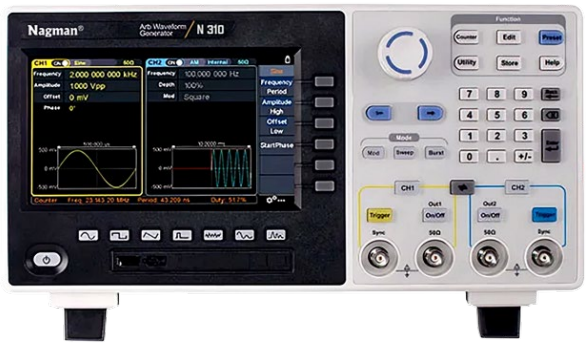
DUAL CHANNEL ARBITRARY WAVEFORM GENERATOR 35 MHZ

NAGMAN 310

SALIENT FEATURES

- Max 35MHz frequency output
- 500MSa/s Sample rate, Vertical resolution 1μHz
- 14 bits Vertical Resolution，10Marb waveform length
- Comprehensive waveform output : 6 basic waveforms, and 150 built-in arbitrary waveforms
- Comprehensive modulation functions : AM, FM, PM, FSK, 3FSK, 4FSK, PSK, OSK, ASK, BPSK, PWM, Sweep, and Burst
- High-accuracy frequency counter integrated, supported range 100mHz - 200MHz
- SCPI, and LabVIEW supported
- 7 inch (800 × 480 pixels) multi-touch screen, support



Typical Photo: Final Product look may vary

GENERAL SPECIFICATIONS

Display type	7-inch color LCD display
Display resolution	800 Horizontal × 480 Vertical pixels
Display color	65536 colors, 16 bits, TFT
Touch screen (Optional)	Capacitive, multi-touch
Voltage	100 - 240 V (± 10%), 50 / 60 Hz
Power consumption	Less than 35W
Fuse	250V, F2AL
Temperature	Working temperature: 0 °C to 40 °C
	Storage temperature: -20 °C to 60 °C
Relative humidity	Less than 35°C: ≤ 90% relative humidity 35°C to 40°C: ≤ 60% relative humidity
Height	Operating 3,000 meters Non-operation 12,000 meters
Cooling method	Smart fan cooling
Dimension	340 mm (Length) × 177 mm (Height) × 90mm (Width)
Weight	Approx. 2.3 kg
IP protection	IP2X
Adjustment interval	The recommended calibration interval is one year

WAVEFORMS

Bandwidth	35 MHz
Sample Rate	500MSa/s
Vertical Resolution	14 bits
Channel	2
Standard Waveforms	Sine wave, square wave, ramp wave, pulse wave, noise, harmonic
Arbitrary Waveforms	Sinc, exponential rise, exponential decline, electrocardiogram, Gaussian, Semi-positive, Lorentz, dual audio, DC voltage totaling more than 150 kinds

FREQUENCY CHARACTERISTICS

Sine wave	1 µHz - 35 MHz
Square wave	1 µHz - 15 MHz
Pulse wave	1 µHz - 15 MHz
Ramp wave	1 µHz - 3 MHz
Noise wave (-3 dB)	35 MHz BW
Arbitrary Wave	1 µHz - 15 MHz
Harmonic wave	1 µHz - 17.5MHz
Frequency resolution	1 µHz or 10 significant figures
Frequency stability	±2 ppm at 25±5℃
Frequency aging rate	±1 ppm per year

AMPLITUDE CHARACTERISTICS

Output Amplitude (load defaults to 50Ω)	50Ω	1mVpp to 10Vpp (≤ 25MHz) 1mVpp to 5Vpp (≤ 60MHz) 1mVpp to 2.5Vpp (≤ 100MHz)
	High Z	2mVpp to 20Vpp (≤ 25MHz) 2mVpp to 10Vpp (≤ 60MHz) 2mVpp to 5Vpp (≤ 100MHz)
Bandwidth Flatness (relative to 100 kHz Sine wave, 1 Vpp, 50Ω)	≤10MHz: ±0.2dB ≤60MHz: ±0.3dB ≤100MHz: ±0.5dB	
Amplitude Accuracy	± (1% of setting + 1 mVpp) (1kHz sine,0V offset, >10mVpp)	
Amplitude Resolution	0.1mVpp or 4 digits (The amplitude ≥ 1Vpp is 1mVpp)	
DC Offset Range (High Z)	± (10 Vpk – Amplitude Vpp / 2)	
DC Offset Accuracy	± (1 % of |setting| + 1 mV + amplitude Vpp * 0.5%)	
Offset Resolution	0.1 mVpp or 4 digits (The amplitude > 1 Vpp is 1 mVpp)	
Units	mVpp, Vpp, Vrms, mVrms, dBm	
Output Impedance	0-10kΩ adjustable (>0Ω, 50Ω Typical); High Z	
Output Protection	Short circuit protection, the output will be automatically turned off when overloaded	

SIGNAL CHARACTERISTICS

SINE	
Harmonic distortion	Typical (0dBm) DC to 1MHz: <-65dBc 1MHz to 10MHz: <-60dBc 10MHz to 60MHz: <-55dBc 60MHz to 100MHz: <-50dBc
Total harmonic distortion	< 0.05 %, 10 Hz to 20 kHz, 1 Vpp
Non-harmonic distortion	Typical (0dBm) ≤10MHz: <-70dBc >10MHz: <-70dBc + 6dB / sound interval
Phase noise	Typical (0dBm, 10kHz offset) 10MHz: ≤-110dBc/Hz

SQUARE	
Rise/fall time	< 8ns
Jitter (rms), **Typical (1Vpp, 50Ω)**	≤5MHz: 2ppm + 300ps >5MHz: 300ps
Overshoot	Typical (100 kHz, 1 Vpp) < 3%
Duty cycle	50.00% (fixed)
RAMP	
Linearity	< 0.1% of peak output (typical 1 kHz, 1 Vpp, symmetry 50%)
Symmetry	0.0% to 100.0%
PULSE	
Period	66.667 ns to 1000 ks
Pulse Width	≥ 18ns
Duty cycle	0.1% to 99.9% (limited by the frequency setting)
Rise and Fall time	≥ 8ns (limited by the pulse width setting)
Overshoot	< 3%
Jitter (rms), **Typical (1Vpp, 50Ω)**	≤5MHz: 2ppm + 300ps >5MHz: 300ps
NOISE	
Types	Gaussian white noise
Bandwidth (-3dB)	35 MHz BW
ARBITRARY WAVE	
Waveform length	2 to 10M points
Sampling rate	500M Sa/s
Amplitude accuracy	14 bits
Minimum rise and fall time	< 8 ns
Jitter (rms), **Typical (1Vpp, 50Ω)**	≤5MHz: 2ppm + 300ps > 5MHz: 300ps
HARMONIC WAVE	
Harmonic number	≤ 16
Harmonic type	Odd, Even, Sequential, Custom
Harmonic amplitude	Each harmonic amplitude can be set
Harmonic phase	Each harmonic phase can be set

MODULATION CHARACTERISTICS

Modulation Type	AM, DSB-AM, FM, PM, ASK, FSK, PSK, BPSK, QPSK, 3FSK, 4FSK, OSK, PWM, SUM
AM	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave (except DC)
Internal modulation waveform	Sine wave, square wave, ramp wave, white noise, arbitrary waveform
Internal amplitude modulation frequency	2 MHz to 1 MHz
Depth	0% to 120%

DSB-AM	
Carrier	Sine wave, square wave, Ramp wave
Modulated signal source	Internal or External
Internal modulation waveform	Sine wave, square wave, ramp wave
Internal amplitude modulation frequency	2 MHz to 1 MHz
Depth	0% to 100%
FM	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave (except DC)
Modulated signal source	Internal or external
Internal modulation waveform	Sine, square, ramp, white noise, and arbitrary waveforms
Internal amplitude modulation frequency	2 MHz to 1 MHz
Frequency offset	2 mHz ≤ offset ≤ min (carrier frequency, carrier maximum frequency - carrier frequency) by default, the smaller of the two
PM	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave (except DC)
Modulated signal source	Internal or external
Internal modulation waveform	Sine, square, ramp, white noise, and arbitrary waveforms
Internal amplitude modulation frequency	2 MHz to 1 MHz
Phase deviation range	0° to 180°
PWM	
Carrier	Pulse wave
Modulated signal source	Internal or external
Internal modulation waveform	Sine, square, ramp, white noise, and arbitrary waveforms (except DC)
Internal amplitude modulation frequency	2 MHz to 1 MHz
Offset	0 to min (min is the smaller value of pulse wave duty cycle and 100%-pulse wave duty cycle)
ASK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
ASK frequency	2 MHz to 1MHz
PSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
PSK frequency	2 MHz to 1MHz

FSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
FSK frequency	2 MHz to 1MHz
3FSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
FSK frequency	2 MHz to 1MHz
4FSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
FSK frequency	2 MHz to 1MHz
BPSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
BPSK frequency	2 MHz to 1MHz
QPSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
QPSK frequency	2 MHz to 1MHz
OSK	
Carrier	Sine wave
Modulated signal source	Internal
Internal modulation waveform	50% square wave
Oscillation time	8ns to 249.75μs
OSK frequency	2 mHz to 1MHz
SUM	
Carrier	Sine wave, square wave, ramp wave
Modulated signal source	Internal or external
Internal modulation waveform	Sine wave, square wave, ramp wave, white noise, arbitrary waveform
Internal amplitude modulation frequency	2 MHz to 1 MHz
Depth	0.0% to 100.0%

SWEEP CHARACTERISTICS

Carrier	Sine, rectangular wave, ramp wave, arbitrary wave (Except DC)	
Minimum/maximum starting frequency	1µHz	
Maximum/Stop frequency	Sine wave	35MHz
	Square wave	15MHz
	Ramp wave	3MHz
	Arbitrary wave	15MHz (built-in waveform) or 25MHz (user-defined waveform)
Types	Linear, logarithmic, Step	
Sweep direction	Up / Down	
Sweep time	1 ms to 500 s ± 0.1%	
Trigger source	Internal, External, Manual	

BURST CHARACTERISTICS

Waveform	Sine wave, square wave, ramp wave, pulse wave, Noise wave (Except N Cycle) and arbitrary wave (Except DC)
Types	Count (1 to 100,000 cycles), unlimited, gated
Trigger source	Internal, External, Manual
Carrier frequency	2mHz to BW/ 2
Trigger cycle	20ns - 500 s (Min = Cycles * Period)
Gated source	External trigger

COUNTER SPECIFICATION

Measurement function	Frequency, period, positive pulse width, negative pulse width, duty cycle
Frequency Range	100 mHz - 200 MHz
Frequency resolution	7 digits
Coupling method	AC, DC
VOLTAGE RANGE AND SENSITIVITY (NON-MODULATED SIGNAL)	
DC offset range	± 1.5V
DC coupling	100mHz - 100 MHz: 250 mVpp - 5 Vpp (AC+DC) 100 Hz - 200 MHz: 400 mVpp - 5 Vpp (AC+DC)
AC coupling	1Hz - 100 MHz: 250 mVpp - 5 Vpp 100 Hz - 200 MHz: 400 mVpp - 5 Vpp
Pulse width and duty cycle measurement	1 Hz - 10 MHz (250 mVpp -5 Vpp)
Input resistance	1 MΩ
Sensitivity	Can be set high, medium and low
Trigger level range	± 2.5 V

INPUT/OUTPUT SPECIFICATION

Communication Interface	USB Host, USB Device, LAN, COM (Optional)
Channel coupling	Channel copy, amplitude syn, frequency syn, align phase
EXTERNAL MODULATION INPUT	
Input frequency range	DC - 100 kHz
Input level range	± 1V full scale
Input impedance	10 kΩ (typical)
EXTERNAL TRIGGER INPUT	
Level	TTL - compatible
Slope	Rising or falling (selectable)
Pulse Width	>100ns
EXTERNAL CLOCK INPUT	
Impedance	1MΩ, AC coupling
Input level range	1Vpp to 3.3Vpp
Lock time	< 1s
Lock range	10 MHz ± 50Hz
INTERNAL CLOCK OUTPUT	
Frequency	10 MHz ± 50Hz
Impedance	50 Ω, DC coupling
Amplitude	1.2Vpp (50Ω)
SYNC OUTPUT	
Level	3.3V LVTTL
Impedance	50 Ω, DC coupling
Maximum frequency	1MHz

STANDARD INCLUSIONS

- Basic Instrument
- Power Cord
- USB communication cable
- CD with communication software
- BNC/Q9 cable
- User Manual

Manufactured by

NAGMAN INSTRUMENTS AND ELECTRONICS PRIVATE LIMITED

AN ISO 9001:2015 CERTIFIED COMPANY

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