Quality&**Precise**

MAXWELLON MX33520A

1μHz~26/36/46/60/80MHz

Function/Arbitrary Generator

2023

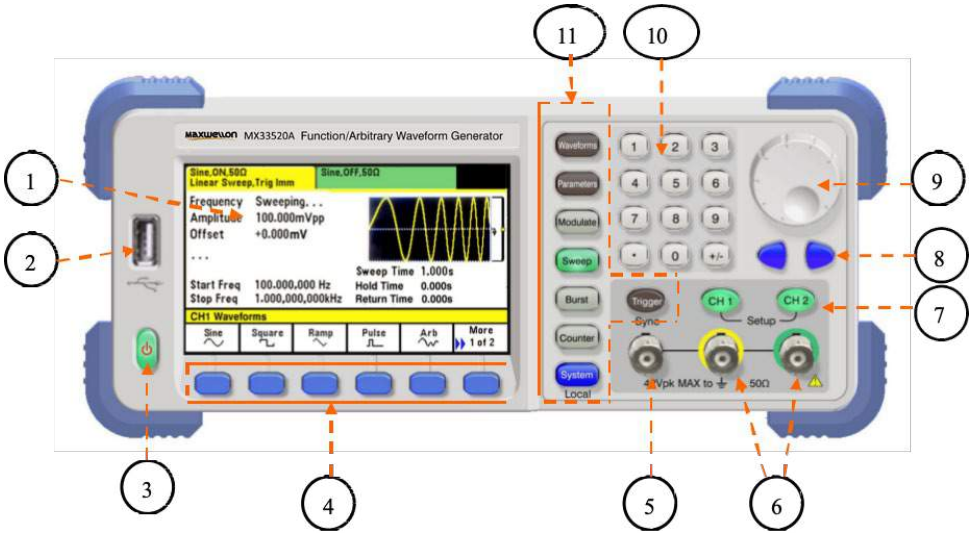
Maxwellon

The MX33520A series function/Arbform generator is a signal generator that utilizes extended high-precision differential technology. Compared with previous DDS signal generators, it has excellent performance, fidelity, and flexibility. It can be equipped with any waveform signal generation module. Help you accelerate development speed, improve product quality and reliability.

Key Feature

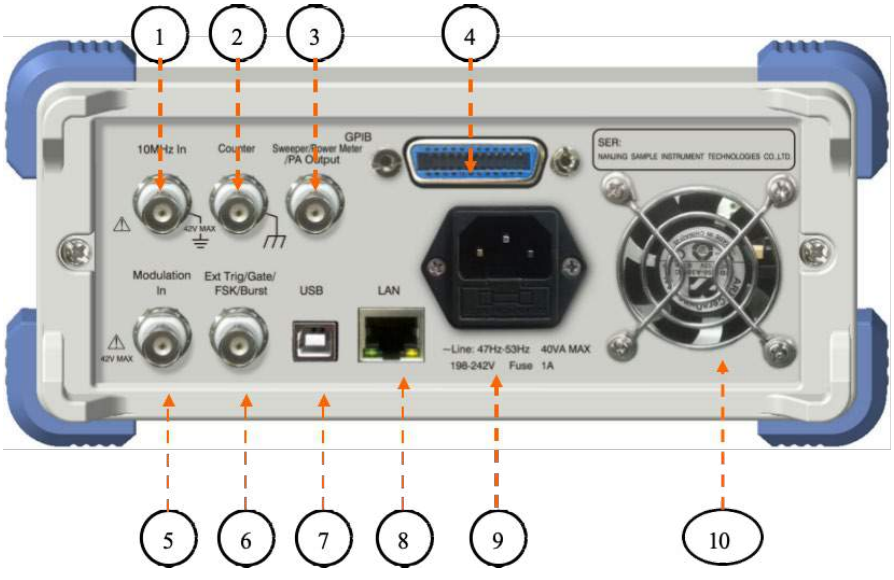
- Adopting extended high-precision difference technology to achieve low distortion and low jitter output, with edge jitter ≤ 100ps rms (nominal value)
- 200MSa/s sampling rate, 14bits vertical resolution, dual channel output
- Total harmonic distortion as low as 0.05%
- Large signal amplitude up to 20Vpp (High Z)
- Small signal amplitude can reach 1mVpp (50 Ω), with excellent small signal quality
- Double sideband suppressed carrier amplitude modulation (DSSC AM)
- ± 1ppm accuracy, with phase noise as low as -125 dBc/Hz (optional TCXO clock)
- Dual channel coupling: frequency coupling, amplitude offset coupling, phase coupling, tracking (parameter replication in phase or out of phase, except for logarithmic sweep and Burst, any function can maintain phase synchronization or out of phase)
- The edge and width of the pulse wave can be adjusted, with a resolution of 0.1ns, edge of 13.0ns~1us, pulse width of 21.3ns ~ waveform period - 21.3ns
- The duty cycle of square wave and pulse wave is adjustable from 0.01% to 99.99%, with a resolution of 0.01%
- The symmetry of the Ramp wave can be adjusted from 0.00% to 100.00%, with a resolution of 0.01%
- Output multiple standard waveforms: sine wave, square wave, Ramp wave, pulse wave, Arb, noise, DC
- All digital modulation: AM, DSSC AM, FM, PM, PWM, ASK, FSK, BPSK
- Built in 6-bit/second, 10Hz~250MHz bandwidth frequency counter
- Optional frequency sweep function plug-in and power meter function plug-in
- Optional power signal output plug-in (PA Out), 8W power signal (load 8 Ω, including sine wave, square wave, triangular wave, pulse wave, Arb), output impedance 2 Ω
- Multiple interfaces: USB (Device, Host supports USB drive read/write), LAN, GPIB (optional)
- 4.3 inch color TFT LCD display screen, user-friendly and intuitive interface, supporting both Chinese and English interfaces

Front Panel



1. TFT LCD display screen
2. USB Host
3. Power button
4. SoftKey
5. Sync output port
6. Waveform output port
7. Channel
8. Cursor direction keys
9. Knob
10 Number keyboard
11 Function keys

Rear Panel



1. External 10MHz reference input port
2. Counter signal input port
3. Power signal output/frequency sweep input/power meter input port
4. GPIB interface
5. External modulation signal input port
6. External trigger signal input port
7. USB Device port
8. LAN communication port
9. Power socket
10. Fan

Specification

Waveform		
Standard	Sine wave, square wave, Ramp wave, pulse wave, noise wave, Arb, DC	
Built-in Arbform	More than 50 Arbforms, including exponential decline, exponential rise, Gaussian pulse, logarithm, etc	
User defined Arbform	8-16384 points	
Sampling rate	200MSa/s	
Working Mode and Modulation Type		
Working Mode	Point Frequency, Modulation, Frequency Sweep, Burst, Frequency Counter, Frequency Sweeper, Power Meter	
Modulation Type	ASK, FSK, BPSK, AM, DSSC AM, FM, PM, PWM	
Waveform Characteristics		
Output Waveform	Sine, Square, Ramp, Pulse, Noise, Arb, DC	
Frequency Accuracy	±1ppm (Optional TCXO clock)	
Sine	Frequency range	1μHz ~ 26 MHz (MX33520A-26), Resolution 1μHz
		1μHz ~ 36 MHz (MX33520A-36), Resolution 1μHz
		1μHz ~ 46 MHz (MX33520A-46), Resolution 1μHz
		1μHz ~ 60 MHz (MX33520A-60), Resolution 1μHz
		1μHz ~ 80 MHz (MX33520A-80), Resolution 1μHz
	Harmonic distortion (0dBm)	< -70dBc (< 20kHz)
		< -50dBc (20kHz ~ 1MHz)
		< -40dBc (1MHz ~ 30MHz)
		< -30dBc (30MHz ~ 80MHz)
	Total distortion (0dBm)	≤0.05% (20Hz ≤ f ≤100 kHz)
	Phase Noise (10 MHz, 0dBm, 10kHz offset)	≤ -125 dBc/Hz (optional TCXO clock)
Square	Frequency range	1μHz ~ 20 MHz, Resolution 1μHz
	Rising/ Falling Edge	13ns fixed value
	Duty cycle	0.01%~99.99%
	Resolution	0.01%
	Overshoot (50 Ω)	≤2%
	Edge jitter	≤ 100ps rms (nominal value)
Ramp	Frequency range	1μHz ~ 1 MHz, Resolution 1μHz
	Symmetry	0.00% ~ 100.00% (0% refers to negative Ramp waves, 100% refers to positive Ramp waves, and 50% refers to triangular waves)
	Resolution	0.01%
	Non linearity	≤ 0.1% (from 5% to 95% of the signal)
Pulse	Frequency range	1μHz ~ 20 MHz, Resolution 1μHz
	Rising/ Falling Edge	13ns~1us (Independently variable), Resolution 0.1ns
	Duty cycle	0.01% ~ 99.99%, Resolution 0.01%
	Pulse width	21.3 ns ~ period - 21.3 ns, Resolution 0.1ns
	Overshoot (50 Ω)	≤2%
	Edge jitter	≤ 100ps rms (nominal value)
Noise	30 MHz bandwidth white noise	
	Recurrence period greater than 50 years	
Arbitrary	Sampling rate	1μSa/s ~ 50 MSa/s, Resolution 1μSa/s
	Waveform length	8~16384 Samples, Resolution 1 Sample
	Vertical resolution	14 bits

Amplitude Characteristic		
Amplitude Range	2mVpp~ 20Vpp (High Z)	
	1mVpp~ 10Vpp (50 Ω)	
Resolution	4 significant digits	
Flatness (Relative to 1kHz)	<100kHz: ±0.5dB	
	100kHz ~ 75MHz: ±1.0dB	
	75MHz ~ 80MHz:-3.0dB	
Accuracy	± 1% set value ± 1mVpp (at 1kHz)	
Unit	Optional Vpp, Vrms, or dBm	
Offset Characteristic		
Offset level range	±(10 VDC –AC peak value/2) (High Z)	
	±(5 VDC –AC peak value/2) (50 Ω)	
Resolution	4 significant digits	
Accuracy	± 1% offset setting value ± 0.25% amplitude setting value ± 2mV (| offset |<=180mV)	
	± 1% offset setting value ± 0.25% amplitude setting value ± 6mV (| offset |>180mV)	
Unit	V	
AM		
Modulation Type	Full carrier or double sideband suppressed carrier (DSSC AM)	
Carrier Waveform	Sine, Square, Ramp, Pulse, Noise, Arb	
Modulation Waveform	Sine, Square, Triangle, Ramp, nRamp, Noise, Arb	
Modulation Frequency	Internal	1μHz to Fsinemax (Sine), Resolution 1μHz
		1μHz to 20 MHz (Square), Resolution 1μHz
		1μHz to 1 MHz (Triangle Ramp nRamp), Resolution 1μHz
		1μSa/s ~ 50 MSa/s (Arb),Resolution 1μSa/s
	External	1μHz ~100 kHz (-3dB)
Modulation Depth	0.00%~ 120.0%, Resolution 0.01%	
	Accuracy: ±1.0%	
Modulation Source	Int/Ext	
FM		
Carrier Waveform	Sine, Square, Ramp, Pulse	
Modulation Waveform	Sine, Square, Triangle, Ramp, nRamp, Noise, Arb	
Modulation Frequency	Internal	1μHz to Fsinemax (Sine), Resolution 1μHz
		1μHz to 20 MHz (Square), Resolution 1μHz
		1μHz to 1 MHz (Triangle Ramp nRamp), Resolution 1μHz
		1μSa/s ~ 50 MSa/s (Arb),Resolution 1μSa/s
	External	1μHz ~100 kHz (-3dB)
Modulation Depth	0 ~ (carrier frequency)/2 (≤ maximum waveform frequency+100KHz)	
	Resolution: 1uHz	
Modulation Source	Int/Ext	
PM		
Carrier Waveform	Sine, Square, Ramp, Pulse	
Modulation Waveform	Sine, Square, Triangle, Ramp, nRamp, Noise, Arb	
Modulation Frequency	External	1μHz to Fsinemax (Sine), Resolution 1μHz
		1μHz to 20 MHz (Square), Resolution 1μHz
		1μHz to 1 MHz (Triangle Ramp nRamp), Resolution 1μHz
		1μSa/s ~ 50 MSa/s (Arb),Resolution 1μSa/s
	External	1μHz ~100 kHz (-3dB)
Modulation Depth	0.00°~360.0°; Resolution 0.01°	
Modulation Source	Int/Ext	

Pulse Width Modulation (PWM)		
Carrier Waveform	Pulse	
Modulation Waveform	Sine, Square, Triangle, Ramp, nRamp, Noise, Arb	
Modulation Frequency	External	1μHz to Fsinemax (Sine), Resolution 1μHz
		1μHz to 20 MHz (Square), Resolution 1μHz
		1μHz to 1 MHz (Triangle Ramp nRamp), Resolution 1μHz
		1μSa/s ~ 50 MSa/s (Arb),Resolution 1μSa/s
	External	1μHz ~100 kHz (-3dB)
Modulation Depth	0.0ns ~ width - 21.3ns; Resolution 0.1ns	
Modulation Source	Int/Ext	
FSK		
Carrier Waveform	Sine, Square, Ramp, Pulse	
Frequency-Hopping	1μHz to Fsinemax(Sine) 1μHz to 20 MHz(Square/Pulse) 1μHz to 1 MHz (Ramp) Resolution 1μHz	
Switching Rate	1μHz ~1 MHz; Resolution 1μHz	
Modulation Source	Int/Ext	
BPSK		
Carrier Waveform	Sine, Square, Ramp, Pulse, Arb	
Phase Jump	0.00° ~ 360.0°; Resolution 0.01°	
Switching Rate	1μHz ~1 MHz; Resolution 1μHz	
Modulation Source	Int/Ext	
ASK		
Carrier Waveform	Sine, Square, Ramp, Pulse, Noise, Arb	
Step Amplitude	2mVpp~ 20Vpp (High Z)	
Switching Rate	1μHz ~1 MHz; Resolution 1μHz	
Modulation Source	Int/Ext	
Sweep		
Carrier Waveform	Sine, Square, Ramp, Pulse	
Start Frequency	1μHz to Fsinemax(Sine) 1μHz to 20 MHz(Square/Pulse) 1μHz to 1 MHz (Ramp) Resolution 1μHz	
Termination Frequency	1μHz to Fsinemax(Sine) 1μHz to 20 MHz(Square/Pulse) 1μHz to 1 MHz (Ramp) Resolution 1μHz	
Sweep Mode	Linear/Log	
Sweep Time	0.001s ~ 3600s; resolution 1mSec	
Hold Time	0.000s ~ 3600s; resolution 1mSec	
Return Time	0.000s ~ 3600s; resolution 1mSec	
Trigger Source	Internal/External/Single	
Burst		
Carrier Waveform	Sine, Square, Ramp, Pulse, Arb	
Burst Mode	N Cycle/Gated	
Start Phase	0.00° ~ 360.0°; Resolution 0.01°	
Number of burst waveforms	1 ~ 100000000; Resolution 1	
Interval	1μS ~ 8000 S; Resolution 1μS	
Trigger Source	Internal/External/Single	

Counter	
Measurement Function	Frequency, periodicity, count
Frequency Input Range	10Hz ~ 250 MHz
Input Voltage Range And Sensitivity	200mVrms~1.5Vrms ≤ 200MHz
Input Coupling Method	AC
Frequency Measurement Gate Time	50ms~10s continuously adjustable
Counting Capacity	56bits counter
Measurement Accuracy	6 digits/s frequency measurement
PA Out Option	
Output Waveform	Sine, square, Ramp, pulse, Arb
Bandwidth	10Hz~200 kHz (total harmonic distortion of waveforms greater than 100kHz will increase)
Output Power	8W (sine wave), load 8 Ω
Output Impedance	2 Ω
Accuracy	± 1%, 1kHz (preheating for 30 minutes)
Output Protection	over load protection
Output Port	Rear panel BNC (PA Out), port multiplexing
Sweeper Option	
Frequency Range	1KHz~80 MHz (maximum)
Dynamic Range	+15dBm~-60dBm
Accuracy	± 1dB
Input Port	Rear panel BNC (Sweeper), port multiplexing
POWER METER Option	
Frequency Range	1KHz~100 MHz
Dynamic Range	+15dBm~-60dBm, supporting simultaneous display of valid values
Accuracy	± 1dB, compensation frequency needs to be set
Input Port	Rear panel BNC (Power Meter), port multiplexing
Dual Channel	
Working Mode	Independence, parameter coupling, tracking
Coupling Parameters	None, frequency, amplitude, offset, phase
Phase Coupling	0~360 °, resolution 0.01 °, synchronized
Frequency Coupling Method	Offset, Ratio
Amplitude and Offset Coupling Mode	Offset, Ratio
Tracking	In phase, out of phase, two channel phase adjustable sweep and burst
Crosstalk	<-65dB
Sync	
Output Port	BNC
Output Impedance	50 Ω
Output Level	3Vpp (High Z) 1.5Vpp (50 Ω)
Sync Source	Channel 1 (CH1) or Channel 2 (CH2)
Output	
Output Port	BNC
Output impedance	50 Ω overload protection
Trig In	
Input Port	BNC
Input impedance	10 kΩ, DC coupling
input voltage	Low level 0 V~0.4 V, high level>2.3 V, maximum 3.5 V
Minimum pulse width	100ns
Input rate	1 μHz~1 MHz

Mod In	
Input Port	BNC
Input Impedance	5 kΩ
Input Level	3.3Vpp
Input Bandwidth	1μHz~100kHz(-3dB Typical value)
10MHz In	
Input Port	BNC
Input Impedance	1 kΩ | | 20pF, AC coupling (nominal value)
Input Frequency	10 MHz ± 20 Hz
Input Voltage	200 mVpp ~ 5 Vpp
Interface	
Interface Configuration	USB,LAN,GPIB(option)
Arb Storage Depth	
Volatile Memory	16384 points
Non-Volatile Memory	1MB
Mechanical Properties	
Dimensions	260mm × 105mm ×290mm
Weight	2kg
Work Environment	
Storage Temperature	-30˚C~70˚C
Working Temperature	0˚C~40˚C
Working Humidity	5%~80% relative humidity
Preheating Time	30 minutes
External Power Supply	
Supply Voltage	100V ~ 240V (47Hz ~ 63Hz)
Power Consumption	< 45 W

Working Mode and Carrier Waveform

Working Mode / Carrier Waveform	AM	FM	PM	PWM	FSK	BPSK	SWEEP	BURST
SINE	●	●	●		●	●	●	●
SQUARE	●	●	●		●	●	●	●
RAMP	●	●	●		●	●	●	●
PULSE	●	●	●	●	●	●	●	●
NOISE	●							
ARB	●					●		●

Carrier and Modulation Waveform

Carrier \ Mod Waveform	SINE	SQUARE	TRIANGLE	RAMP	NRAMP	NOISE	ARB
SINE	●	●	●	●	●	●	●
SQUARE	●	●	●	●	●	●	●
RAMP	●	●	●	●	●	●	●
PULSE	●	●	●	●	●	●	●
NOISE	●	●	●	●	●		●
ARB	●	●	●	●	●	●	

Ordering Information

Model

Model	Name	Description
MX33520A-26	Function/Arbitrary Generator	1μHz ~ 26 MHz
MX33520A-36	Function/Arbitrary Generator	1μHz ~ 36 MHz
MX33520A-46	Function/Arbitrary Generator	1μHz ~ 46 MHz
MX33520A-60	Function/Arbitrary Generator	1μHz ~ 60 MHz
MX33520A-80	Function/Arbitrary Generator	1μHz ~ 80 MHz

Standard

No.	Name	Qty.
1	USB communication cable	1 pc
2	BNC test cable	1 pc
3	BNC double clip cable	1 pc
4	Power cord	1 pc
5	Product User Manual	1 pc
6	Product Qualification Certificate	1 pc
7	0.5A/2220V fuse (installed in socket)	2 pc
8	USB driver and testing software	1 pc
9	Arbitrary wave generation software	1 pc
10	LAN interface and testing software	1 pc

Option

No.	Name	Qty.
1	GPIB interface	1 pc
2	Sweeper plugin	1 pc
3	Power meter plug-in	1 pc
4	Power signal output plug-in	1 pc
5	TCXO clock	1 pc

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