



## MFG-3000 Series DDS Function Generator

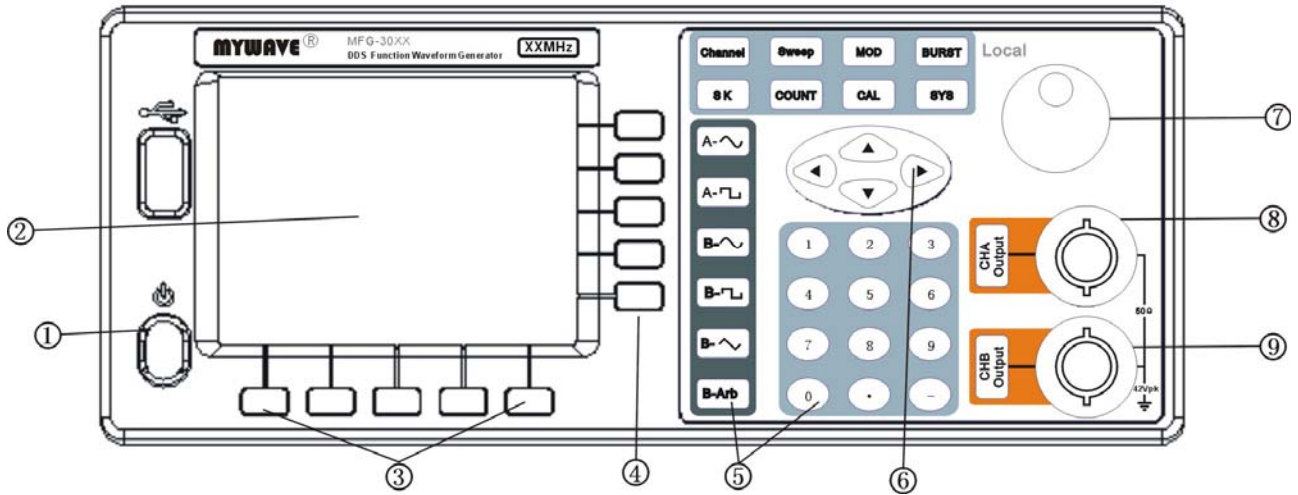


### ◆ Main Features

- Direct Digital Synthesis (DDS) technology, 2 independent output channels
- 3.5-inch TFT display, English/Chinese menu
- 32 kinds of built-in pre-stored waveforms in Channel B
- Minimum stable output waveform: 1mV(50Ω)
- Multiple modulation functions: FM, AM, FSK, ASK, PSK
- Frequency sweep, amplitude sweep, burst and CHA&CHB add functions
- Over voltage, over current, output short-circuit and reverse voltage protections
- Optional parts: RS232, USB interface, 200MHz frequency counter, 7W(8Ω) power amplifier

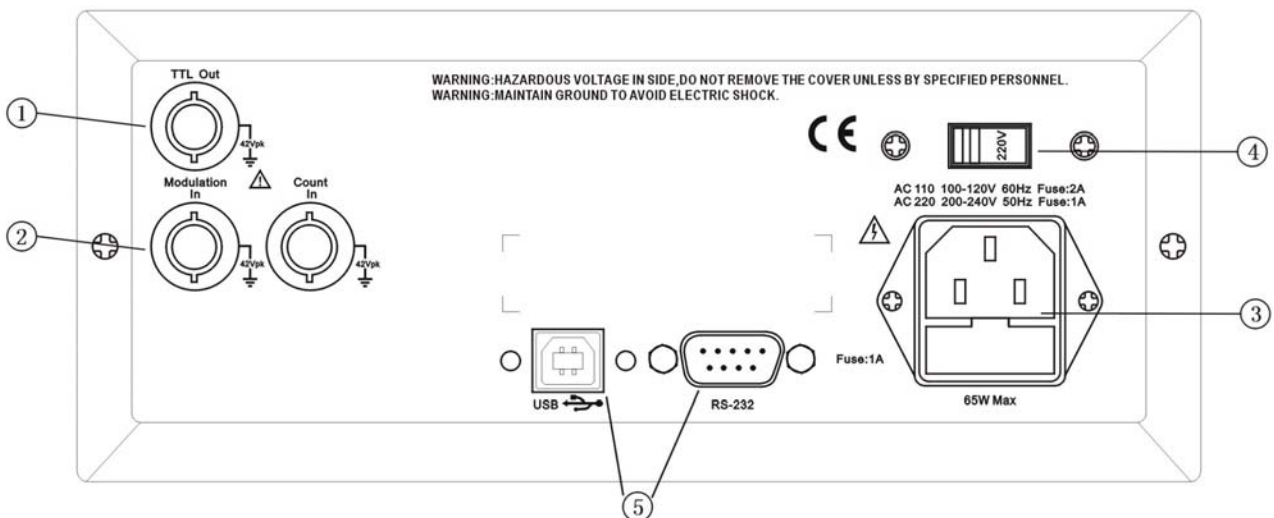
## ◆ Front Panel and Real Panel

### Front Panel



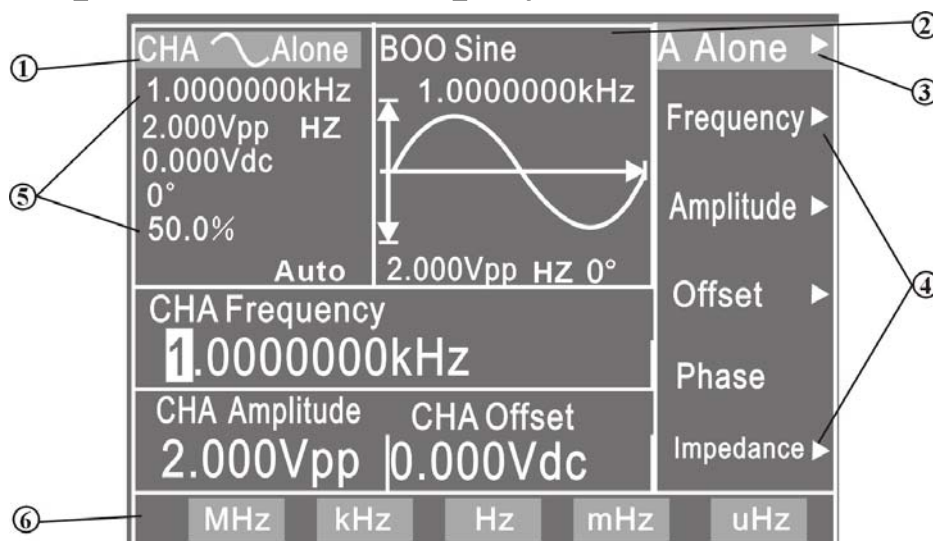
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|------------------------------------|---------------------|------------------|--------------------|
| 1. Power switch                    | 2. TFT display      | 3. Unit soft key | 4. Software option |
| 5. Function key and Numeric keypad | 6. Direction key    | 7. Rotary knob   |                    |
| 8. Channel A output                | 9. Channel B output |                  |                    |

### Real Panel



- |                              |   |
|------------------------------|---|
| 1. TTL output (BNC)          | 2. Modulation/External signal input (BNC) |
| 3. Power connector with fuse | 4. AC110V/220V power selection switch     |
| 5. RS232/USB connector       |   |

## ◆ Description of TFT Display



1. **A Waveform Display:** at the upper-left display area, displays the waveform of channel A and preset parameter.
2. **B Waveform Display:** at the upper-central display area, displays the waveform of channel B under the variety functions.
3. **Function Menu:** at the right-side display area, displays the function menu on the first line.
4. **Option Menu:** at the right-side display area, displays the option menu from the second line to the sixth line.
5. **Parameter Menu:** at the lower-left display area, displays the waveform of channel A, frequency, amplitude, offset, phase and duty cycle.
6. **Unit Menu:** at the bottom of display area, displays unit menu on the bottom line of TFT display.

## ◆ Technical Specifications

Model	MFG-3010	MFG-3020	MFG-3040	MFG-3060
Frequency range(sine)	40μHz~10MHz	40μHz~20MHz	40μHz~40MHz	40μHz~60MHz
<b>Output Characteristics of Channel A</b>				
<b>Waveform Characteristics</b>				
Waveform type	sine, square, pulse, DC			
Waveform length	4 ~ 16000 points			
Sample rate	180MSa/s			
Waveform amplitude resolution	10bits			
Sinusoidal harmonic rejection	≥50dBc (≤1MHz), ≥ 40dBc (1MHz ~ 20MHz), ≥30dBc (20MHz ~ 40MHz)			
Sine wave total distortion	≤0.5 % (20Hz ~ 200kHz)			
Pulse and square rise/fall time	≤20ns			
Pulse and square overshoot	≤5%			
Square wave duty cycle	50%			

Pulse wave duty cycle	0.1%~ 99.9%
<b>Frequency Characteristics</b>	
Frequency range (sine)	2kHz ~ the maximum frequency, resolution: 40 mHz 40μHz ~ 2kHz, resolution: 40μHz
Frequency range (square)	40μHz~20MHz
Frequency range (pulse)	40μHz~10MHz
Frequency accuracy	$\pm(5 \times 10^{-5} + 40\text{mHz})$
Frequency stability	$\pm 5 \times 10^{-6}/3$ hours
<b>Amplitude Characteristics</b>	
Amplitude range	2mVpp ~ 20Vpp (high impedance)
Amplitude resolution	20mVpp (amplitude>2Vpp), 2mVpp (amplitude<2Vpp)
Amplitude accuracy	$\pm(1\% + 2\text{mVrms})$ (high impedance, true RMS, frequency at 1kHz)
Amplitude stability	$\pm 0.5\%/3$ hours
Amplitude flatness	$\pm 5\%$ (frequency<1MHz), $\pm 10\%$ (frequency between 1MHz ~ 10MHz), $\pm 20\%$ (frequency between 10MHz ~ 60MHz)
Output impedance	50Ω
Sine wave amplitude setting range (50Ω)	1mVpp ~ 10Vpp, when output frequency $\leq 10\text{MHz}$ 1mVpp ~ 5Vpp, when output frequency $\leq 40\text{MHz}$ 1mVpp ~ 2Vpp, when output frequency $\geq 40\text{MHz}$
Amplitude setting range (high impedance)	2mVpp ~ 20Vpp, when output frequency $\leq 10\text{MHz}$ 2mVpp ~ 10Vpp, when output frequency $\leq 40\text{MHz}$ 2mVpp ~ 4Vpp, when output frequency $\geq 40\text{MHz}$
<b>Offset Characteristics</b>	
Offset range	$\pm 10\text{V}$ (high impedance)
Resolution	20mVdc
Offset accuracy	$\pm(1\% + 20\text{mVdc})$
<b>Sweep Characteristics</b>	
Sweep type	frequency sweep, amplitude sweep
Sweep range	free to set the start and stop points
Sweep time	100ms~900s
Sweep direction	Up, Down, Up-Down
Sweep mode	linear, logarithmic
Control mode	auto sweep or manual sweep
<b>Frequency Modulation Characteristics</b>	
Modulation signal	internal or external waveforms
FM deviation	0%~20%
<b>Amplitude Modulation Characteristics</b>	
Modulation signal	internal or external waveforms
AM depth	0%~120%
<b>Shift Keying Characteristics</b>	
FSK	free to set carrier frequency and hop frequency
ASK	free to set carrier amplitude and hop amplitude
PSK	hop phase 0~360°, resolution 11.25°
Alternative rate	10ms~60s

<b>Output Characteristics of Channel B</b>	
<b>Waveform Characteristics</b>	
Waveform type	32 kinds of waveforms, like sine, square, triangle, sawtooth, ladder etc.
Waveform length	1024 points
Sample rate	12.5MSa/s
Waveform amplitude resolution	8bits
<b>Frequency Characteristics</b>	
Frequency range	Sine: 10mHz~1MHz      Other waveforms: 10mHz~100kHz
Frequency resolution	10mHz
Frequency accuracy	$\pm(1 \times 10^{-5} + 10\text{mHz})$
<b>Amplitude Characteristics</b>	
Amplitude range	50mVpp~20Vpp (high impedance)
Amplitude resolution	20mVpp
Output impedance	50Ω
<b>Harmonic Characteristics</b> (channel B frequency is the harmonic wave of channel A)	
Harmonic time	0.1 ~ 250.0 times
Harmonic frequency	<1MHz
Phase adjustment	coarse adjustment: 11.25 degree/step, fine adjustment: 2 degree/step
<b>Burst Characteristics</b> (channel B signal is used as burst signal)	
Frequency of Channel B	40mHz ~ 1MHz
Burst Frequency	10mHz ~ 50kHz
Burst count	1~65000 cycles
Burst mode	continuous burst and single burst
<b>TTL Output Characteristics</b>	
Waveform characteristics	Square, rise/fall time≤20ns
Frequency characteristics	same as sine wave of channel A
Amplitude characteristics	TTL, CMOS compatible, low level<0.3V, high level>4V
<b>Common Characteristics</b>	
Power source	Voltage: AC220V±10%, AC110V±10% (Pay attention to the position of voltage selection switch) Frequency: 50Hz ±5%      Power: <45VA
Environment	Temperature: 0~40°C      Humidity: <80%
Operation characteristics	Key operation for all functions, menu display, rotary dial adjustment
Display	TFT display, 320*240, English, Chinese (simplified), Chinese (traditional)
Manufacturing technology	Surface Mount Technology, Integrated Circuit. High reliability and stability.
Accessories	Power cord, Q9 test lead, Q9 BNC-clip test lead, Operation manual RS232 cable (optional), RS232 interface software CD (optional) USB cable (optional), USB interface software CD (optional)
Dimension	Machine dimension: 385(D)×260(W)×110(H)mm Chassis dimension: 415(D)×295(W)×195(H)mm
Weight	3.5kg
<b>Optional Parts Characteristics</b>	
Remote interface	USB Universal Serial Bus Interface RS232 serial interface

Frequency counter	Testing frequency range: 1Hz~200MHz Input signal amplitude: 100mVpp~20Vpp
Power amplifier	Max. output power: 7W (8 $\Omega$ ), 1W (50 $\Omega$ ) Max. output voltage: 22Vpp Frequency bandwidth: 1Hz~200kHz

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