



- Frequency range: 1 μ Hz ~100MHz.
- Up to 250MSa/s sampling rate, no distortion of analog waveforms.
- 16-bit vertical resolution ensures the accuracy of waveform amplitude.
- Equip with dual channels with equal performance, equivalent to two independent signal sources.
- The storage depth of up to 2M ensures the creation of more waveform cycles and better waveform details.
- A 4.3-inch color TFT LCD screen, a clear and intuitive user interface.
- Rich modulation function, support for AM, DSB - AM, FM, PM, ASK, FSK and PSK, BPSK, QPSK, 3 FSK, 4 FSK, OSK and PWM, etc.
- 1 μ Hz frequency resolution: When the impedance is high, the amplitude range is 2mV~20Vpp. When the impedance is 50 Ω , the amplitude range is 1mV~10Vpp.
- Built-in 80MHz high-resolution frequency meter.
- Standard communication interface: front USB 2.0 high speed (USB Host) and rear USB 2.0 full speed (USB Device).
- More than 160 kinds of arbitrary signals, such as exponential rise, exponential decline, ECG signal, Gaussian, semi-positive vector, Lorentz, dual-tone multi-frequency, DC voltage, etc.
- Built-in 16 harmonic generator function, output with specified frequency, amplitude and phase of harmonics, usually used in harmonic detection equipment or harmonic filter equipment test.

Model	MFG4215	MFG4225	MFG4240	MFG4260	MFG4280	MFG42100
Channel	2					
Wavelength	2M					
Frequency range	15MHz	25MHz	40MHz	60MHz	80MHz	100MHz
Sampling rate	250MSa/s					
Voltage resolution	16Bits					
Waveform						
Standard waveform output	sine wave, square wave, triangular wave, pulse wave, noise, harmonics					
Arbitrary waveform output	160 kinds of arbitrary waveforms, including exponential rise, exponential fall, ECG signal, Gauss, half vector, Lorentz, dual tone multi-frequency, DC voltage, etc					
Frequency property						
Sine wave	1μHz~15MHZ	1μHz~25MHZ	1μHz~40MHz	1μHz~60MHZ	1μHz~80MHz	1μHz~100MHZ
Square wave	1μHz~15MHZ	1μHz~15MHZ	1μHz~15MHz	1μHz~15MHZ	1μHz~15MHZ	1μHz~15MHZ
Pulse wave	1μHz~15MHZ	1μHz~15MHZ	1μHz~15MHz	1μHz~15MHZ	1μHz~15MHZ	1μHz~15MHZ
Triangle wave	1μHz~2MHZ	1μHz~2MHZ	1μHz~2MHZ	1μHz~2MHZ	1μHz~2MHZ	1μHz~2MHZ
Harmonic	1μHz~5MHZ	1μHz~10MHZ	1μHz~20MHz	1μHz~30MHZ	1μHz~40MHZ	1μHz~50MHZ
Noise (3 db)	100 MHZ bandwidth					
Arbitrary wave	1 μHz ~ 15 MHZ			1 μHz ~ 20 MHZ		
Resolution	1μHz					
Precision	±1ppm, 18~28℃					
Square wave property						
Rise/Fall time	Typical (1kHz, 1Vpp)					
	≥9ns					
Overshoot	Typical (100kHz, 1Vpp)					
	≤5%					
Duty cycle	0.001% ~ 99.999%;					

	The range varies with the frequency
Asymmetry	1% of the period plus 4ns
Triangular wave property	
Linear	$\leq$ 1% of peak output (typical, 1kHz, 1Vpp, symmetry 100%)
Symmetry	0% ~ 100%
Impulse wave property	
Cycle	67ns~1Ms
Pulse	$\geq$ 16ns
Rise/Fall time	$\geq$ 9ns (limited by current frequency setting and pulse width setting)
Overshoot	Typical (1kHz, 1Vpp)
	$\leq$ 5%
Arbitrary wave property	
Wavelength	2M
Vertical resolution	16 Bits
Sampling rate	1 μ Sa/s~62.5 MSa /s, 1 μ Sa/s resolution
Time of rise/fall	Ns of 9 or higher
Overshoot	Typical (1Vpp)
	$\leq$ 5%
Harmonic property	
Harmonic frequency	$\leq$ 16
Harmonic type	Even harmonics, odd harmonics, all harmonics
Harmonic amplitude	All harmonic amplitude can be set.
Harmonic phase	All harmonic amplitude can be set.
Amplitude property (50 Ω terminal)	
Amplitude range	$\leq$ 10MHz: 1mVpp ~ 10Vpp;
	$\leq$ 55MHz: 1mVpp ~ 5.5Vpp;
	$\leq$ 80MHz: 1mVpp ~ 3.5Vpp;
	$\leq$ 100MHz: 1mVpp ~ 2Vpp;
Precision	Typical (1kHz sine wave, 0V offset, > 10mVPP)
	$\pm$ 1% setting value $\pm$ 5mVpp
Amplitude flatness (relative to 1kHz sine wave, 1Vpp, 50 Ω)	$\leq$ 5MHz: $\pm$ 0.1dB;
	$\leq$ 15MHz: $\pm$ 0.2dB;
	$\leq$ 25MHz: $\pm$ 0.3dB
	$\leq$ 40MHz: $\pm$ 0.5dB
	40MHz: $\pm$ 1.0dB

Unit	Vpp, mVpp, Vrms, dBm(50Ω impedance)
Resolution	1mVpp
Offset property (50Ω terminal)	
Scope	±5Vpkac+dc
Precision	±(1% of the setting value + 5mV + 1% of the amplitude)
Waveform output	
Impedance	50 Ω
Modulation property	
Modulation type	AM, DSB-AM, FM, PM, ASK, FSK, PSK, BPSK, QPSK, 3FSK, 4FSK, OSK, PWM
AM	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, Lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~1MHz
Modulation depth	0% ~ 120%
DSB-AM	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~1MHz
Modulation depth	0% ~ 120%
FM	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~1MHz
PM	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave

	(except DC)
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~1MHz
Phase deviation	0 ° ~ 360 °
ASK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal and external
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
FSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal and external
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
PSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal and external
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
BPSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	internal
Data source	PN15, PN21, 01, 10

Modulation frequency	2mHz~1MHz
QPSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	internal
Data source	PN15, PN21
Modulation frequency	2mHz~1MHz
3FSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	internal
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
4FSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	internal
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
OSK	
Carrier	Sine wave
Modulation source	Internal, external
Shock time	8 ns - 4.99975 ms
Modulation frequency	2mHz~1MHz
PWM	
Carrier	Square wave
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, Lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~50KHz

Duty cycle deviation	0% ~ 50%					
External modulation input						
Input range	AM, DSB-AM, FM, PM, OSK, PWM: 75mVRMS ~ ± 5Vac + dc					
	ASK, FSK, PSK: TTL level					
Input bandwidth	50KHz					
Input impedance	10 KΩ					
Sweep frequency property						
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)					
Type	Linear					
Direction	Upward					
Frequency sweep time	1ms ~ 50Ks					
Hold/return time	0ms ~ 50Ks					
Trigger source	Internal, external, manual					
Tag	Synchronize the model's falling edge					
Burst property						
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)					
Carrier frequency	1μ Hz~15MHz	1μ Hz~25MHz	1μ Hz~40MHz	1μ Hz~60MHz	1μ Hz~80MHz	1μ Hz~100MHz
Burst counting	1 ~ 2000 000 000					
Start/stop phase	0 ° ~ 360 °					
Internal cycle	2 μs ~ 500 s					
Door control source	External trigger					
Trigger source	Internal, external, manual					
Frequency meter						
Measurement functions	Frequency, period, positive/negative pulse width, duty cycle					
Frequency	1 μHz ~ 80 MHz					
Gate time	10ms~16s					
Input signal range	0 ~ 3.3 V					

Trigger property	
Trigger input	
Level	TTL - compatible
Slope	Up or down (optional)
Pulse width	>100ns
Trigger output	
Level	TTL - compatible
The pulse width	>60ns
Maximum frequency	1MHz
Reference clock	
External reference input	
Lock range	10 MHz $\pm$ 50 Hz
Level	Low level: 0~400mV, high level: 2.5V~5V
Locking time	< 2 s
Input impedance	50 Ω , DC coupling
Internal reference output	
Frequency	10 MHz $\pm$ 50 Hz
Level	3.3 Vpp
Output impedance (typical value)	50 Ω , DC coupling
Synchronous output	
Level	TTL - compatible
Impedance	50 Ω , nominal value
General features	
Interface	USB Host, USB Device
Display	4.3-inch color TFT LCD screen
Voltage	100-120VAC _{RMS} ($\pm$ 10%),45Hz to 440Hz, CAT II
	120-240VAC _{RMS} ($\pm$ 10%),45Hz to 66Hz, CAT II
Power	<30W
Fuse	T, 0.5 A, 250 v, 5 x20mm
Environment	
Temperature range	Operation: 10°C ~ 40°C
	Non-operation: -20°C ~ 60°C
Humidity range	$\leq$ +104°F ($\leq$ +40°C): Relative humidity $\leq$ 90%
	106°F ~122°F (+41°C ~50°C): Relative humidity $\leq$ 60%
Altitude	Operation: below 3000 meters
	Non-operation: below 15000 meters
Mechanical specifications	

Dimensions (W × H × D)	308mm x 232mm x 110mm
Weight	3.09 KG