AFG-100/200 series
USB Modular
Arbitrary Function Generator

Date: Oct, 2014
Outline

• Product Overview
• Feature, Advantage and Benefit
• Comparison Chart
• Ordering Information
Product information

- AFG-125, 25MHz Single channel USB Modular Arbitrary Function Generator
- AFG-225, 25MHz Dual channel USB Modular Arbitrary Function Generator
- AFG-125P, 25MHz Single channel USB Modular Arbitrary Function Generator plus power supply
- AFG-225P, 25MHz Dual channel USB Modular Arbitrary Function Generator plus power supply

**Accessories Supplied**
- GTL-101, BNC-Alligator Test Lead *1 (only AFG-125/125P)
- GTL-101, BNC-Alligator Test Lead *2 (only AFG-225/225P)
- GTL-105A, Test Lead*1 (only AFG-125P/225P)
- Quick Start Guide *1, CD-ROM with AFG software and user manual

**Optional Accessories**
- DH2-FH1, Module extension bay & USB Type A to Type A/B cable
- GPA-501, Power Adapter
- GTL-246, USB Type A to Type B cable
- GTL-201A, Ground lead
Front Panel

AFG-125, 25MHz USB modular Single Channel Arbitrary Function Generator

AFG-225, 25MHz USB modular Dual Channel Arbitrary Function Generator
Front Panel

AFG-125P, 25MHz USB modular Single Channel Arbitrary Function Generator

AFG-225P, 25MHz USB modular Dual Channel Arbitrary Function Generator
Front Panel

- GDS-2000A DSO + AFG-100/200 series AFG

DS2-FH1, Module extension bay

GPA-501, Power Adapter

GPA-502, Universal Power Adapter
Real Panel

- Vent
- USB Device Port
- Input Power
Two Types Operation Mode

Collocation with GDS-2000A series MSO

Stand-alone operation with External PC
# Main Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>AFG-125</th>
<th>AFG-225</th>
<th>AFG-125P</th>
<th>AFG-225P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel number</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Dual-Channel Output</td>
<td>No</td>
<td>CH1 = Ch2</td>
<td>No</td>
<td>CH1 = CH2</td>
</tr>
<tr>
<td>Correlated Function of Dual-Channel</td>
<td>No</td>
<td>Couple, Tracking, Phase, Sum</td>
<td>No</td>
<td>Couple, Tracking, Phase, Sum</td>
</tr>
<tr>
<td>DC Power Supply</td>
<td>No</td>
<td>No</td>
<td>Support</td>
<td>Support</td>
</tr>
<tr>
<td>Sine / Square</td>
<td>1 μHz - 25MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triangle/Ramp</td>
<td>1 μHz to 1MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency Resolution</td>
<td>1 μHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Range</td>
<td>1 mVpp to 2.5 Vpp (into 50Ω)</td>
<td>2 mVpp to 5 Vpp (open-circuit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arbitrary Functions</td>
<td>120MSa/s, 10 bits, 4k-Point</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modulation</td>
<td>AM/FM/PM/FSK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweep</td>
<td>Log / Linear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burst</td>
<td>Gate, N-Cycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>USB Device</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Application

- Audio products frequency characteristics measurement. (Ex: Amplifier & Filter)
- Pulse signal as trigger or synchronization signal for electronic product testing.
- Reference clock signal of electronic device (Ex: Phase Lock loop circuit design)
- Vibration signal simulation (Ex: Magnetic Hard Disk)
- Baseband noise simulation for communication system
- Two tone signal for Third order intercept point testing (Ex: Baseband Amplifier)
- Educational Lab
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Features

- **Frequency ranges from 1uHz to 25MHz, and offers multiple standard waveforms**
- The maximum frequency is 25 MHz and offers full-range 1uHz frequency resolution. The built-in functions include Sine, Square, Ramp/Triangle, Pulse, and Noise.
Features

- **Full-Functions equipped Dual-channel Signal Output Capability**

- Most of dual-channel arbitrary waveform generators in this basic level cluster offer one major channel and one minor channel.

- Unlike other dual-channel AFG in this class, AFG-225/225P is fully equipped with equal capabilities on dual outputs.

- This sort of non-full-function dual-channel AFGs cannot meet the requirements of reality.

The equivalent function in dual-channel
Features

• **Correlated Functions of Dual-channel Outputs**

• AFG-225/225P provides four correlated functions which are Couple, Tracking, and Phase functions.

  • Couple function, two signals with a ratio or offset in amplitude or frequency can be generated

  • Tracking function, two differential signals with equal-frequency, equal-amplitude but inverted phase can be produced

  • Phase function is designed to create two signals with specified phase offset

![Differential Signals](image1.png) ![Quadrature (sine and cosine) signals](image2.png)

Differential Signals

Quadrature (sine and cosine) signals
Features

• **High-flexibility of Arbitrary Waveforms Editing**
• 120MSa/s sampling rate, 10-bit vertical resolution, 4k-point waveform length, regarded as an outstanding arbitrary waveform capability.
• There are four ways for AFG-100/200 series to generate customized arbitrary waveforms
  • Editing waveform via PC software
  • Point-by-point editing on the panel
  • Loading CSV file
  • Loading the captured waveform from GW Instek GDS2000A-Series Oscilloscopes.
Features

- High-flexibility of Arbitrary Waveforms Editing

**GDS-2000A Operation**

![GDS-2000A Operation Image]

**Supports CSV file upload**

![CSV File Upload Image]

**Direct Waveform Reconstruction (DWR) Capability**

![Direct Waveform Reconstruction Image]

**Arbitrary Waveform Editing PC Software**

![Arbitrary Waveform Editing Image]
Features

• **1%~99% Adjustable Duty Cycle of Square Wave**

• AFG-100/200 series provides a 1%~99% variable duty cycle for its Square waveform within 100kHz bandwidth, which is considered practical for the tests such as simulating pulse and transient signals without purchasing extra advanced function generator and pulse generator.
Features

• **Friendly Operating Interfaces and Instant Parameter Display**

• AFG-100/200 series provides friendly operation setting. From editing to output, the process can be manipulated via panel or external PC.

More flexibility of arbitrary waveform storage and extraction
Features

- **66 Built-in Arbitrary Waveforms**
- 66 frequently used function waveforms in all fields are built in arbitrary waveform memory for user’s selection.

**Common**
- AbsTan, AbsSin, AbsSinHalf, AmpAlt, AttAlt, Diric_Even, ...

**Math**
- ArcCos, ArcCot, ArcCsc, ArcSec, ArcSin, ArcSinh, ...

**Window**
- Barthannwin, Bartlett, Blackman, Bohmanwin, ...

**Engineer**
- Airy, Bessel, Betainc, Gamma, Legendre, Neumann...
Features

• **Support Multi-change Signal Application**
• AFG-100/200 series built-in Modulation, Sweep, Burst.
• The modulation types contain AM, FM, PM, FSK, SUM(AFG-225/225P)
• Sweep Function includes linear & log mode
• Burst function supports Gate & N-Cycle
Features

- **Impedance Switch Function**
- AFG-100/200 series provides 50Ω and high impedance switching modes, which can efficiently enhance the accuracy while users reading the results.
Features

- **Provide USB Device Interface**
- USB Device, which is used to connecting with PC, besides controlling through software on PC, USB Device also supports IEEE488.2 & SCPI Command List for users to process customized functional control.
# Feature, Advantage and Benefit

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantage</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Dual-Channel AFG Output</td>
<td>Dual-Channel with the same specifications can be used as two respective AFG.</td>
<td>Satisfy the test requirements of differential signal, phase control, server motor... etc.</td>
</tr>
<tr>
<td>Three Correlated Functions of Dual-Channel Outputs</td>
<td>Flexibility of Simulating two channel signals is significantly extended.</td>
<td>Satisfy simulations on baseband, noise-added, audio frequency, digital signal and vibration …etc signals.</td>
</tr>
<tr>
<td>1%~99% Adjustable Duty Cycle of Square Waveform</td>
<td>Used as Pulse Signal Generator as the mark, synchronized or noise signals.</td>
<td>Unnecessary to purchase extra pulse signal generator.</td>
</tr>
<tr>
<td>120MSa/s, 10-bit, 4k Point Arbitrary Waveform Function</td>
<td>The 60MHz Repetition Rate is the highest amongst in its class.</td>
<td>Satisfy the major requirements of educational purpose and general industries.</td>
</tr>
<tr>
<td>Direct Waveform Reconstruction with GW DSO-Series</td>
<td>Directly and easily rebuilds the signal captured from DSO.</td>
<td>The efficiency of signal analysis and trouble-shooting can be significantly enhanced.</td>
</tr>
</tbody>
</table>
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Competition Chart

AFG-225 and 225P are the simplified versions of AFG-2225. AFG-225 and 225P have most of the AFG-2225 functions. The following chart shows the comparison between the two products.

<table>
<thead>
<tr>
<th>Feature</th>
<th>AFG-2225</th>
<th>AFG-225/225P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplitude under 50 Ohm</td>
<td>10 Vpp</td>
<td>2.5 Vpp</td>
</tr>
<tr>
<td>Frequency counter</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Modulation input port</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Trigger input port</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Trigger output port</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>SYNC port</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>3 power supply output port</td>
<td>No</td>
<td>AFG-225P only</td>
</tr>
<tr>
<td>Display</td>
<td>3.5” TFT LCD</td>
<td>None</td>
</tr>
<tr>
<td>Operation mode</td>
<td>Stand-alone operation</td>
<td>Connect with a computer or GDS-2000A Series Oscilloscope</td>
</tr>
</tbody>
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**Accessories Supplied**
- GTL-101, BNC-Alligator Test Lead *1 (only AFG-125/125P)
- GTL-101, BNC-Alligator Test Lead *2 (only AFG-225/225P)
- GTL-105A, Test Lead*1 (only AFG-125P/225P)
- Quick Start Guide *1, CD-ROM with AFG software and User Manual

**Optional Accessories**
- DH2-FH1, Module extension bay & USB Type A to Type A/B cable
- GPA-501, Power Adapter
- GTL-246, USB Type A to Type B cable
- GTL-201A, Ground lead
# Ordering for Solution

<table>
<thead>
<tr>
<th></th>
<th>AFG-125</th>
<th>AFG-225</th>
<th>AFG-125P</th>
<th>AFG-225P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand-alone</td>
<td>GPA-501 option</td>
<td>GPA-501 option</td>
<td>GPA-501 option</td>
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<tr>
<td>operation</td>
<td>GPA-502 option</td>
<td>GPA-502 option</td>
<td>GPA-502 option</td>
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<tr>
<td></td>
<td>GTL-246 option</td>
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<td>GTL-246 option</td>
</tr>
<tr>
<td>Collocation with</td>
<td>DS2-FH1 option</td>
<td>DS2-FH1 option</td>
<td>DS2-FH1 option</td>
<td>DS2-FH1 option</td>
</tr>
<tr>
<td>GDS-2000A series</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSO</td>
<td></td>
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</tr>
</tbody>
</table>

Note: AFG-125P/225P must work with external power adapter GPA-501 option.
The End

Thank your for your attention