

# **User Manual**

## **SPA1010 Series Power Amplifier**

UM60010-E01A

2015 SIGLENT TECHNOLOGIES CO.,LTD

## Declaration

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## General Safety Summary

Carefully read the following safety precautions to avoid person injury and prevent damage to the instrument and any products connected to it. To avoid potential hazards, please use the instrument as specified.

### **Only qualified technician should perform service procedures**

#### **To Avoid Fire or Personal Injure**

##### **Use Proper Power Line**

Use only the special power line of the instrument which approved by local state.

##### **Connect the Signal Wire Correctly**

The potential of the signal wire is equal to the earth, so do not connect the signal wire to a high voltage. Do not touch the exposed contacts or components.

##### **Look Over All Terminals' Ratings**

To avoid fire or electric shock, please look over all ratings and sign instruction of the instrument. Before connecting the instrument, please read the manual carefully to gain more information about the ratings.

##### **Not Operate with Suspected Failures**

If you suspect that there is a damage of the instrument, please let a qualified service personnel check it.

##### **Avoid Circuit or Wire Exposed Components Exposed**

Do not touch exposed contacts or components when the power is on.

**Do not operate in wet/damp conditions.**

**Do not operate in an explosive atmosphere.**

**Keep the surface of the instrument clean and dry.**

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## Safety Terms and Symbols

**Terms used on the instrument.** Terms may appear on the instrument:

**DANGER:** Indicates an injury or hazard that may be immediately happen.

**WARNING:** Indicates an injury or hazard that may be not immediately happen.

**CAUTION:** Indicates that a potential damage to the instrument or other property might occur.

**Symbols used on the instrument.** Symbols may appear on the instrument:



**Hazardous  
Voltage**



**Protective  
Earth Ground**



**Warning**



**Earth Ground**



**Power  
Switch**

## SPA1010 Power Amplifier Introduction

The amplifier is one of the options provided for SIGLENT Function/Arbitrary Waveform Generators, with up to 1MHz full power bandwidth and higher than 90 V/ $\mu$ s slew rate, which can be used in fast constructions of a test platform in connection with all SIGLENT SDG series products, and as a single power amplifier in coordination with other generators.

### Features

Easily and neatly communicate with SDG through the USB interface;

Enables to set the Gain (x1 or x10);

Up to 15k $\Omega$  output impedance;

The integrated output protection circuit (overcurrent protection and internal overtemperature protection) provided with ensures the instrument is working stably and safely;

Compact size, easy to carry and use.

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## Quick start

This chapter shows you how to operate the front/rear panel and some preparation works when you first use the instrument.

## General Inspection

### 1. Inspect the shipping container.

Keep the damaged shipping container or cushioning material until the contents of the shipment have been completely checked and the instrument has passed both electrical and mechanical tests.

The consigner or carrier will be responsible for damages to the instrument resulting from shipment. **SIGLENT** would not provide free maintenance or replacement.

### 2. Inspect the instrument.

If there are instruments found damaged, defective or failure in electrical and mechanical tests, please contact **SIGLENT**.

### 3. Check the accessories.

Please check the accessories according to the packing list. If the accessories are incomplete or damaged, please contact your **SIGLENT** sales representative.

## The Front Panel

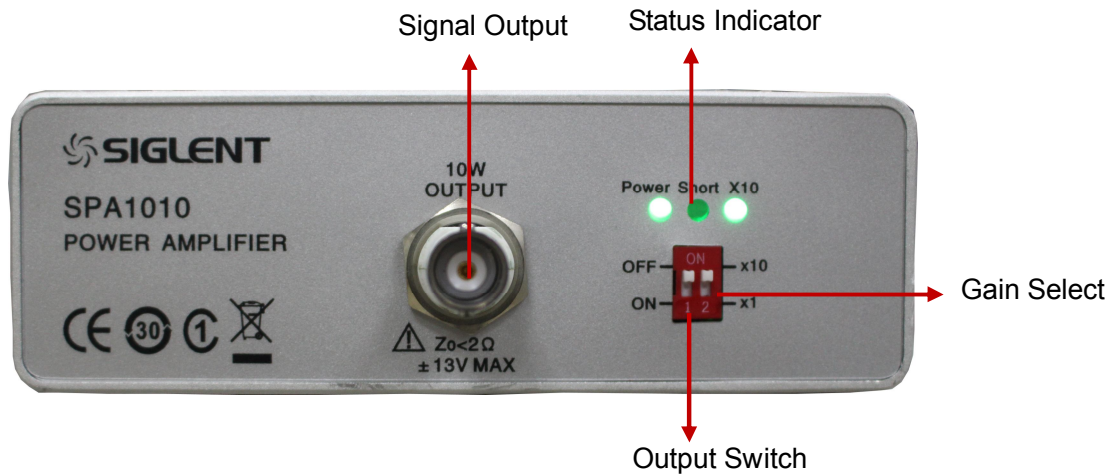


Figure 1- 1 SPA1010 Front Panel



### CAUTION

The output impedance of the instrument  $Z_o$  is less than  $2\Omega$ , and the range of output voltage is  $-13V \sim +13V(RL=1K\Omega)$ .

### Status Indicator

Power: On Green, indicating the successful power supply to the instrument.

Short: On Red, indicating the over current protection is enable.

X10: On Green, indicating the voltage gain select is set to X10.



## The Rear Panel

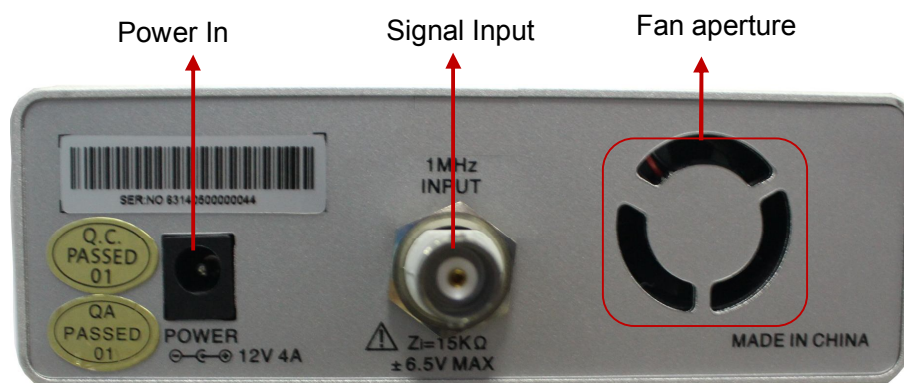


Figure 1- 2 SPA1010 Rear Panel

### Power In

Please plug with DC (12V, 4A) using the power adapter provided in the accessories.



#### CAUTION

Do not use any other adapters to supply power for the SPA1010, or else it may cause degradation or perpetual damage.

Please make sure the vents at both sides and the fan aperture at the rear panel are visible in operation for normal working.

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#### CAUTION

The input impedance of the instrument  $Z_i$  is 15 k $\Omega$ , and the range of voltage is -6.5 V ~ +6.5 V or -1.3 V ~ +1.3 V separately while the voltage gain is set to X1 or X10.

The inputs exceed these ranges may cause damages to the instrument or other hazards.

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## Operation

### How to set the output status

For the details of each selection on the front panel of SPA1010, see table below:

<b>Function</b>	<b>Setup</b>	<b>Explanation</b>
Voltage Gain	X1, X10	Sets the output gain. The input range of signals is different in different gain setting.
Output Switch	ON, OFF	Enables or disables the output.

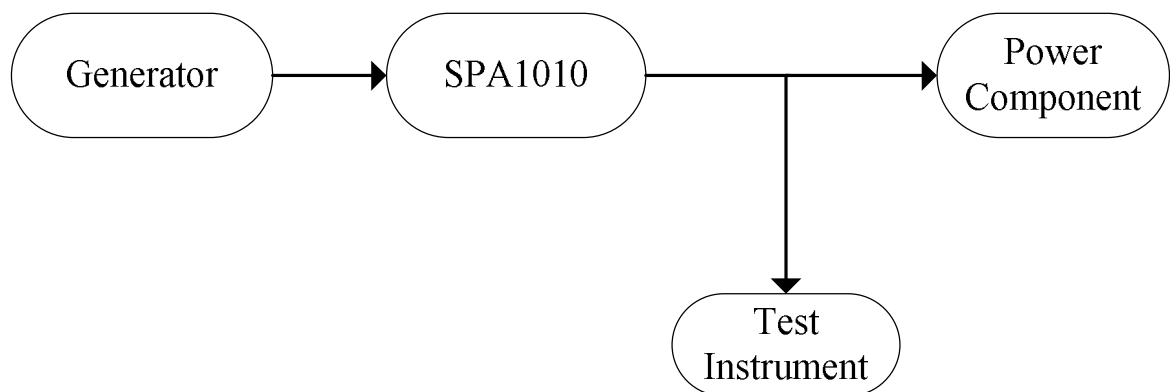
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## Application Examples

### Power Component Measurements

SPA1010 could be used as the power amplifier of a generator to evaluate the performance of a power component. In virtue of its wide bandwidth and high speed output, users can evaluate or test the components through various waves, pulses and arbitrary waves.

See the measurement system of a power component below:



## Troubleshooting

This chapter lists some troubles that may occur when you use the power amplifier and the corresponding solutions. Please follow the appropriate steps to deal with; if the trouble still exists, please contact SIGLENT for help.

### **1. No response to the output when connect the AC power.**

- (1) Check if the power is correctly connected;
- (2) Check if the power switch is enable;
- (3) After above checks, restart the instrument;
- (4) If it can't work properly, please contact SIGLENT for help.

### **2. Circuit Protection**

The instrument will start overcurrent protection or overtemperature protection once the output current is too high or the internal temperature of SPA1010 is abnormal (overtemperature) to avoid damages.

SPA10100 must be restarted after the Circuit Protection is launched.

We kindly suggest you to inspect the load of SPA1010 or the ambient temperature and make sure both of these specifications are within the prescribed limits when the Circuit Protection is on.

## Specifications

All specifications listed in the table below can be met under following two conditions unless where noted:

- ◆ The instrument has been continuously operated for 30 minutes at the stated temperature.
- ◆ All the specifications are guaranteed except for the one marked “typical”.

<b>Signal Input</b>	
Input Impedance	15k $\Omega$
External Input	-6.5V~+6.5V Vpp (Gain:X1); -1.3V~+1.3V (Gain:X10)
<b>Amplifier</b>	
Gain	Switching in 10V/1V and 10V/10V
Virtual Value of Sine Output Power (RL=7.5)	10W (typical, input: Sine, 1kHz,X1) 【Note 1】
Output Voltage	25.4 Vpp (input: Sine, 1kHz,RL=8 $\Omega$ )
Output Current	1.12 A (input: Sine, 1kHz,RL=8 $\Omega$ )
Output Impedance	< 2 $\Omega$
3dB Bandwidth	$\geq$ 1 MHz
Full Power Bandwidth	$\geq$ 1 MHz 【Note 2】
Slew Rate	$\geq$ 90 V/ $\mu$ s 【Note 3】
Overshoot	$\leq$ 4%
Maximum allowed access to	1 $\mu$ F

the capacitive load	
Overtemperature Protection Gate	60 °C
<b>Power In</b>	
Rated Voltage	12 Vpp
Rated Voltage	4 A
<b>Others</b>	
Working Temperature	0 ~ 40°C
Dimension( WxHxD)	193 mm x 122 mm x 42 mm
Net Weight	540 g

**【Note 1】**

The output power of SPA1010 is limited by frequency. When input frequency between 500Hz to 200 KHz, the SPA1010 will deliver 10 watts into a 8Ωload. As SPA10100 has overload protection circuit and thermal protection circuit to prevent permanent damage, the SPA1010 will not deliver 10 watts any more when frequency is below 500Hz and frequency is beyond 200 KHz.

**【Note 2】**

The Full-power bandwidth refers to the maximum frequency of signal generated with undistorted and utmost amplitude in AC output state from the Amplifier.

$$FPB = \frac{SR}{2\pi V_{max}}$$

SR: Slew Rate

Vmax: Maximum undistorted output amplitude

**【Note 3】**

Slew Rate: When you send a large step signal to the amplifier, the output slope of signal will be stable as a constant at some certain point; this constant is named Slew Rate.

## Contact SIGLENT

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