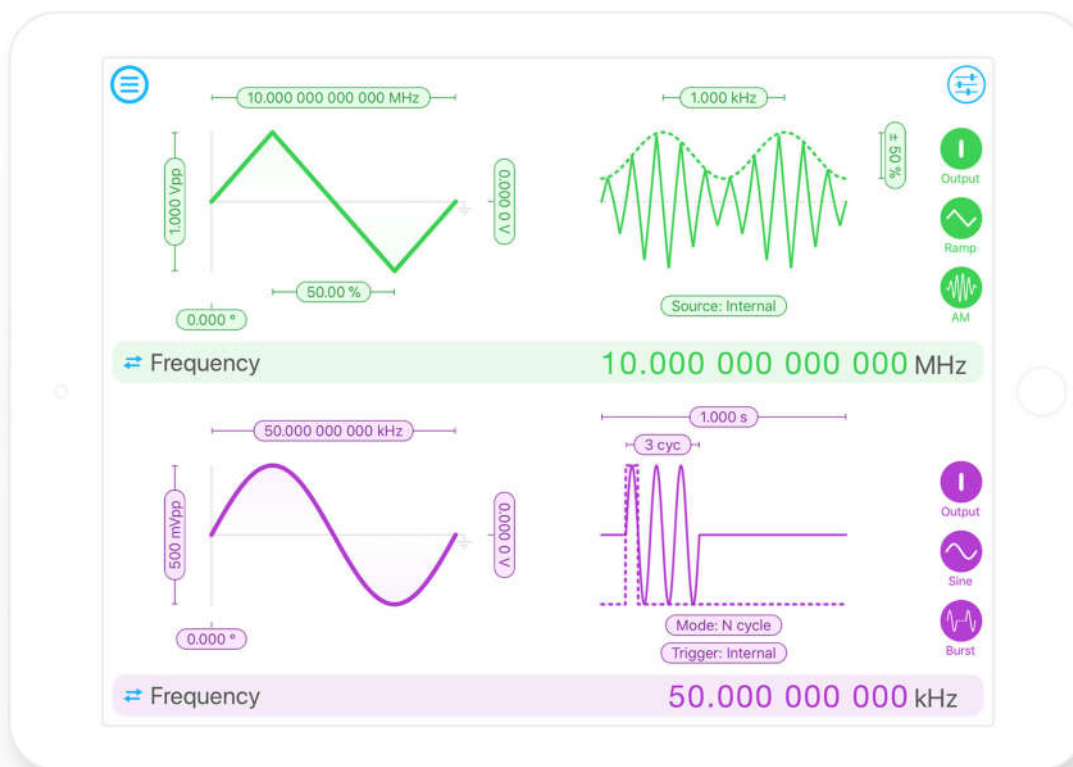




Waveform Generator

Description

The Moku:WaveformGenerator enables users to generate two waveforms with a sampling rate of up to 250 MS/s, an analog bandwidth of 300 MHz, and a output voltage range of ± 1 V into a 50 Ω load. Select between sine, square, ramp, pulsed or DC waveform shapes. Modulate the phase, frequency or amplitude, or generate triggered bursts or sweeps from an internal or external source.



Features

- Generate sine waves from 1 mHz to 250 MHz
- Generate square and ramp waves from 1 mHz up to 100 MHz
- Generate pulsed waveforms with a minimum pulse width of 10 ns at up to 100 MHz
- Modulate waveforms in amplitude, frequency and phase at up to 62.5 MHz using both internal and external sources



Specifications

Common characteristics

Overview

Channels	2
Bandwidth (-3 dB)	300 MHz into 50 Ω
Sampling rate	1 GS/s per channel
Output impedance	50 Ω
Waveforms	Sine, Square, Ramp, Pulse, DC

Amplitude

Range	1 mV _{pp} to 2 V _{pp} into 50 Ω
Offset error	< 500 μ V into 50 Ω
Resolution	100 μ V
Channel isolation	> 40 dB from DC to 200 MHz
Units	V _{pp} , dBm

DC offset

Range (peak AC + DC)	\pm 1 V into 50 Ω
Resolution	100 μ V

Phase offset

Range	0° to 360°
Resolution	0.001°

Waveform characteristics

Sine

Frequency range	1 mHz to 250 MHz	
Amplitude flatness (into 50 Ω)	< 100 kHz	< 0.03 dB
	100 kHz to 10 MHz	< 0.08 dB
	10 MHz to 250 MHz	< 0.12 dB
Total harmonic distortion	< 0.5% (1.5 MHz, 5 harmonics)	
SFDR	> 50 dBc for frequencies less than 20 MHz	



Square

Frequency range	1 mHz to 100 MHz	
Edge time ¹⁰	< 2.3 ns into 50 Ω	At frequencies < 75 MHz
	< 2.6 ns into 1 M Ω	
	< 3.6 ns into 50 Ω	At frequencies < 100 MHz
	< 2.8 ns into 1 M Ω	
Overshoot	< 2% for rise times greater than 8 ns < 15% for rise times between 2 ns and 8 ns	
Jitter (cycle-to-cycle)	< 1 ns	

Ramp

Frequency range	1 mHz to 100 MHz	
Symmetry ¹¹	20% to 80% at 100 MHz 4% to 96% at 20 MHz 0% to 100% at 5 MHz	
Linearity	Below 1 MHz	> 99%
	Between 1 MHz and 50 MHz	> 98%
	Above 50 MHz	> 95%

Pulse

Frequency range	1 mHz to 100 MHz	
Period range	1000 s to 10 ns	
Pulse width	2 ns to period	
Edge time	2 ns to half the pulse width	
Edge time resolution	1 ns	
Overshoot	< 2% for rise times greater than 8 ns < 15% for rise times between 2 ns and 8 ns	
Jitter	Same as square wave	

Modulation

Amplitude

Carrier waveforms	Sine, Square, Ramp, Pulse
Source	Internal, External
Internal modulation	Sine
Frequency	1 mHz to 62.5 MHz
Depth	0% to 100%

¹⁰ Measured for a 2 V_{pp} square wave at 10 MHz using a 4 GS/s MSO7104B Mixed Signal Oscilloscope.

¹¹ Symmetry is limited by the minimum rise time of 2 ns and number of harmonics required to maintain a linearity of more than 99%.



Frequency

Carrier waveforms	Sine, Square, Pulse
Source	Internal, External
Internal modulation	Sine
Frequency	DC to 62.5 MHz
Deviation (carrier + deviation)	DC to 250 MHz

Phase

Carrier waveforms	Sine, Square, Pulse
Source	Internal, External
Internal modulation	Sine
Frequency	DC to 62.5 MHz
Phase shift	0.0° to 360.0°

External

Carrier waveforms	Sine, Square, Ramp, Pulse
Source	Ch1: Input 1, Output 2 Ch2: Input 2, Output 1
Voltage range	± 1 V into 50 Ω
Frequency	DC to 62.5 MHz
Variable deviation	AM: %/V FM: Hz/V PM: °/V

Burst

Modes of Operation	Start, N-Cycle, Gated
N-Cycle range	1 to 1,000,000
Trigger Sources	Ch1: Input 1, Output 2, External Ch2: Input 2, Output 1, External
Nominal Trigger Level	Input Channel: 1.8 V Output Channel: 0.5 V External: 1.2 V



Sweep

Sweep Frequency Start/End	Sine: 1 mHz to 250 MHz Square, Ramp, Pulse: 1 mHz to 100 MHz
Sweep Time	1 ms to 1 ks
Trigger Sources	Ch1: Input 1, Output 2, External Ch2: Input 2, Output 1, External
Nominal Trigger Level	Input Channel: 1.8 V Output Channel: 0.5 V External: 1.2 V