# Waveform Generator

**RND lab**

## Features

- Max 35 MHz frequency output
- 500 MSa/s sample rate, vertical resolution 1 μHz
- 14 bits vertical Resolution, 10 Marb 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 100 mHz - 200 MHz
- SCPI, and LabVIEW supported
- 7 inch (800 × 480 pixels) multi-touch screen support
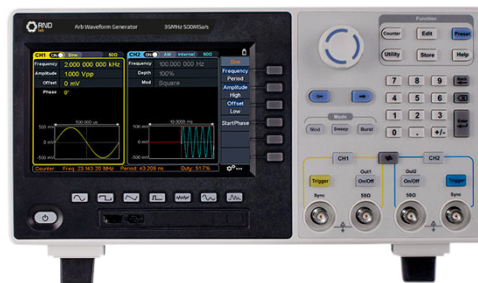
## Specifications

| Channels | 2 |
|---|---|
| Frequency Output | 35 MHz |
| Sample Rate | 500 MSa/s |
| Vertical Resolution | 14 bits |

**Waveform**

| | |
|---|---|
| Standard Waveform | Sine, Square, Pulse, Ramp, Noise, and Harmonic |
| Arbitrary Waveform | Exponential Rise, Exponential Fall, sin(x)/x, Step Wave, and others, Total 150 Built-in Waveforms, and User-Defined Arbitrary Waveform |

**Frequency (resolution 1μHz)**

| | |
|---|---|
| Sine | 1 μHz-35 MHz |
| Square | 1 μHz ~ 15 MHz |
| Pulse | 1 μHz ~ 15 MHz |
| Ramp | 1 μHz ~ 3 MHz |
| Noise | 35 MHz (-3 dB, typical) |
| Arbitrary Waveform | 1 μHz ~15 MHz |
| Harmonic | 1 μHz ~17.5 MHz |
| Accuracy | ±2 ppm, 25°C±5°C |

**Sine Wave Spectrum Purity**

| | |
|---|---|
| Harmonic Distortion (typical (0dB)) | DC ~ 1 MHz：<-65 dBc 1 MHz ~ 10 MHz：<-60 dBc 10 MHz ~ 60 MHz：<-55 dBc 60 MHz ~ 120 MHz：<-50 dBc |
| Total Harmonic Distortion | < 0.05 %, 10 Hz to 20 kHz, 1 Vpp |
| Spurious (Non-Harmonic) (typical (0dB)) | ≤10 MHz：<-70 dBc >10 MHz：<-70 dBc + 6 dB/ octave band |
| Phase Noise (typical (0 dBm, 10 kHz deviation)) | Typical（0 dBm， 10 kHz offset） 1 MHz：-110 dBc/Hz |

# Waveform Generator

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**Square**

| Rise / Fall Time | <8 ns |
|---|---|
| Overshoot | < 3% |
| Duty Cycle | 50.0% (Fixed) |
| Jitter (rms) | ≤5 MHz:<300 ps + 2 ppm;>5 MHz 300 ps |

**Pulse**

| | |
|---|---|
| Period | 66.667 ns~1000000 s |
| Pulse Width | ≥18 ns |
| Rise / Fall Time | ≧8 ns |
| Overshoot | < 3% |
| Jitter (rms) | ≤5 MHz:<300 ps + 2 ppm;>5 MHz 300 ps |
| Duty cycle | 0.1%~99.9% |

**Ramp**

| Linearity | ≤0.5% of peak output (typical, 1 kHz, 1 Vpp, 50% symmetry) |
|---|---|
| Symmetry | 0% ~ 100% |

**Arbitrary**

| Waveform Length | 2 points - 10M points |
|---|---|
| Minimum Rise/Fall Time | <8 ns |
| Jitter (rms) (1MHz,1Vpp,50Ω) | ≤5 MHz:<300 ps + 2 ppm;<br>>5 MHz 300 ps |

**Amplitude**

| Into 50Ω load | 1 mVpp ~ 10 Vpp (≤ 25 MHz) ;<br>1 mVpp ~ 5 Vpp (≤60 MHz) ; |
|---|---|
| Resolution | 0.1 mVpp or 4 digits，(Amplitude > 1 Vpp：1 mVpp) |
| DC Offset Range (AD+DC) | ±5 V(50 Ω)、±10 V(High Resistance) |
| DC Offset Resolution | 0.1 mV or 4 digits |
| Load Impedance | 50 Ω (Typical) |
| DC Offset Accuracy | ±(1% of setting + 1 mVpp+ amplitude Vpp * 0.5%) (typical 1 kHz sine, 0V offset) |
| Unit | mVpp，Vpp，Vrms，mVrms，dBm |

**Modulation**

| Type | AM, DSB-AM, FM, PM, ASK, FSK, PSK, BPSK, QPSK, 3FSK, 4FSK, OSK, PWM, SUM |
|---|---|

**DSB-AM**

| Carrier Waveform | Sine, Square, Ramp |
|---|---|
| Source | Internal / External |
| Internal Modulation Waveform | Sine, Square, Ramp |

**AM**

| Carrier Waveform | Sine, Square, Ramp, and Arbitrary (Except DC) |
|---|---|
| Source | Internal / External |
| Modulating Waveform | Sine, Square, Ramp, Noise, and Arbitrary |
| Depth | 0.0%~120.0% |
| Modulating Frequency | 2 mHz ~1 MHz |

# Waveform Generator

RND lab

**FM**

| | |
|---|---|
| Carrier Waveform | Sine, Square, Ramp, and Arbitrary (Except DC) |
| Source | Internal / External |
| Modulating Waveform | Sine, Square, Ramp, Noise, and Arbitrary |
| Modulating Frequency | 2 mHz ~1 MHz |

**PM**

| | |
|---|---|
| Carrier Waveform | Sine, Square, Ramp, and Arbitrary (Except DC) |
| Source | Internal / External |
| Modulating Waveform | Sine, Square, Ramp, Noise, and Arbitrary |
| Phase Deviation | 0° - 180° |
| Modulating Frequency | 2 mHz - 1 MHz |

**ASK**

| | |
|---|---|
| Carrier Waveform | Sine, Square, Ramp, and Arbitrary (Except DC) |
| Source | Internal / External |
| Modulating Waveform | Square with 50% Duty Cycle |
| Key Frequency | 2 mHz - 1 MHz |

**FSK/3FSK/4FSK**

| | |
|---|---|
| Carrier Waveform | Sine, Square, Ramp, and Arbitrary (Except DC) |
| Source | Internal |
| Modulating Waveform | Square with 50% Duty Cycle |
| Key Frequency | 2 mHz - 1 MHz |

**PSK**

| | |
|---|---|
| Carrier Waveform | Sine, Square, Ramp, and Arbitrary (Except DC) |
| Source | Internal / External |
| Modulating Waveform | Square with 50% Duty Cycle |
| Key Frequency | 2 mHz - 1 MHz |

**BPSK**

| | |
|---|---|
| Carrier Waveform | Sine, Square, Ramp and Arbitrary (Except DC) |
| Source | Internal |
| Modulating Waveform | Square with 50% Duty Cycle |
| Key Frequency | 2 mHz - 1 MHz |

**OSK**

| | |
|---|---|
| Carrier Waveform | Sine, Square, Ramp, and Arbitrary (Except DC) |
| Source | Internal |
| Oscillation Time | Square with 50% Duty Cycle |
| Key Frequency | 2 mHz - 1 MHz |
| Concussion Time | 8 ns - 249.75 s |

**SUM  (Dual tone)**

| | |
|---|---|
| Carrier Waveform | Sine, Square, Ramp |
| Source | Internal / External |
| Internal Modulation Waveform | Sine, Square, Ramp，  White Noise, Arbitrary Waveform |
| Internal am Frequency | 2 mHz~1 MHz |
| Depth | 0.0%~100.0% |

**PWM**

| | |
|---|---|
| Carrier Waveform | Pulse |
| Source | Internal / External |

# Waveform Generator

RND lab

| | |
|---|---|
| Modulating Waveform | Sine, Square, Ramp, Noise, and Arbitrary |
| Width Deviation | 0~99% |
| Modulating Frequency | 2 mHz ~ 1 MHz |
| Deviation | 0~min |

**Pulse Train Responses**

| | |
|---|---|
| Carrier | Sine，Square，Harmonic，Pulse,Noise and Arbitrary Waveform |
| Carrier Frequency | 2 mHz ~ BW/2 |
| Type | Count (1 to 1000000 cycles), Unlimited, Gated |
| Internal Cycle | 20 ns ~ 500 s |
| Gated Source | External Trigger |

**Sweep Characteristic**

| | |
|---|---|
| Carrier | Sine, Square, Ramp, and Arbitrary (except DC) |
| Maximum / Termination Frequency | Sine: 35 MHz<br>Square: 15 MHz<br>Ramp: 3 MHz<br>Arbitrary: 15 MHz（Built-in）or 25 MHz（User Defined） |
| Type | Linear, Logarithmic, Step |
| Direction | Up / Down |
| Scanning Time | 1 ms to 500 s ± 0.1% |
| Trigger Source | Internal, External, Manual |

**Frequency Counter**

| | |
|---|---|
| Function | Frequency, period, +width, -width, +duty, and -duty |
| Frequency Range | 100 mHz ~ 200 MHz |
| Frequency Resolution | 7 Digits |
| Coupling Mode | AC, DC |

**Input / Output**

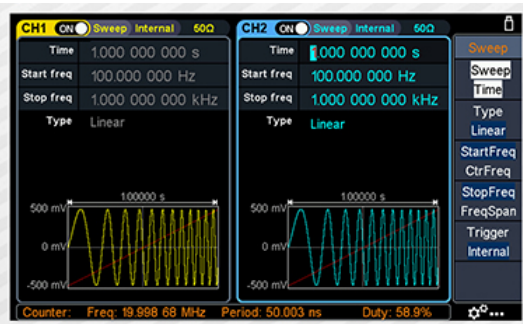| | |
|---|---|
| Display | 7"800 x 480 Pixels Touch Screen LCD |
| Input Mode | Frequency Counter,<br>External Modulation Input,<br>External Trigger Input,<br>Internal Clock Output,<br>External Reference Clock Input / Output |
| Communication Interface | USB Host, USB Device, LAN, COM |

**Mechanical Specifications**

| | |
|---|---|
| Size | 340 mm x 177 mm x 90 mm |
| Weight | 2.3 kg |

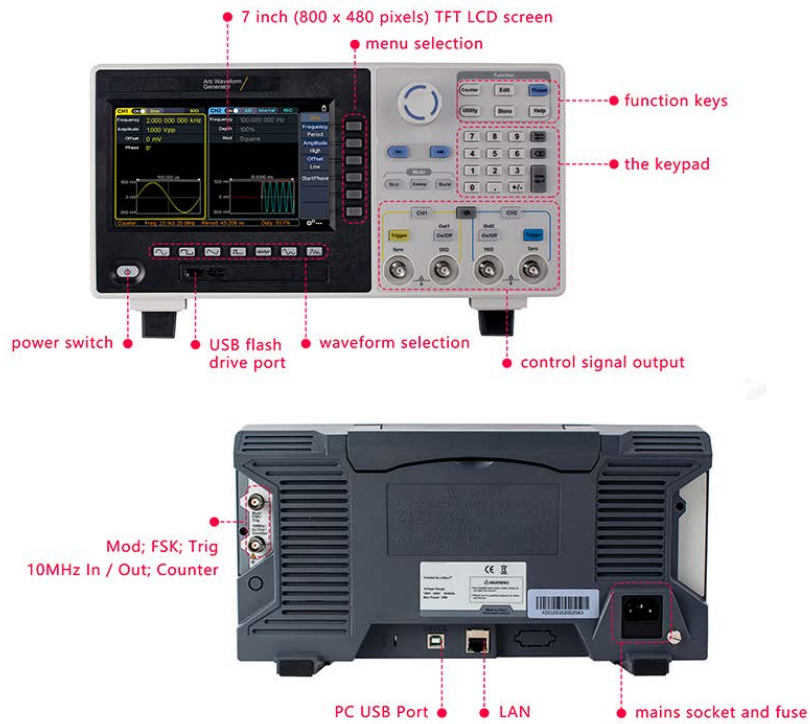# Waveform Generator

**Equal Performance Dual Channel Output**
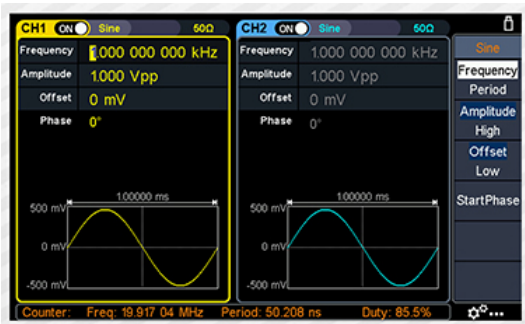
**Rich Sweep Function**

**Rich Analog and Digital Modulation**

**Built-In 152 Arbitrary Waveforms**

- 7 inch (800 x 480 pixels) TFT LCD screen
- menu selection
- function keys
- the keypad
- control signal output
- power switch
- USB flash drive port
- waveform selection

- Mod; FSK; Trig 10MHz In / Out; Counter
- PC USB Port
- LAN
- mains socket and fuse

**Art Nr.**
**RND 360-00002**