







# Innovation and Value in Waveform Design

The AFG-2100/2000 Series Arbitrary Function Generators are DDS based signal generators covering the output of Sine, Square, Ramp, Noise and 20MSa/s Arbitrary waveform. The 0.1Hz resolution and 1%  $\sim$  99% adjustable duty cycle of Square(Pulse) waveform greatly extend its application range in various fields.

The AFG-2100/2000 Series includes 6 models in three frequency bands of 5MHz, 12MHz and 25MHz. Besides the features of AFG-2000, AFG-2100 also carries additional features of AM/FM/FSK Modulation, Sweep and Frequency Counter. The 3.5" color LCD will clearly display the digital waveform parameters set through front panel. The entire Series is equipped with USB Device interface for remote control and importing waveform data from PC.

# **Built-In Arbitrary Waveform Function**

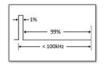
20MSa/s sampling rate, 10 bit vertical resolution and 4k point memory equip AFG-2100/2000 the arbitrary waveform capacity. User can create waveform by mean of either point by point input from front panel or PC software.



#### 1% Adjustable Duty Cycle of Square Wave

The AFG-2100/ 2000 Series provides  $1\% \sim 99\%$  variable duty cycle for its square waveform output. This feature allows generating the pulse waveform to simulate a spike signal or a transient signal.





# Fully Digital Entry Design

The fully digital entry design of AFG-2100/2000 Series improves the setting uncertainty of conventional Function Generator and therefore significantly increases the accuracy of its waveform output. The 3.5" LCD screen allows user to see the parameter value change in detail when the adjustment is in progress.



# Amplitude and DC Offset Display

In addition to the setting parameters, the amplitude, DC offset values are also displayed on the LCD screen. Three amplitude units, Vpp, Vrms and dBm, can be selected and exchanged.



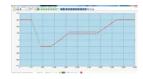
#### AM/FM/FSK, Sweep, Counter(AFG-2100 only)

AFG-2100 models are equipped with additional AM/FM/FSK Modulation, Sweep and Frequency Counter functions. The 150MHz frequency counter saves user the cost of purchasing a standalone frequency counter.



# **Arbitrary Waveform Editing Software**

A free arbitrary waveform editing software is available which is used to edit the arbitrary waveform on PC. After completing the waveform editing, it can be downloaded to AFG through USB interface for waveform output.



# AFG-2100/2000 Series

# **FEATURES**

- 0.1Hz ~ 5/12/25 MHz with in 0.1Hz Resolution
- Sine, Square, Ramp, Noise and Arbitrary Waveform
- 20MSa/s Sampling Rate, 10 bit Vertical Resolution and 4k point Memory for Arbitrary Waveform
- 1% ~ 99% Adjustable Duty Cycle for Square Waveform
- Waveform Parameter Setting Through
   Numeric Keypad Entry & Knob Selection
- Amplitude, DC Offset and Other Key Setting Information Shown on the 3.5" LCD Screen Simultaneously
- AM/FM/FSK Modulation, Sweep, and Frequency Counter functions (AFG-2100 only)
- USB Device Interface for Remote Control and Waveform Editing
- PC Arbitrary Waveform Editing Software



**AFG-2000 Series Front** 

# **APPLICATIONS**

- Audio Products Frequency Characteristics Measurement
- Pulse Signal as Trigger or Synchronization
   Signal for Electronic Product Testing
- Pulse Noise Simulation
- Reference Clock Signal of Electronic
  Device
- Vibration Signal Simulation
- Noise Simulation for Communication System Educational Lab



MODULATION   Sample Rate   NAC-2105   AFC-2105   AFC-2005   AFC-2012   AFC-2007   AFC-2012   AFC-2007   AFC-2012   AFC-2007   AFC-2007   AFC-2012   AFC-2007   AFC-2007   AFC-2012   AFC-2007   AFC-2012   AFC-2007   AFC-2007   AFC-2012   AFC-2007   AFC-	SPECIFICATIONS									
MARTRARY FUNCTION   Sample Rate   Repetition Rate   Waveform Length   Waveform Length   Company   Compan				AFG-2100 Series			-			
APPLICATION   Sample Rate Repetition Rate Waveform Length Amplitude Resolution   100 kt   1								AFG-2012	AFG-2025	
10MHz   10 bet					Ramp, Noise, A	Arbitrary Wavefo	orm			
Mayeform Length	ARTIRARY FUNCTION									
Range   Rang		Waveform Length								
Ramp   Sine-Square-Ramp   Sine				10 bit						
Resolution   Resolution   Stability   St	FREQUENCY CHARACTERISTICS	Range	Sine/Square	0.1Hz~5MHz	0.1Hz~12MHz	0.1Hz~25MHz	0.1Hz~5MHz	0.1Hz~12MHz	0.1Hz~25MHz	
Accuracy   Aging   20ppm   1ppm, per 1 year   5   10m   1   10m   1   1   1   1   1   1   1   1   1			Ramp		lz					
Aging   Clored   Colored		Resolution								
OUTPUT CHARACTERISTICS		Accuracy			1 vear					
Accuracy   Resolution   Flatness   255MHz; 1m/tpp-5vpp[9G0]; 2m/tpp-10tpp[pem-creunit]   229k Greating a   1m/tppc(18 Hz) o 500 without Doffset   1m/to or 3 digits   1m/tppc 3 digits			Tolerance		,					
Accuracy   Resolution   Flatness   Resolution   Resolu	OUTPUT CHARACTERISTICS	Amplitude	Range							
Resolution   Flates			Accuracy					et)		
Units Offset   Range   Accuracy   Waveform Output   Impedance   Sylop, Vrms, dfsm   25Vpk ac-dc(pen circuit); ±2.5Vpk ac-dc(into 50Q); 10Vpk ac-dc(open circuit); ±2.5Vpk ac-dc(open circuit); ±2.5Vpk ac-dc(into 50Q); 10Vpk; ac-dc(open circuit); ±2.5Vpk ac-dc(open circuit			•					,		
Units Offset   Range   STypk ac-dec(into 500]; e10Vpk ac-de(open circuit); ±2.5Vpk ac-de(into 500]) for 20MHz-25MHz; ±3.5Vpk ac-de(into 500]) for 20MHz = 10MHz = 10MH			Flatness						2dB)≤20MHz;	
Offset   Range   Accuracy   Waveform Output   Impedance   Protection (fmain output)   SYNC Output   Level   Impedance   Protection (fmain output)   SYNC Output   Level   Impedance   Protection (fmain output)   SYNC Output   Level   Impedance   SYNC Output   Level   Impedance   SYNC Output   Level   Impedance   SYNC Output   Level   Impedance   Rise or Fall Time   SYNC Output   Sonc   SYNC Output   SYN			Unite			vave relative to	1 kHz/into 50Ω	2)		
Accuracy   Waveform Output   Accuracy   Probection (main output)   SYNC Output   Level   Impedance   Rise or Fall Time   SYNC Output   Level   Impedance   Rise or Fall Time   SYNC Output   Level   Impedance   Rise or Fall Time   SYNC Output   Level   Impedance   SYNC Output   Level   TITL-compatible into >1kΩ   SOD (xyncial (fixed)) > 300kΩ (output disabled)   SYNC Output   SYNC Output   TITL-compatible into >1kΩ   SYNC Output		Offset				/nk ac+dc(open	circuit): +2 5V	nk ac+dc(into '	50O) for	
Waveform Output Impedance   SOO bypical (fixed):>300K (output disabled)   SYNC Output   Level   Impedance   Rise or Fall Time   STNC Extraction (main output)   SYNC Output   Level   Impedance   Rise or Fall Time   SOO by ominical   SOO by omin			20MHz~25MHz; ±5Vpk ac+dc(open circuit)				for 20MHz~25MHz			
SYNC Output    SYNC Output   Level   Impedance   Short-diroutly protected: O'verload relay auto matically disables main output   The compatible into >1kΩ		Waveform Output								
SYNC Output   Level   Impedance Rise or Fall Time   SOD nominal   SOD										
Rise or Fall Time		SYNC Output	SYNC Output Level Impedance		TTL-compatible into >1k $\Omega$ 50 $\Omega$ nominal					
SINE WAVE CHARACTERISTICS										
SQUAREWAVE CHARACTERISTICS  Rise/Fall Time Overshoot Asymmetry Variable Duty Cycle  Covershoot Asymmetry Variable Duty Cycle  RAMP CHARACTERISTICS  Linearity Variable Symmetry Volve Symber Symber Variable Var	SINE WAVE CLIADACTERISTICS									
Overshoot	SINE WAVE CHARACTERISTICS	Harmonic Disto	rtion	-55 dBc DC ~ 200kHz, Ampl > 0.1Vpp; -50 dBc 200kHz ~ 1MHz, Ampl > 0.1Vpp   -35 dBc 1MHz ~ 5MHz, Ampl > 0.1Vpp; -30 dBc 5MHz ~ 25MHz, Ampl > 0.1Vpp						
Overshoot   Asymmetry   1% of period+1 ns   1% -0.9% = 10.0% = 30.0% = 50.0% = 50.0% = 25MHz ; 40.0% -60.0% ≤ 10MHz ; 50% ≤ 25MHc   1% of period+1 ns   1% -0.9% = 10.0% = 10.0% = 25MHz ; 40.0% -60.0% ≤ 10MHz ; 50% ≤ 25MHc   1% of period+1 ns   1% -0.0% = 10.0% = 25MHz	SQUAREWAVE CHARACTERISTICS	Rise/Fall Time		7 1 117						
Variable Duty Cycle		Overshoot		< 5%						
RAMP CHARACTERISTICS  Linearity Variable Symmetry  O%-1006 of poak output O%-1006 (1% Resolution)  Carrier Waveforms Modulating Waveforms Modulating Frequency Depth Source  FM MODULATION  Carrier Waveforms Modulating Frequency Depth Source  FM MODULATION  Carrier Waveforms Modulating Waveforms Modulating Waveforms Modulating Frequency Deviation Source  Sine, Square, Triangle Sine, Square										
RAMP CHARACTERISTICS  Linearity Variable Symmetry Variable Symmetriable Variable Very Exclusion Variable Very Exclusion Variable Very Very Exclusion Variable Very Very Very Very Very Very Very Ver		variable Duty Cycle					40.0%~60.0%	≥10MHz ; 50%	≥25MHz	
AM MODULATION  Carrier Waveforms Modulating Frequency Deviation Source  SWEEP  Waveforms Source Sine, Square, Triangle Linear or Logarithmic O.HHz-Max Frequency Internal/External  FSK  Carrier Waveforms Source Sine, Square, Triangle Linear or Logarithmic O.HHz-Max Frequency Internal/External  FSK  Carrier Waveforms Modulating Waveforms Source Sine, Square, Triangle Sow duty cycle square Modulating Waveforms Sow duty cycle square Modulating Waveforms Sow Source Sine, Square, Triangle Sow Subject Square Modulating Waveforms Sow Source Sine, Square, Triangle Sow Subject Square Modulating Waveforms Sow Source Sine, Square, Triangle Sow Subject Square Modulating Waveforms Sow Source Sine, Square, Triangle Sow Subject Square Modulating Waveforms Sow Subject Square Modulating Waveforms Sine, Square, Triangle Sow Subject Square Modulating Waveforms Sine, Square, Triangle Sine, Square, Tri	RAMP CHARACTERISTICS	Linearity		,		errey marige,				
Modulating Waveforms Modulating Frequency Depth Source  Carrier Waveforms Modulating Waveforms Modulating Waveforms Modulating Waveforms Modulating Waveforms Modulating Frequency Deviation Source  SWEEP  Waveforms Type Start/Stop Frequency Sweep Time Source  Carrier Waveforms Type Start/Stop Frequency Sweep Time Source  FSK  Carrier Waveforms Modulating Waveforms Modulating Waveforms Type Start/Stop Frequency Sweep Time Source  Sine, Square, Triangle Linear or Logarithmic 0.1Hz-Max Frequency 1mrs-500S 1mrs-500S 1mrs-500S 1mrs-50ver Source  FSK  Carrier Waveforms Modulating Waveforms Modulat										
Modulating Frequency Depth Source   2 mHz-20 kHz (Int); DC-20KHz (Ext) 0%-120.0%   1 mternal/External	AM MODULATION	Modulating Waveforms								
Depth   Source   O%-120.0%   Internal/External						(I.I (F. +)				
Source   Internal/External					1z (Int); DC~201	CHZ (EXT)		_		
Modulating Waveforms   Sine, Square, Triangle   2 mHz~20 kHz (Int); DC~20KHz (Ext)   DC to Max Frequency   Internal/External					rnal					
Modulating Frequency Deviation Source   2 mHz-20 kHz (Int); DC-20KHz (Ext)   Dc to Max Frequency   Internal/External   Sine, Square, Triangle   Linear or Logarithmic   O.1Hz-Max Frequency   O.1Hz	FM MODULATION									
DC to Max Frequency   Internal/External   Sure, Square, Triangle   Linear or Logarithmic   Carrier Waveforms   Type   Start/Stop Frequency   Sweep Time   Source   Internal/External   Sine, Square, Triangle   Linear or Logarithmic   Carrier Waveforms   Sine, Square, Triangle   Source   Internal/External   Sine, Square, Triangle   Sow duty cycle square   Addulating Waveforms   Source   Sow duty cycle square   Carrier Waveforms   Source   Sow duty cycle square   Carrier Waveforms   Source   Carrier Waveforms   Source   Carrier Waveforms   Source   Carrier Waveforms   Sow duty cycle square   Carrier Waveforms   Carrier Waveforms   Sow duty cycle square   Carrier Waveforms   Carrier						/∐→ (Ev+)		_		
SWEEP  Waveforms Type Start/Stop Frequency Sweep Time Source  Carrier Waveforms Modulating Waveforms Modulation Rate Frequency Range Source  FREQUENCY COUNTER  Range Accuracy Time base Resolution Input Impedance Sensitivity  STORE/RECALL  INTERFACE  Internal Sine, Square, Triangle Soff duty cycle square 2mHz-100kHz(Int); DC-100kHz(Ext)						XIIZ (LXI)		_		
Type Start/Stop Frequency Sweep Time Source  Carrier Waveforms Modulating Waveforms Modulation Rate Frequency Range Source  FREQUENCY COUNTER  Range Accuracy Time base Resolution Input Impedance Sensitivity  STORE/RECALL  INTERFACE  Internal / External  Linear or Logarithmic 0.1Hz—Max Frequency Internal/External  Sine, Square, Triangle 50% duty cycle square 2mHz-100kHz(Int); DC-100kHz(Ext) 0.1Hz—Max Frequency Internal/External										
Start/Stop Frequency Sweep Time   D.1Hz-Max Frequency   Tms-500s   Surec   Start/Sternal   Sine, Square, Triangle   Sow duty cycle square   Sow duty cycle square   Sow duty cycle square   D.1Hz-Max Frequency   Sow duty cycle square   D.1Hz-Max Frequency   D.1Hz-Max Frequency   Sow duty cycle square   D.1Hz-Max Frequency   D.1	SWEEP									
Sweep Time   1ms-500s   1ms-500s   1nternal/External			iency					_		
Source   Internal/External		Sweep Time	acticy	1ms~500s				_		
Modulating Waveforms   50% duty cycle square   2mHz-100kHz(Int); DC-100kHz(Ext)   - Frequency Range   0.1Hz-Max Frequency   Internal/External					rnal					
Modulation Rate   2mHz=100kHz (Int); DC=100kHz (Ext)   0.1Hz=Max Frequency   0.1Hz=Max Frequency   1nternal/External   Source   1nternal/External   SHz=150MHz   Time Base accuracy ± 1count   Time Base accuracy ± 20ppm (23°C±5°C) after 30minutes warm up 100nHz for 1Hz, 0.1Hz for 100MHz   1KΩ   Sensitivity   35mVrms=30Vrms (5Hz=150MHz)   STORE/RECALL   USB (Device)   USB (Devic	FSK									
Frequency Range Source   0.1Hz~Max Frequency Internal/External						kHz(Ext)		_		
Source   Internal   External				0.1Hz~Max F	requency	KI 12 (LAL)				
Accuracy		Source		Internal/Exter	rnal					
Time base	FREQUENCY COUNTER									
Resolution   100nHz for 1Hz, 0.1Hz for 100MHz   1KΩ   1KΩ   1KΩ   35mVrms~30Vrms (5Hz~150MHz)   1 NTERFACE   USB(Device)   USB(Device)   U0nHz for 1Hz, 0.1Hz for 100MHz   1 NTERFACE   100nHz for 1Hz, 0.1Hz for 100MHz   1 NTERFACE   100nHz for 1Hz, 0.1Hz for 100MHz   1 NTERFACE   100nHz for 1Hz, 0.1Hz for 100MHz   1 NTERFACE		Time base		±20ppm(23°C	±5°C) after 30mi	nutes warm up				
Sensitivity 35mVrms~30Vrms (5Hz~150MHz)  STORE/RECALL 10 Groups of Setting Memories  INTERFACE USB (Device)			_	100nHz for 1				_		
STORE/RECALL 10 Groups of Setting Memories INTERFACE USB (Device)			e		Vrms (5Hz~150	MHz)				
	STORE/RECALL	10 Group's of Setting Memories								
DISPLAY		· ·								
	DISPLAY	LCD								
POWER SOURCE         AC100~240V , 50~60Hz           POWER CONSUMPTION         25 VA			υ~οUHZ							
OPERATING ENVIRONMENT Temperature to satisfy the specification: 18–28°C; Operating temperature: 0–40°C										
Relative Humidity: ≤80%, 0~40°C; ≤70%, 35~40°C; Installation category: CAT II										
OPERATING ALTITUDE 2000 meters			l'1 <700/							
STORAGE TEMPERATURE         -10~70°C, Humidity: ≤70%           DIMENSIONS & WEIGHT         266(W)×107(H)×293(D) mm; Approx. 2.5 kg				5 kg						

ORDERII		

AFG-2005	5MHz Arbitrary Waveform Function Generator
AFG-2105	5MHz Arbitrary Waveform Function Generator
AFG-2012	12MHz Arbitrary Waveform Function Generator
AFG-2112	12MHz Arbitrary Waveform Function Generator
AFG-2025	25MHz Arbitrary Waveform Function Generator
AFG-2125	25MHz Arbitrary Waveform Function Generator

Specifications subject to change without notice. FG-2000GD3DH

ACCESSORIES

CD (user manual + software) × 1, Quick Start Guide x 1, Power cord x 1

AFG-2100 Series - GTL-101 Test Lead x 2, Instruction Manual x 1, Power cord x 1

AFG-2000 Series - GTL-101 Test Lead x 1, Instruction Manual x 1, Power cord x 1

OPTIONAL ASSESSORIES

GTL-246 USB Cable, USB 2.0 Type A - Type B, 4P

FREE DOWNLOAD

PC Software Arbitrary Waveform Editing Software Driver USB driver