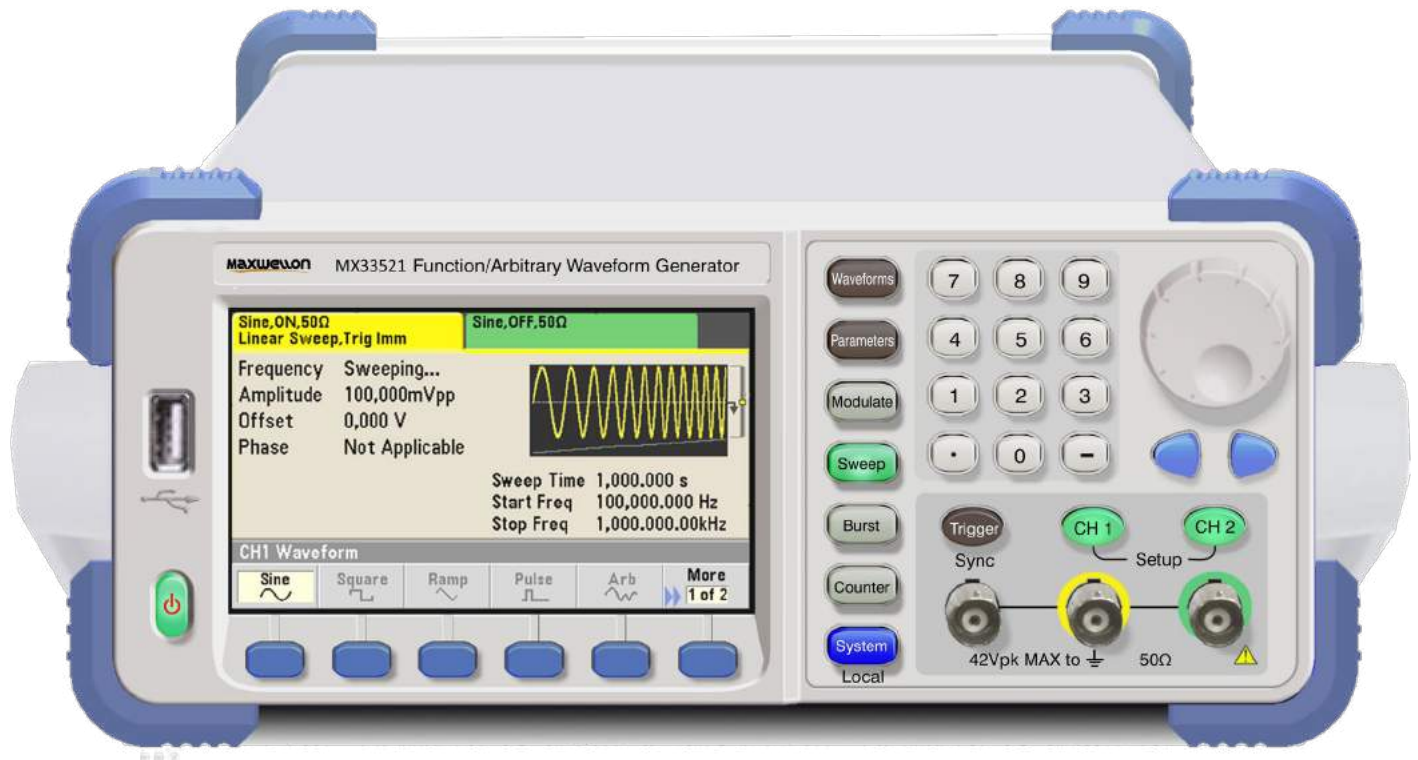




MAXWELLON MX33521

1μHz~6/11/21/31/46/60MHz

Function/Arbitrary Generator

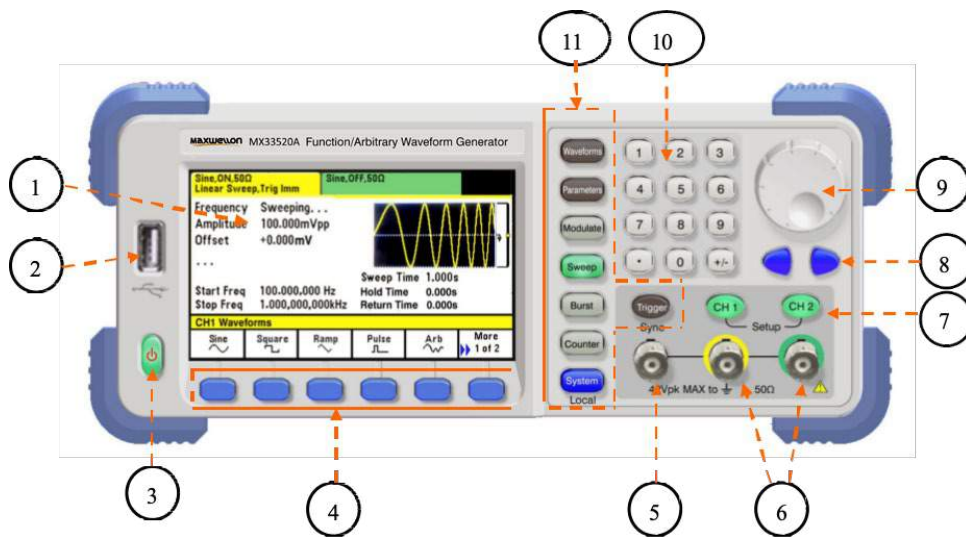
2023

The MX33521 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
- Accurate pulse and square wave waveforms, with edge jitter as low as 200ps rms (nominal value), a low jitter clock in AD and DA conversion applications can ensure the authenticity of signal acquisition and restoration, reduce errors and distortion.
- The total harmonic distortion is as low as 0.2%.
- The large signal amplitude can reach 20Vpp (High Z, $\leq 20\text{MHz}$).
- The small signal amplitude can reach 1mVpp (50 Ω).
- Equipped with dual sideband suppression carrier amplitude modulation (DSSC AM).
- Dual channel coupling: frequency coupling, amplitude offset coupling, phase coupling, tracking (only the main waveform).
- The width of the pulse wave is adjustable, with a resolution of 0.1ns and a pulse width of 28.5ns~waveform period - 28.5ns
- The duty cycle of square wave and pulse wave is adjustable from 0.1% to 99.9%, with a resolution of 0.1%
- The symmetry of the oblique wave can be adjusted from 0.0% to 100.0%, with a resolution of 0.1%
- 150MSa/s sampling rate, 14bits vertical resolution, dual channel output.
- Output multiple standard waveforms: sine, square, ramp, pulse, arbitrary, noise, DC.
- All digital modulation: AM, DSSC AM, FM, PM, ASK, FSK, BPSK.
- The internal modulation frequency of AM, DSSC AM, FM, and PM can reach: 1 μHz ~100kHz, resolution 1 μHz
- Output linear/logarithmic frequency sweep (Sweep) signals and pulse train waveforms (Burst)
- Built in 6-bit/second, 10Hz~250MHz bandwidth frequency counter
- Optional output power module, 8W/8 Ω
- Optional frequency scanner function plugin Sweeper
- Optional power meter function plugin Power Meter
- Powerful arbitrary wave editing software that supports remote command control.
- Multiple interfaces: USB (Device, Host supports reading and writing of USB drives), LAN, GPIB (optional)
- 4.3 inch color TFT LCD display screen, user-friendly and intuitive interface, supporting both Chinese and English interfaces
- The chassis design is beautiful and generous, and the button operation is comfortable and flexible

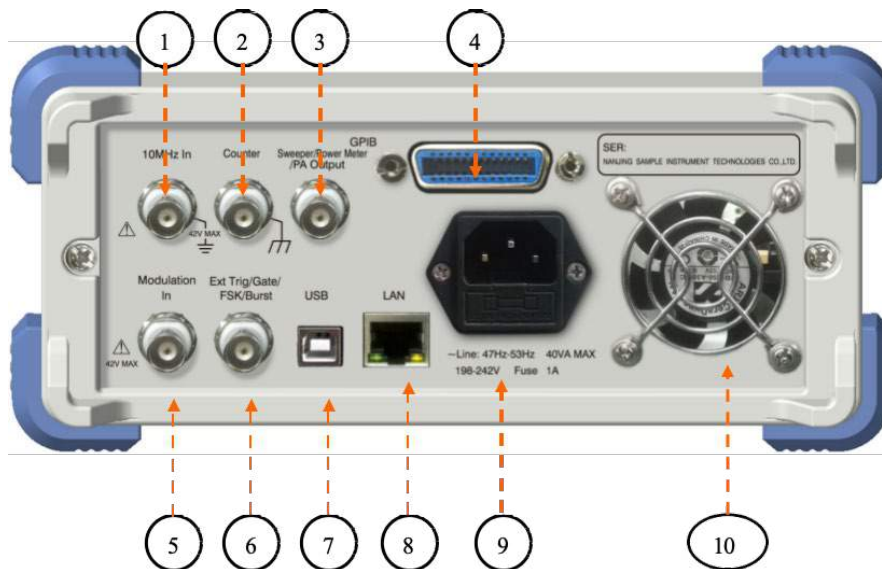
Front Panel



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, Square, Ramp, Pulse, Noise, Arb, DC	
Built-in Arbform	More than 50 Arbforms, including exponential decline, exponential rise, Gaussian pulse, logarithm, etc	
User defined Arbform	8-16384 points (CH1); 8-2048 points (CH2)	
Sampling rate	150MSa/s	
Working Mode and Modulation Type		
Working Mode	Point Frequency, Modulation (CH1), Sweep (Sweep CH1), Burst (Burst CH1), Counter, Sweeper, Power Meter	
Modulation Type	ASK, FSK, BPSK, AM, DSSC, FM, PM	
Waveform Characteristics		
Output Waveform	Sine, Square, Ramp, Pulse, Noise, Arb, DC	
Frequency Accuracy	Frequency error: $\leq \pm 5 \times 10^{-5}$	
	Frequency stability: $\pm 1 \times 10^{-5}$	
Sine	Frequency range	1μHz ~ 6 MHz (MX33521-06), Resolution 1μHz
		1μHz ~ 11 MHz (MX33521-11), Resolution 1μHz
		1μHz ~ 21 MHz (MX33521-21), Resolution 1μHz
		1μHz ~ 31 MHz (MX33521-31), Resolution 1μHz
		1μHz ~ 46 MHz (MX33521-46), Resolution 1μHz
		1μHz ~ 60 MHz (MX33521-60), Resolution 1μHz
	Harmonic distortion (0dBm)	< -70dBc (< 20kHz)
		< -50dBc (20kHz ~ 1MHz)
		< -40dBc (1MHz ~ 30MHz)
		< -30dBc (30MHz ~ 60MHz)
	Total distortion (0dBm)	≤0.2% (20Hz ≤ f ≤100 kHz)
	Phase Noise (10 MHz, 0dBm, 10kHz offset)	≤-108 dBc/Hz
	Spurious Signal (non-harmonic)	< 10MHz ≤ -70dBc (typical value)
		>10MHz ≤ -70dBc+6dB/octave (typical value)
Square	Frequency range	1μHz ~ 6 MHz, Resolution 1μHz (MX33521-06)
		1μHz ~ 11 MHz, Resolution 1μHz (MX33521-11)
		1μHz ~ 15 MHz, Resolution 1μHz (MX33521-21/31/46/60)
	Rising/ Falling Edge	18ns fixed value
	Duty cycle	0.1% ~ 99.9%
	Resolution	0.1%
	Overshoot (50 Ω)	≤2%(CH1)
Edge jitter	≤200ps rms (nominal value)	
Ramp	Frequency range	1μHz ~ 1 MHz, Resolution 1μHz
	Symmetry	0.0% ~ 100.0% (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 ~ 6 MHz, Resolution 1μHz (MX33521-06)
		1μHz ~ 11 MHz, Resolution 1μHz (MX33521-11)
		1μHz ~ 15 MHz, Resolution 1μHz (MX33521-21/31/46/60)
	Rising/ Falling Edge	18ns
	Duty cycle	0.1% ~ 99.9%, Resolution 0.1%
	Pulse width	28.5 ns ~ period - 28.5 ns, Resolution 0.1ns
	Overshoot (50 Ω)	≤2%(CH1)
Edge jitter	≤ 200ps 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 (CH1)
		8~2048 Samples, Resolution 1 Sample (CH2)
	Vertical resolution	14 bits
Amplitude Characteristic		
Amplitude Range	CH1: 2mVpp~20Vpp(HighZ) ≤20MHz 2mVpp~10Vpp(HighZ) ≤60MHz 1mVpp~10Vpp(50Ω) ≤20MHz 1mVpp~5Vpp(50Ω) ≤60MHz CH2: 2mVpp~ 6Vpp(High Z) ≤60MHz 1mVpp~ 3Vpp(50 Ω) ≤60MHz	
Resolution	4 significant digits	
Flatness (Relative to 1kHz)	<100kHz: ±0.5dB	
	100kHz ~ 60MHz: ±1.0dB	
Accuracy	± 1% set value ± 1mVpp (at 1kHz)	
Unit	Optional Vpp, Vrms, or dBm	
Offset Characteristic		
Offset level range	CH1: ±(10 VDC –AC peak value/2) (High Z) ±(5 VDC –AC peak value/2) (50 Ω) CH2: Signal output amplitude>378.6mVpp (High Z) ±(3 VDC –AC peak value/2) (High Z) ±(1.5 VDC –AC peak value/2) (50 Ω) Signal output amplitude≤378.6mVpp (High Z) ±(189.3 mVDC–AC peak value/2)(High Z) ±(94.7 mVDC –AC peak value/2) (50 Ω)	
Resolution	4 significant digits	
Accuracy	CH1: ± 1% offset setting value ± 0.25% amplitude setting value ± 2mV (offset ≤180mV) ± 1% offset setting value ± 0.25% amplitude setting value ± 6mV (offset >180mV) CH2: ± 1% offset setting value ± 0.25% amplitude setting value ± 6mV	
Unit	V	
AM CH1		
Modulation Type	Full carrier or double sideband suppressed carrier (DSSC AM)	
Carrier Waveform	Sine, Square, Ramp, Pulse, Noise, Arb	
Modulation Waveform	Sine, Square, Triangle, Positive Sawtooth, Negative Sawtooth, Noise, Arb	
Modulation Frequency	Internal	1μHz ~ 100 kHz, Resolution 1μHz
		1μSa/s ~ 50 MSa/s (Arb),Resolution 1μSa/s
	External	1μHz ~100 kHz (-3dB)
Modulation Depth	0.0%~ 120.0%, Resolution 0.1%	
	Accuracy: ±1.0%	
Modulation Source	Int/Ext	

FM CH1		
Carrier Waveform	Sine, Square, Ramp, Pulse	
Modulation Waveform	Sine, Square, Triangle, Positive Sawtooth, Negative Sawtooth, Noise, Arb	
Modulation Frequency	Internal	1μHz ~ 100 kHz, 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 CH1		
Carrier Waveform	Sine, Square, Ramp, Pulse	
Modulation Waveform	Sine, Square, Triangle, Ramp, nRamp, Noise, Arb	
Modulation Frequency	External	1μHz ~ 100 kHz, Resolution 1μHz
		1μSa/s ~ 50 MSa/s (Arb),Resolution 1μSa/s
	External	1μHz ~100 kHz (-3dB)
Modulation Depth	0.0° ~360.0°; Resolution 0.1°	
Modulation Source	Int/Ext	
FSK CH1		
Carrier Waveform	Sine, Square, Ramp, Pulse	
Frequency-Hopping	1μHz to Fsinemax(Sine) 1μHz to 15 MHz(Square/Pulse) 1μHz to 1 MHz (Ramp) Resolution 1μHz	
Switching Rate	1μHz ~1 MHz; Resolution 1μHz	
Modulation Source	Int/Ext	
BPSK CH1		
Carrier Waveform	Sine, Square, Ramp, Pulse, Arb	
Phase Jump	0.0° ~ 360.0°; Resolution 0.1°	
Switching Rate	1μHz ~1 MHz; Resolution 1μHz	
Modulation Source	Int/Ext	
ASK CH1		
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 CH1		
Carrier Waveform	Sine, Square, Ramp, Pulse	
Start Frequency	1μHz to Fsinemax(Sine)	
	1μHz to 15 MHz(Square/Pulse)	
	1μHz to 1 MHz (Ramp)	
	Resolution 1μHz	
Termination Frequency	1μHz to Fsinemax(Sine)	
	1μHz to 15 MHz(Square/Pulse)	
	1μHz to 1 MHz (Ramp)	
	Resolution 1μHz	
Sweep Mode	Linear/Log	
Sweep Time	0.001s ~ 1000s; resolution 1mSec	
Hold Time	0.000s ~ 1000s; resolution 1mSec	
Return Time	0.000s ~ 1000s; resolution 1mSec	
Trigger Source	Internal/External/Single	

Burst	
Carrier Waveform	Sine, Square, Ramp, Pulse, Arb
Burst Mode	N Cycle/Gated
Start Phase	0.0° ~ 360.0°; Resolution 0.1°
Number of burst waveforms	1 ~ 1000000; Resolution 1
Interval	1μS ~ 1000 S; Resolution 1μS
Counter	
Measurement Function	Frequency, periodicity, count
Frequency Input Range	10Hz ~ 250 MHz
Input Voltage Range And Sensitivity	200mVrms~1.5Vrms ≤ 200MHz
Frequency Measurement Gate Time	50ms~10s continuously adjustable
Counting Capacity	40bits 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 ~ 60 MHz (maximum)(Sine)
Dynamic Range	+15dBm ~ 60dBm(CH1) +13dBm ~ 60dBm(CH2)
Accuracy	± 1dB
Input impedance	50 Ω or High Z
Input Port	Rear panel BNC (Sweeper), port multiplexing
POWER METER Option	
Frequency Range	1KHz~100 MHz(Sine)
Dynamic Range	+15dBm~-60dBm, supporting simultaneous display of valid values
Accuracy	± 1dB, compensation frequency needs to be set
Input impedance	50 Ω
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 and Amplitude Coupling Mode	Offset, Ratio
Tracking	In phase, out of phase, two channel phase adjustable sweep and burst
Sync	
Output Port	BNC
Output Impedance	50 Ω
Output Level	3Vpp (High Z) 1.5Vpp (50 Ω)
Sync Source	Channel 1 (CH1)
Output	
Output Port	BNC
Output impedance	50 Ω overload protection

Trig In	
Input Port	BNC
Input impedance	10 k Ω , 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 MHz (Max)
Mod In	
Input Port	BNC
Input Impedance	5 k Ω
Input Level	3.3Vpp
Input Bandwidth	100kHz(Max, -3dB Typical value)
10MHz In	
Input Port	BNC
Input Impedance	1 k Ω 20pF, AC coupling (nominal value)
Input Frequency	10 MHz $\pm$ 20 Hz
Input Voltage	200 mVpp ~ 5 Vpp
Interface	
Interface Configuration	USB,LAN,GPIB(option)
Arb Storage Depth	
Volatile Memory	16384 points(CH1); 2048(CH2)
Non-Volatile Memory	2MB
Mechanical Properties	
Dimensions	260mm $\times$ 105mm $\times$ 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	FSK	BPSK	SWEEP	BURST
SINE	●	●	●	●	●	●	●
SQUARE	●	●	●	●	●	●	●
RAMP	●	●	●	●	●	●	●
PULSE	●	●	●	●	●	●	●
NOISE	●						
ARB	●				●		●

Carrier and Modulation Waveform

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

Ordering Information

Model

Model	Name	Description
MX33521-06	Function/Arbitrary Generator	1μHz ~ 6 MHz
MX33521-11	Function/Arbitrary Generator	1μHz ~ 11 MHz
MX33521-21	Function/Arbitrary Generator	1μHz ~ 21 MHz
MX33521-31	Function/Arbitrary Generator	1μHz ~ 31 MHz
MX33521-46	Function/Arbitrary Generator	1μHz ~ 46 MHz
MX33521-60	Function/Arbitrary Generator	1μHz ~ 60 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	GPIO interface	1 pc
2	Sweeper plugin	1 pc
3	Power meter plug-in	1 pc
4	Power signal output plug-in	1 pc



Maxwellon Electronic Instruments Co.,LTD.

Factory: No.6 Xiangjiang Road, Qingdao 266000, China
Tel: 0086 13816527810

Sales Office: NO.153 Zhuzhou Rd.,Laoshan District, Qingdao 266100, China.
Tel: 0086-532-80977508
Fax: 0086-532-80977508

Sales: Sales@Maxwellon.com
Web: www.maxwellon.com