolution

FSK Modulation(CH1/CH2)

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	50% duty-cycle square waveform(2mHz~50kHz)

ASK Modulation(CH1/CH2)

Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Source	Internal/External
Modulation waveform	50%duty-cycle square waveform(2mHz~50kHz)

PWM Modulation(CH1/CH2)

Frequency	500μHz~20kHz
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Arbitrary(except DC)
External Modulation range	-6V~+6V (maximum width deviation)

Sweep(CH1/CH2)	
Carrier	Sine, Square, Ramp, Arbitrary(except DC)
Type	linear/logarithmic
Direct	Up/down
Sweep time	1ms~500s
Trigger source	Manual, external, internal
Burst(CH1/CH2)	
Waveform	Sine, Square, Ramp, Pulse, Arbitrary(except DC)
Type	Count(1~50,000 periods),infinite, Gated
Start/Stop phrase	0°~+360°
Internal period	1μs~500s
Gated source	External trigger
Trigger source	Manual, External or Internal

Rear Panel Connector	
External modulation	±6V=100% modulation>5kΩ input impedance
External trigger	TTL compatible
Note: The external input voltage can't be over ±6V, otherwise instrument gets damaged.	

Trigger Input	
Input Level	TTL compatible
Slope	Up or down (optional)
Pulse width	>100ns
Input impedance	>5kΩ ,DC coupling

Trigger Output	
Voltage level	TTL compatible
Pulse width	>400ns
Output impedance	50Ω (typical)
Max. frequency	1MHz

SYNC Output

Voltage level	TTL compatible
Pulse width	>50ns
Output impedance	50 Ω (typical)
Max. frequency	2MHz

Frequency Counter

Measurement	Frequency, Period, Positive/negative pulse width, duty cycle		
Frequency range	Single Channel:100mHz~200MHz		
Frequency resolution	6bits/s		
Voltage range (non-modulated signal)			
Manual	DC coupling	DC offset range	±1.5VDC
		100mHz~100MHz	50mVrms~±2.5V
		100MHz~200MHz	100mVrms~±2.5V
	AC coupling	1Hz~100MHz	50mVrms~5Vpp
		100MHz~200MHz	100mVrms~5Vpp
Pulse width and duty-cycle measurement	1Hz~10MHz(50mVrms~5Vpp)		
Input adjustment	Input impedance		1MΩ
	Coupling mode		AC,DC
	High-frequency rejection		ON/OFF
Trigger level range	-3V~ +1.8V		

General Specification

Display	
Display type	3.5inch'TFT-LCD
Resolution	320×240
Color depth	24bit
Contrast Ratio	350:1(typical)
Luminance	300cd/m^2(typical)
Power	
Voltage	100~240 VAC$_{RMS,}$ 45~66Hz,CATII
	100~127 VAC$_{RMS,}$ 45~440Hz,CATII
Consumption	<30W
Fuse	1.25A,250V
Environment	
Temperature	Operation:0°C~40°C
	Storage:-20°C~60°C
Humidity range	Below +35℃:≤90% relative humidity
	+35℃~+40℃:≤60% relative humidity
Altitude	Operation: below 3,000 meters
	Storage: below 15,000 meters
Others	
Dimension	Width:229mm
	Height:105mm
	Depth:281mm
Weight	N.W: 2.6Kg
	G.W: 3.4Kg