Hantek®

User's Manual

Hantek1025G

**ARBITRARY FUNCTION GENERATOR**

V1.0.2

# Content

General safety summary

Please understand the following safety precautions to avoid injuries and damages to the product or any equipment connected. To be away from possible dangers, please be sure to follow the regulations.

◆ **Only qualified persons are allowed to do the maintenance**.

◆ **Prevent from fire and any personal damage.**

◆ **Use Proper Power Cord.** Use the power cord authorized in your country only.

◆ **Correctly Plug in and Pull out.** When the probes or the test leads are connecting to the voltage source, please do not plug in or pull out.

◆ **Ground the product.** This product is grounded through the grounding conductor of the power cord. To avoid electric shocks, the grounding conductors must be grounded properly before making connections to the input or output terminals of the instrument.

◆ **Correctly connect probe.** The probes' ground terminals are at the same voltage level of the product ground. Do not connect the ground terminals to a high voltage.

◆ **Check the ratings of all terminals.** To avoid fire or shock hazard, check all ratings and marks on the product. Follow the user's guide for detailed rating information before making connections to the product.

◆ **Do not operate the product when the case or panel is removed.**

◆ **Avoid Circuit Exposure.** Do not touch exposed connections and components when power is on.

◆ **If you think the product is broken, do not operate.** If you think that this product has something wrong, please let qualified service persons to check it.

◆ **Keep proper ventilation.**

◆ **Do not operate in wet/damp environment.**

◆ **Do not operate in flammable and explosive air.**

◆ **Please keep the product surface clean and dry.**

Introduction

Hantek 1025G Arbitrary Waveform Generator has 1 channel of arbitrary waveform output, 12 Bits output, 1 channel of synchronized signal outputs, 1 channels of Counter/Frequency Measurement inputs, 4 Bits input and external trigger input. User can edit the waveform arbitrarily by the mouse or choose the regular waveforms such as Sine, Square, Tri-angle, Saw-tooth, TTL, White Noise, Gauss Noise, Trapeze, Exponent, AM and FM. The parameters, such as amplitude, frequency and offset, are also settable. The data format of Hantek 1025G is completely compatible with that of Tektronix; it can directly read the waveform data files produced by the Tektronix oscilloscope or Tektronix waveform editor software and redisplay the waveform. Hantek 1025G adopts the DDS technology so that it has the advantages of high frequency accuracy, high waveform resolution, high reliability, and wide software support. It can widely use in the various kinds of electronics labs and it offers complete interface for second time development to be pointlessly inserted into other auto-measuring systems.

Control Pin   Digital Out Pins

OUTPUT   SYNC OUTPUT   COUNT IN   External Trigger   Digital IN Pins

USB Port   USBXI Port
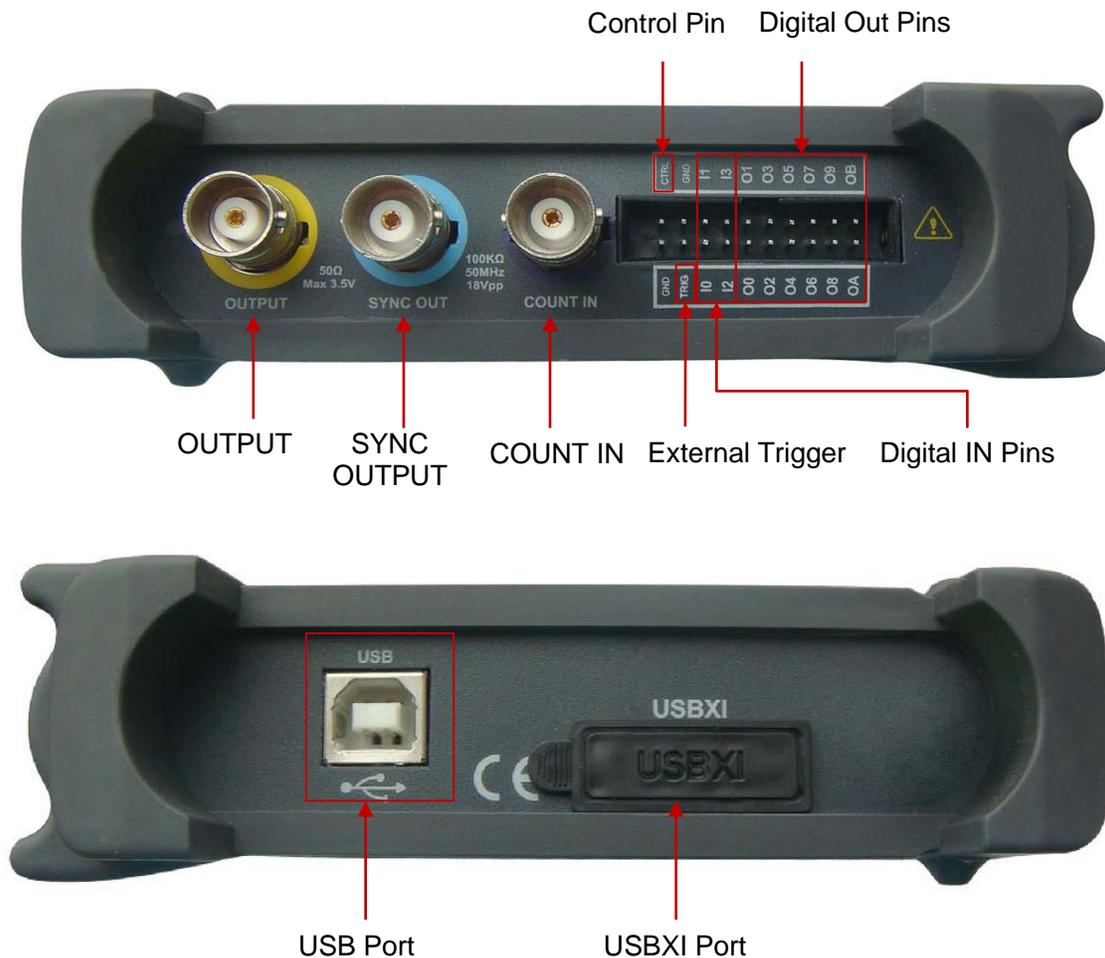
Chapter 1 Getting started

This chapter focuses on the following topics:

◆ System Requirements

◆ Installing hardware

◆ Installing software

1.1 System Requirements

◆ **Minimum System Requirements**

Operating System

Windows XP/Vista/Win7/Win8

Memory

128MB

Graphic Card

Microsoft DirectX supported

Screen resolution: 1024x768

Color depth: 16bit

◆ **Recommended System Requirements**

Operating System

Windows XP/Vista/Win 7

Memory

256MB

Graphic Card

Microsoft DirectX supported

Screen resolution: 1024x768

Color depth: 16bit

1.2 Installing Hardware

1. Connect the A-Type Plug of USB cable to your PC's USB port.
2. Connect the B-Type Plug of USB cable to the device's USB port.
3. New hardware is found.

4. New hardware search wizard starts.

5. Choose the correct directory of the driver through the browser or search in the CD driver.

Found New Hardware Wizard

Please choose your search and installation options.

○ Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

☐ Search removable media (floppy, CD-ROM...)

☑ Include this location in the search:

G:\driver   [Browse]

○ Don't search. I will choose the driver to install.

Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

[< Back] [Next >] [Cancel]

6. New hardware wizard installs software.

Found New Hardware Wizard

Please wait while the wizard installs the software...

Hantek 1025G Device

STM32MS.sys
To C:\WINDOWS\system32\DRIVERS

[< Back] [Next >] [Cancel]
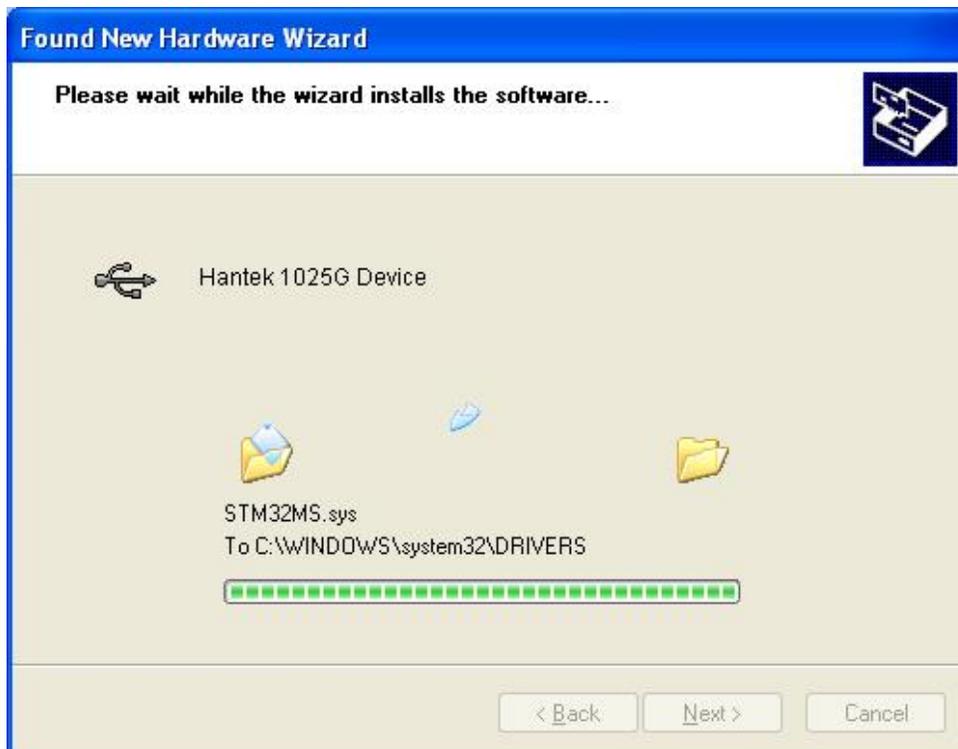
7. Finish new hardware search wizard.

1.3 Installing Software

1. While in Windows, insert the installation CD into the CD-ROM drive.

2. The installation should start up automatically. Otherwise in Windows Explorer, switch to the CD-ROM drive and run "Setup.exe".

3. The Hantek 1025G Installation is started. Click 'Next' to continue.
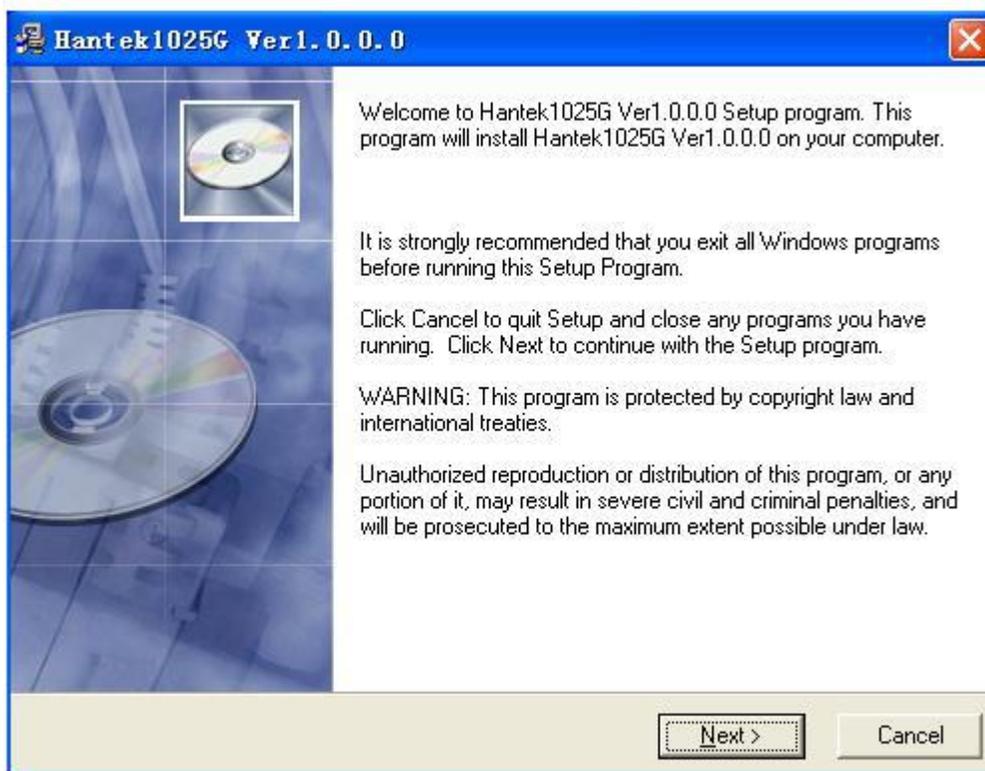
4. Choose a destination directory. Click 'Next' to continue.
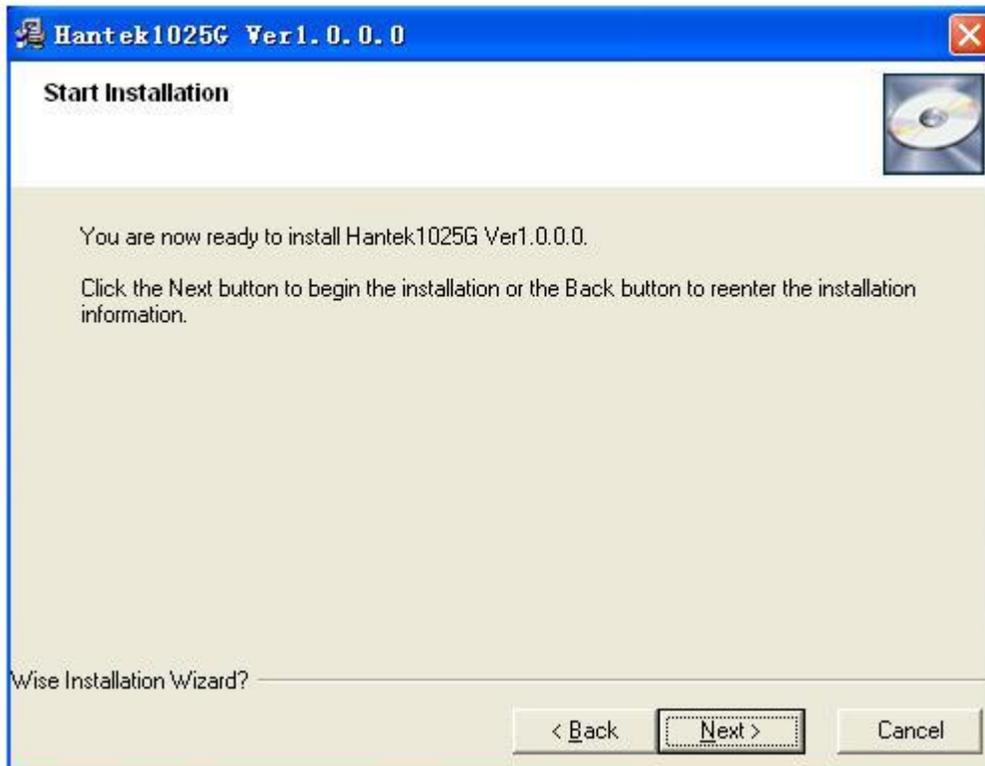
5. Check the setup information. Click Next to start copying of files.
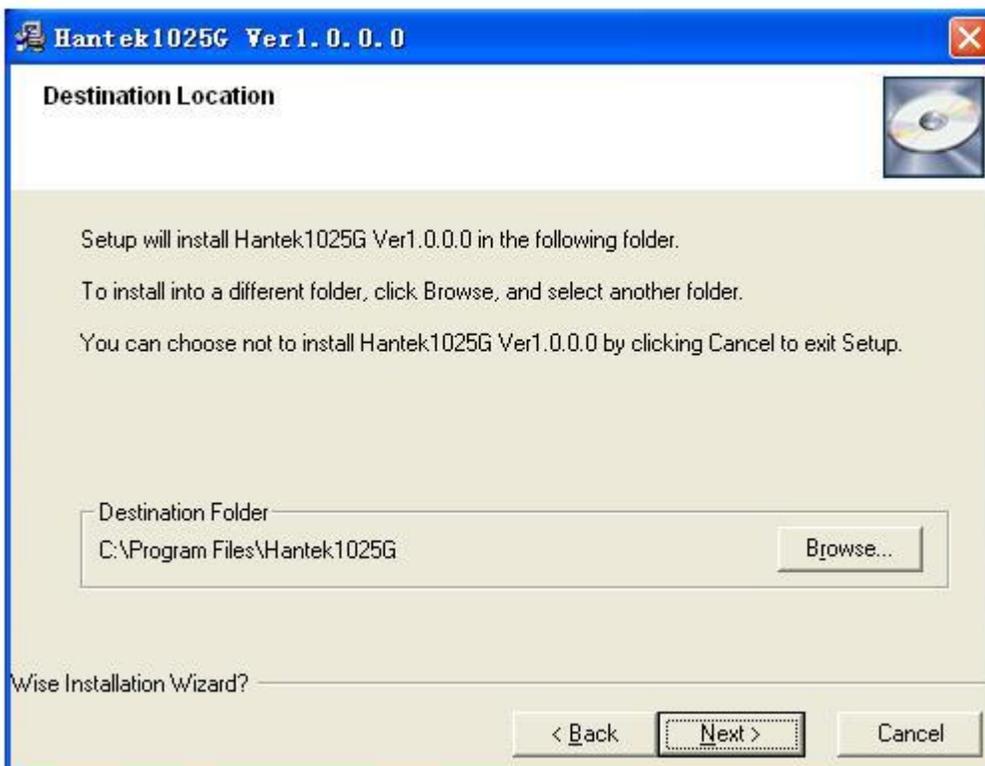
6. This Status dialog is displayed during copying of files.
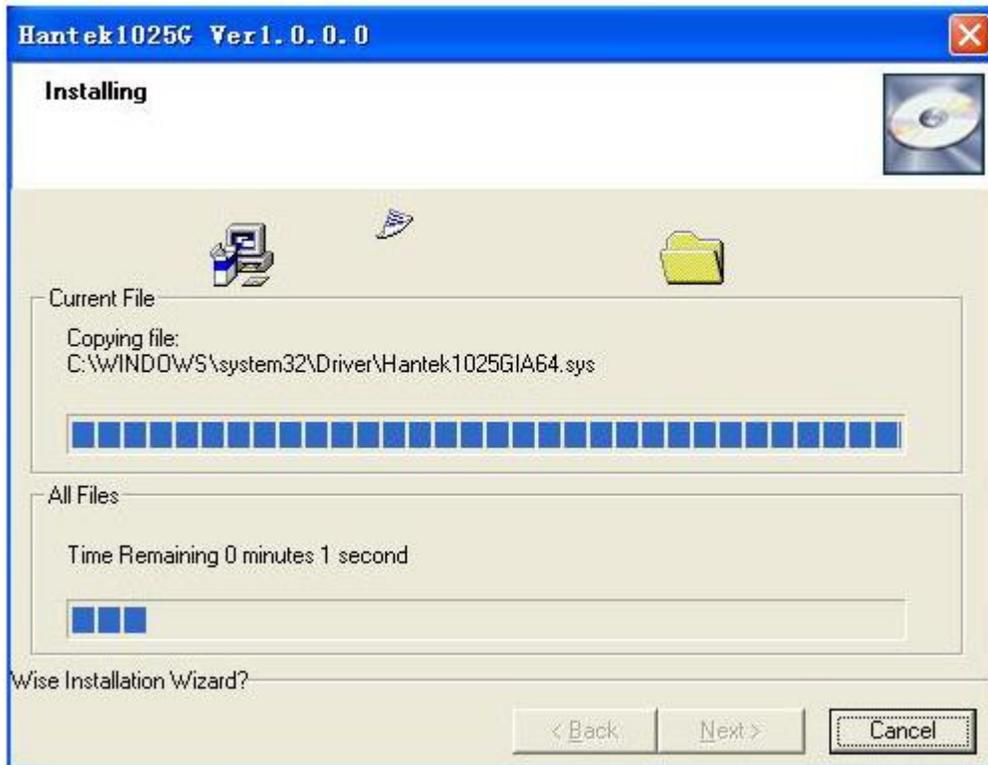

7. The installation is complete.
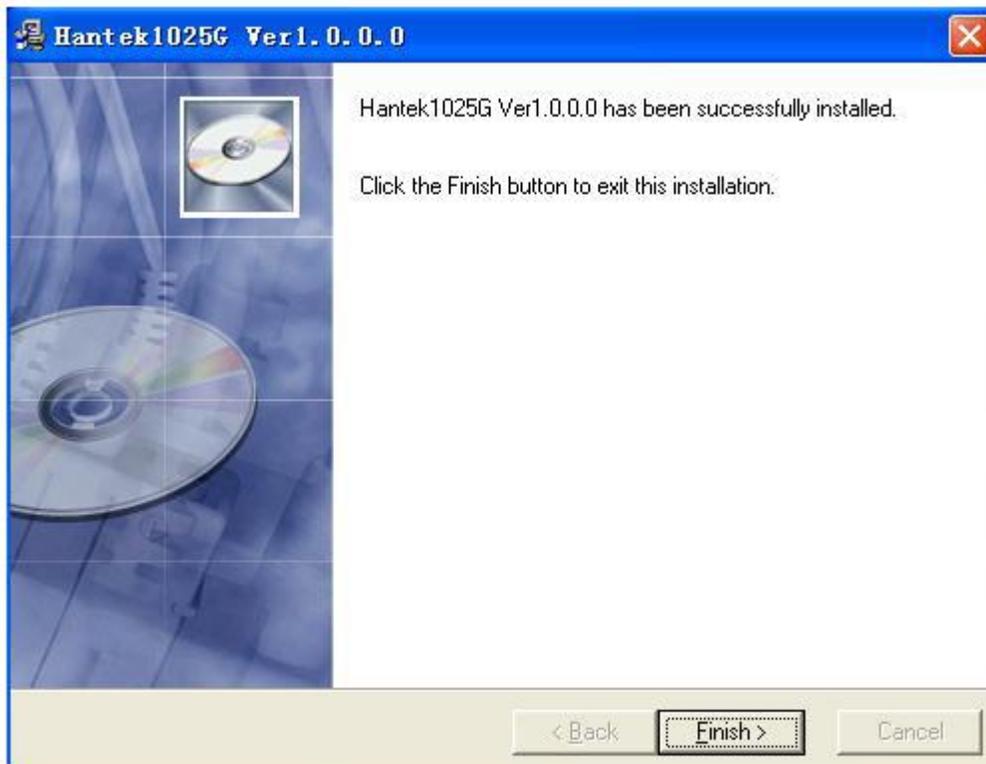
Chapter 2 Operating Basics

This chapter focuses on the following topics:

◆ The User's Interface

◆ The Menu System

◆ The Waveform Control System

2.1 The User's Interface

Hantek 1025G provides users a simple and full-featured interface so that users do not have to spend a lot of time to learn.
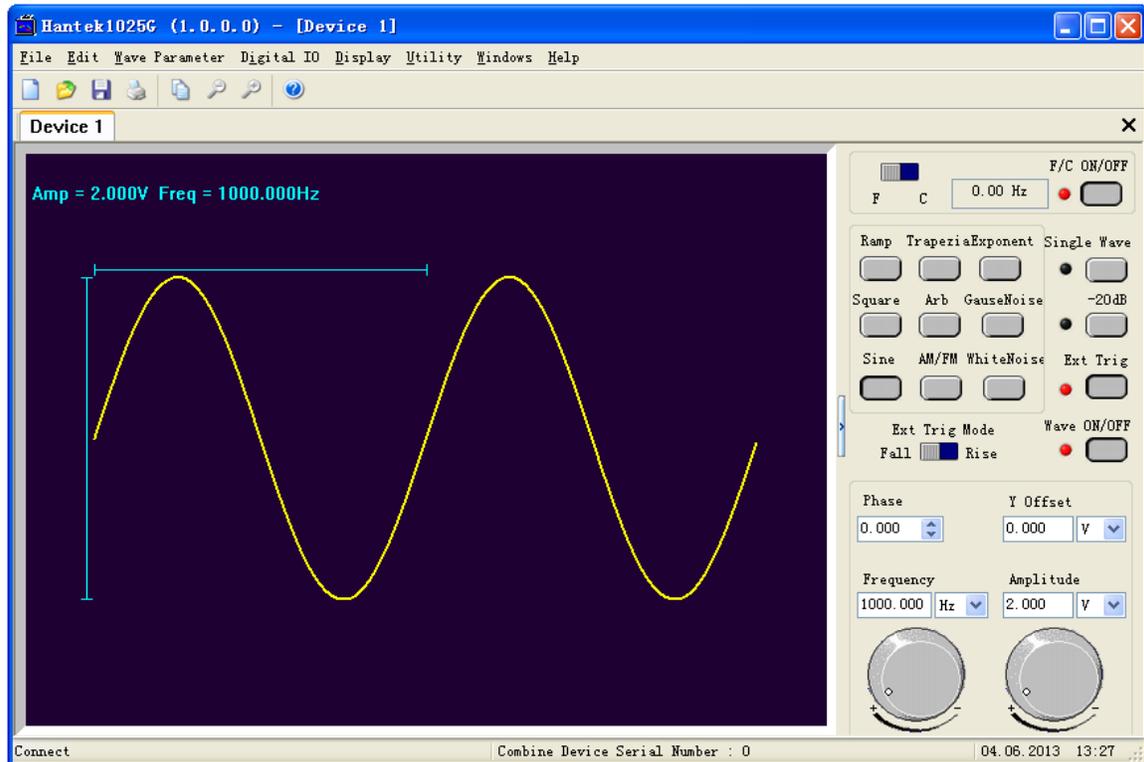
2.2 The Menu System

1. File

- **New:**   Create a new device
- **Close:**   Close current device
- **Open CSV…:**   Open a "CSV" file
- **Save CSV…:**   Save a "CSV" file
- **Save CSV As…:**   Save a "CSV" file as other name
- **Print…:**   Print the current waveform
- **Print Preview:**   Preview the current waveform
- **Print Setup:**   Configure the print setup
- **Exit:**   Exit Hantek 1025G

2. Edit
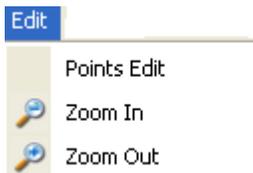
- **Points Edit:**   Draw the waveform after click the command of Arb.
- **Zoom In:**   Zoom in the waveform.
- **Zoom Out:**   Zoom out the waveform.

3. Wave Parameter

Wave Parameter
Square
Ramp
Trapezia
Exponent
AM/FM

- **Square:**   Show square waveform.
- **Ramp:**   Show ramp waveform.
- **Trapezia:**   Show trapezia waveform.
- **Exponent:**   Show exponent waveform.
- **AM/FM:**   Show AM/FM waveform.

4. Digital IO

Digital IO
√ Pattern Generator

Programmable Output
Output Set

Digital Input
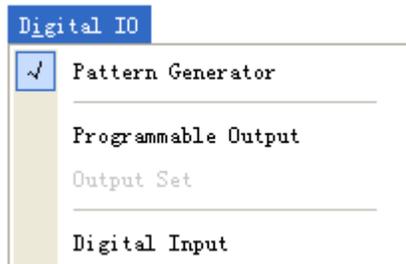
- **Pattern Generator:**   Set the Digital out pin as pattern generator.
- **Programmable Output:** Set the Digital out pin as programmable output.
- **Output Set:**   Show Digital out setup dialog.

5. Display

Display
Background Color
XY Line Color
Curve Color
Cursor Color

Wave Number
√ Show/Hide Control
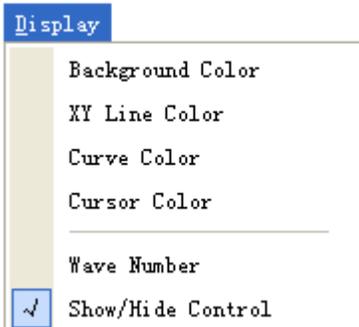
- **Background Color:**   Set background color.
- **XY Line Color:**   Set XY color.
- **Curve Color:**   Set curve color.
- **Cursor Color:**   Set cursor color.
- **Wave Number:**   Set the number of periods displayed.
- **Show/Hide Control:**   Show or hide the control panel.

6. Utility
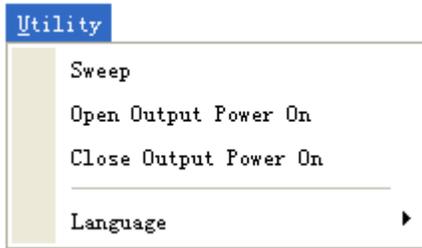
- **Sweep:**   Show the sweep dialog.
- **Open Output Power On:** Save the current waveform to Hantek1025G, and generate the waveform when the Hantek1025G powers on.
- **Close Output Power On:** Stop generates the waveform when the Hantek1025G powers on.

2.3 The Waveform Control System

Click Menu "Display"->"Show/Hide control", you can show or hide the waveform control panel. You can change the waveform parameter such as frequency, amplitude, Y Offset, or phase. Also, it includes the frequency/counter measurement system.
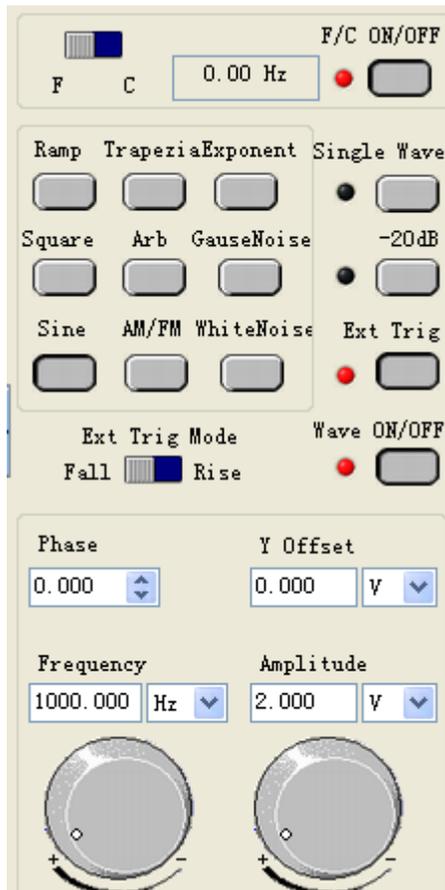
Chapter 3 Understanding Functions

This chapter focuses on the following topics:

◆ Waveform parameter

◆ Waveform output control

◆ Edition of Arbitrary Waveform

◆ Counter/Frequency Measurement

◆ Waveform data files

◆ Digital Input/Output

◆ Output Power On

◆ Synchronized Output

◆ External Trigger Input

3.1 Waveform parameter

1. **Choose waveform**

Press down any button of certain waveform to switch to the output of such kind of waveform. When switch to arbitrary waveform from other kind of waveform, the edition work can be done on the original wave form.
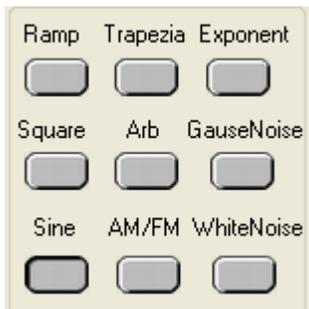
2. **Set waveform parameters**

Click Menu "Wave Parameter", there are the choices for setting of various waveform parameters.
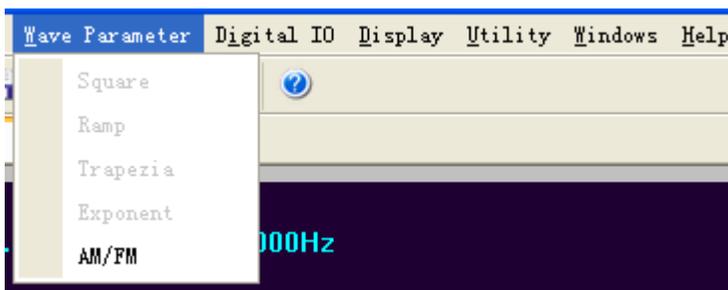
For example: click "AM/FM" to set the AM/FM parameters in the dialog.
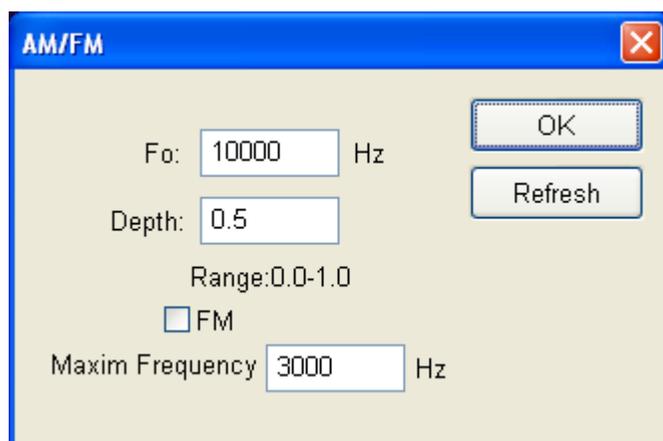
3.2 Waveform Output Control

By the following buttons to control the output dot numbers, trigger mode, output amplitude, and limit frequency of the wave filter.
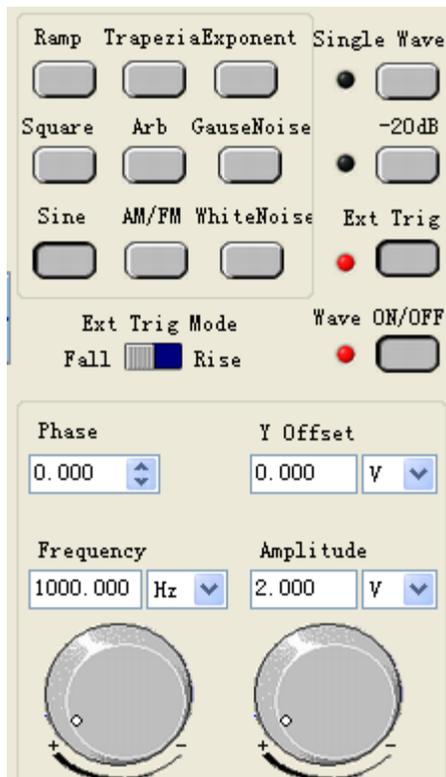
Single Wave: Output waveform only once.

-20dB: Attenuation the waveform

Ext Trig: Use the external or internal trigger system.

Wave ON/OFF: Turn the waveform on/off.

Ext Trig Mode: External Trigger Mode (see "External Trigger Input").

Phase: The phase of the waveform to generate.

Y Offset: The offset of the waveform to generate.

Frequency: The frequency of the waveform to generate (The Frequency Range is DC~75MHz when generating sine waveform, or DC~25MHz when generating other waveforms).

Amplitude: The maximum voltage of the waveform to generate.

## 3.3 Edition of Arbitrary Waveform

Choose "Arb" waveform, and click the menu "Edit" -> "Edit Points" to open edit points dialog.
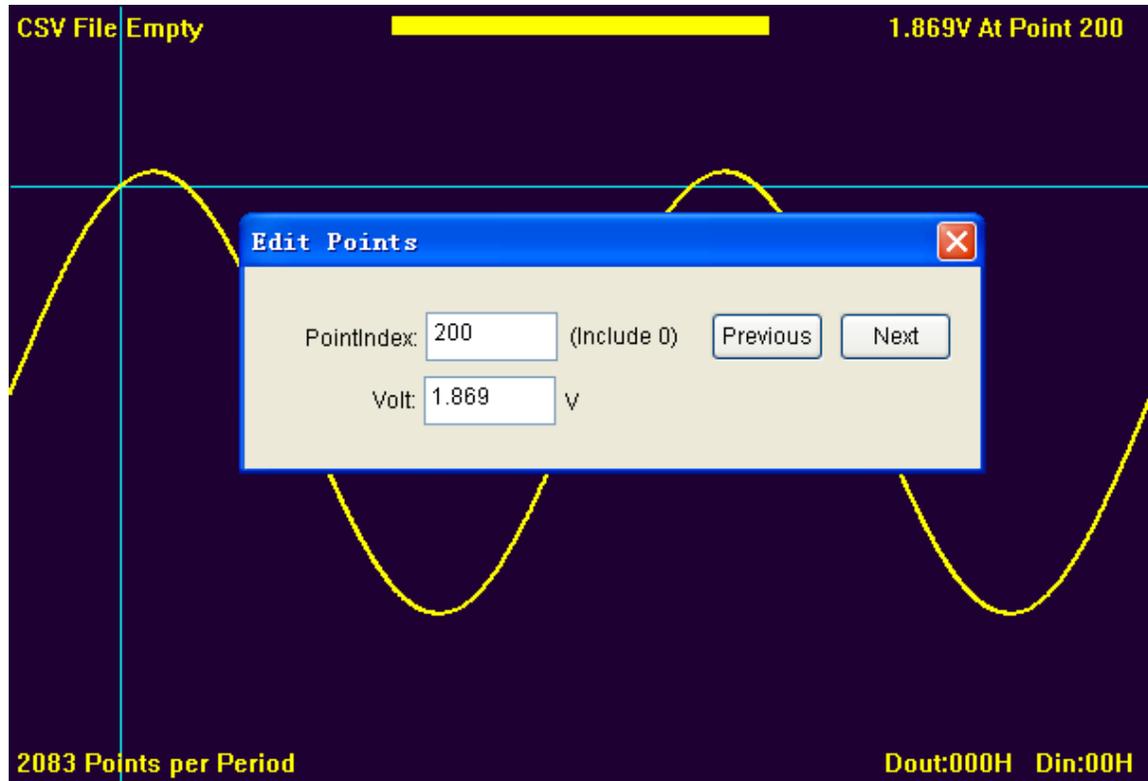
3.4 Waveform Data Files

The data format of Hantek1025G is ".CSV". Its format is compatible with the CSV file produced by the Tektronix ARB Express software. User can edit or set up the required CSV waveform and also use Excel to open and edit the CSV wave files.

3.5 Frequency/Counter Measurement

Click the "F/C ON/OFF" to turn on or off the frequency/counter measurement.
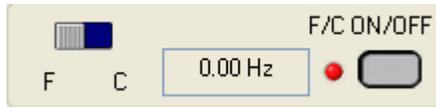
Connect to the Frequency/Counter Measurement terminal, and turn on the "F/C ON/OFF", you can see the frequency in the edit box.


Turn the left right button to "C" end, you can see the counter in the edit box.
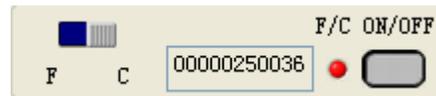
3.6 Digital Input/Output

Select Menu "Digital IO", you can change the current digital IO mode.
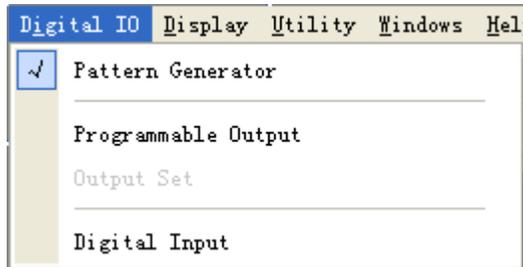
At the digital IO terminal on the Hantek1025G, there are 20 digital IO pins, 2 GND, 1 TRIG, 1 CTRL, 4 Digital In Pins and 12 Digital Out Pins.
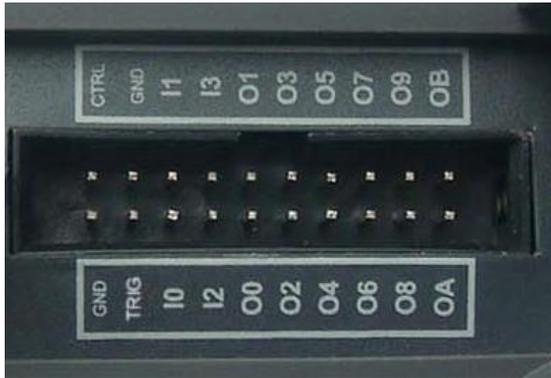

1. Pattern Generator:

The vertical resolution of Hantek1025G is 12bits. If selected this mode, you can get the each bit of the value by testing the digital out pins. The LSB is O0, and OB is MSB. By Logic Analyzer, you will get a good view.

For example: Use the Hantek1025G to generate a 1 KHz, 2.00V, sine waveform at the BNC output channel, there will be synchronizied square waveforms outputs from O0- OB. Connect the O0- OB to logic analyzer and you will see the digital waveforms for the analog Sine wave.
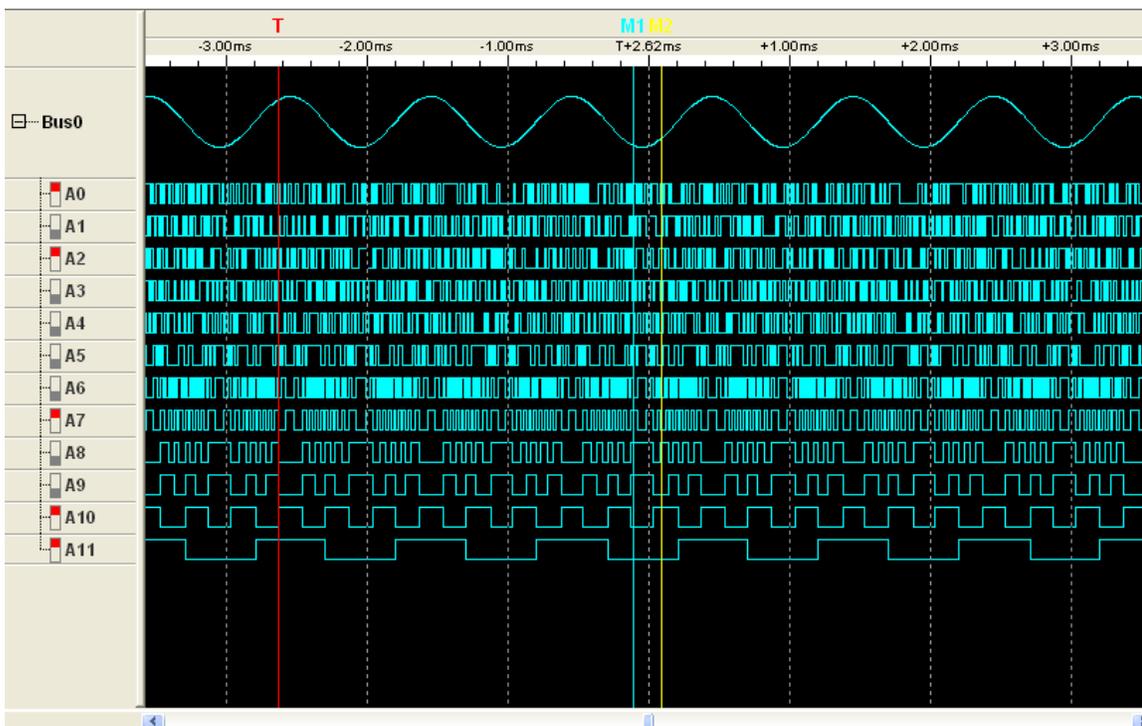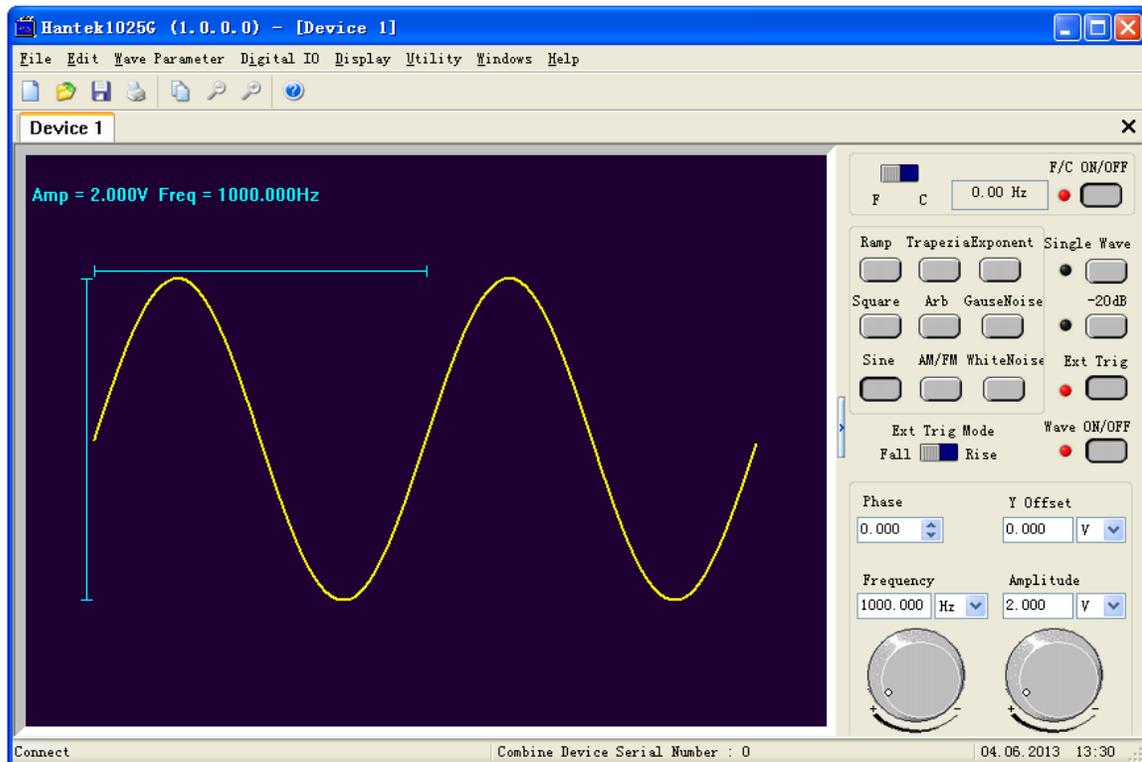
2. Programmable Output:

Select menu "Programmable output", then the Programmable output mode works. Select menu "Digital IO"->"Output set", the "output set" dialog show.

By selecting one pin, that digital output pin will output high level. Otherwise, the pin will output low level.
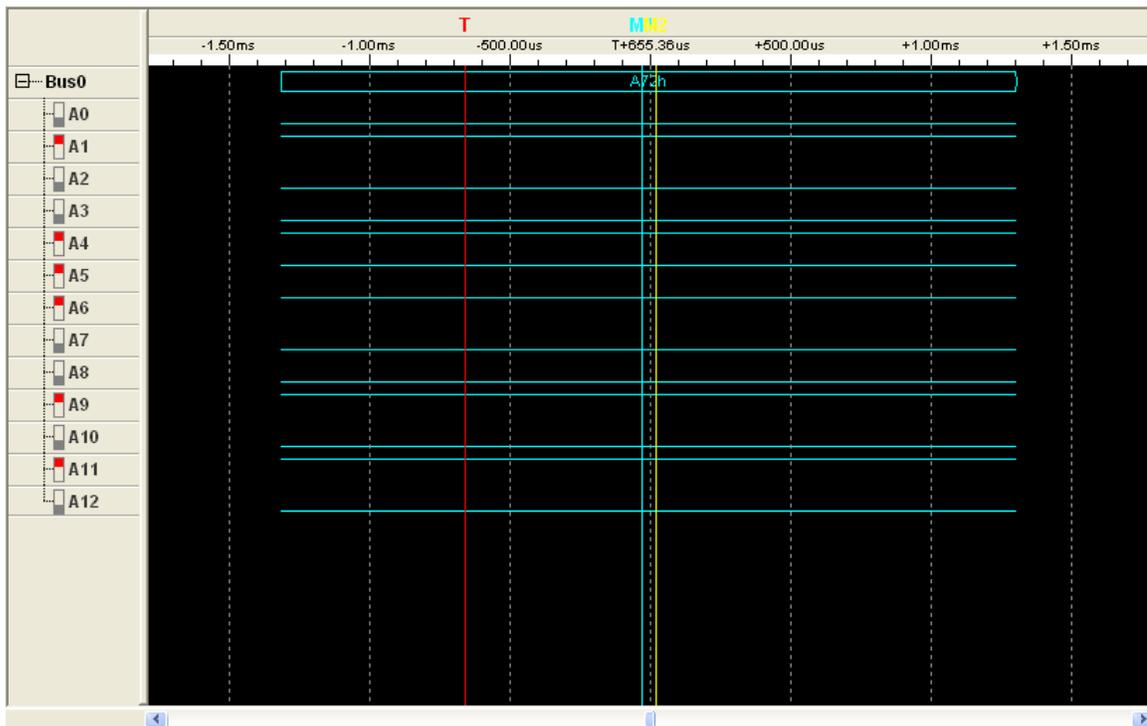
3. Digital Input

   Select menu "Digital IO"->"Digital Input", the following dialog show.
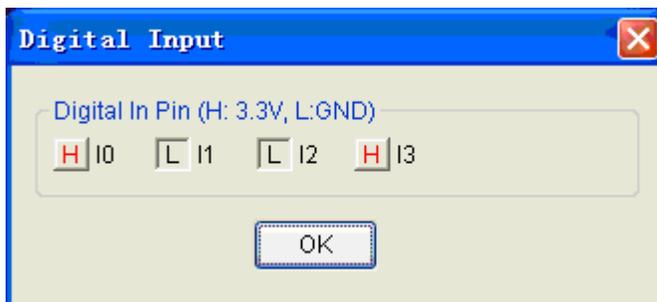
If you input a high level to a digital input pin, the pin on the dialog would show H; otherwise, the pin on the dialog would show L.

3.7 Output without PC

Hantek1025G can save a waveform to its own memory and work without PC.

Open:

Select menu "Utility" -> "Open output power on". Then the current waveform will be saved to hardware. And the waveform will be generated every time when you connect the Hantek 1025G to power.
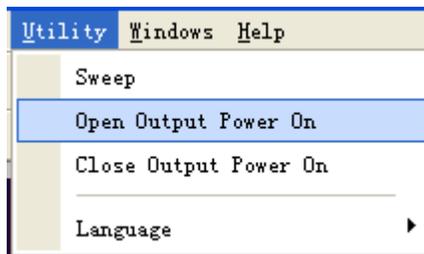
The Hantek 1025G is powered by USB.

Close:

If you want to clear the waveform from the hardware memory, select "Close Output Power On".
If you don't want to generate the waveform which is saved in the hardware memory, connect the "CTRL" pin end to ground before inputting power to this instrument.
Please don't run the software when you do this operation, otherwise, the saved waveform will appear a few seconds later after the CTRL is connect to ground.


Note：Once select "Open Output Power On" menu, it will keep working until you click "Close Output Power On" to close it manually.

3.8 Synchronized output

If you generate a waveform by software, there is a synchronized signal output from "SYNC" terminal. The signal is square waveform, the frequency of which is equal to the waveform you generated.

For example, if you generated a 1 KHz, sine waveform, you will also generate an 1 KHz, square waveform simultaneously.
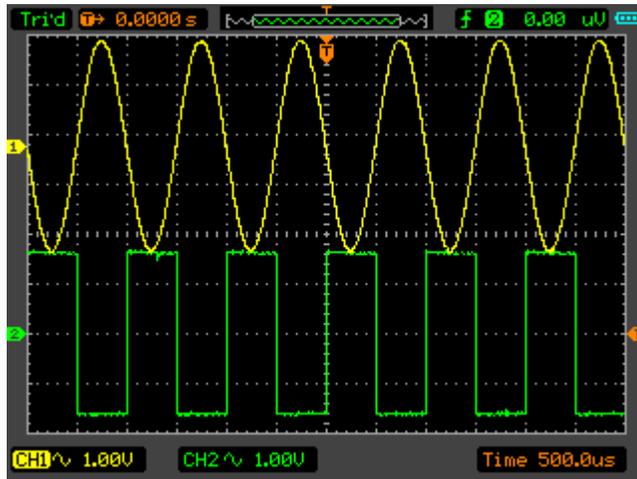

The waveform on CH1 is the sine waveform you generated from the "**OUTPUT**" BNC terminal, and that on CH2 is the synchronized signal from "**SYNC OUT**" BNC terminal.

3.9 External Trigger Input

Also, you can use the external trigger input to control the Hantek1025G.
For example, the instrument generated a waveform, and you got a waveform on oscilloscope.
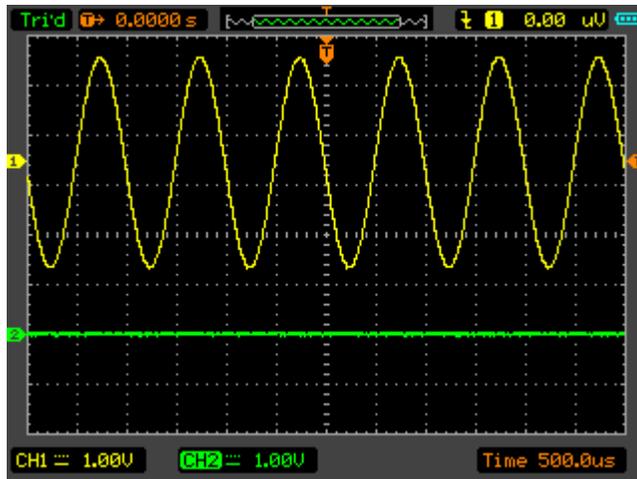
Then, click the "Ext Trig" button on the interface of the software. The waveform on the oscillograph disappeared. Now the instrument use the external trigger system, but there is no external signal input, so the instrument stops to output waveform.
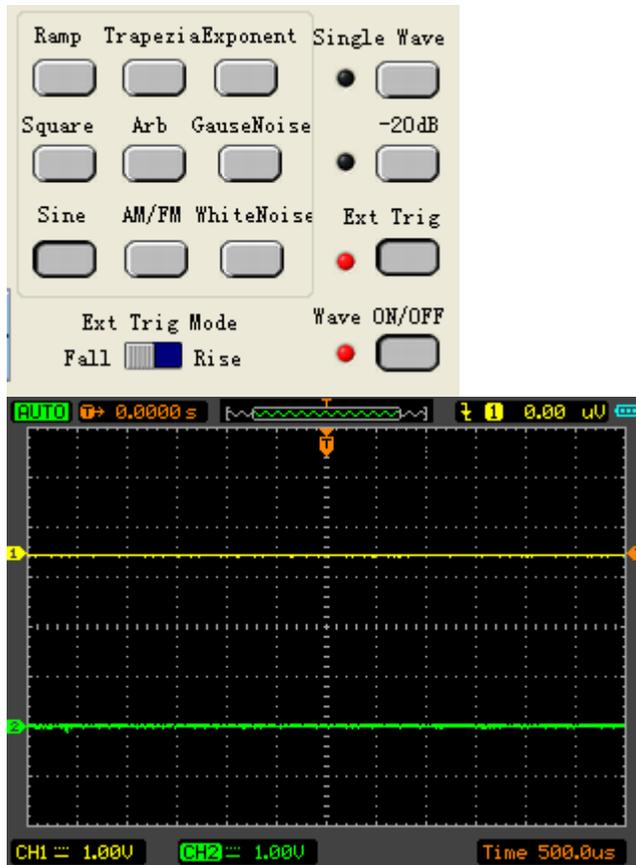
Click the "Ext Trig" mode to switch the external trigger mode between "Fall" and "Rise". Select the Fall mode as example.

Input a signal which has fall edges to the "TRIG" pin. When the Hantek 1025G gets to the fall edge of the external signal, it begins to generate waveform.
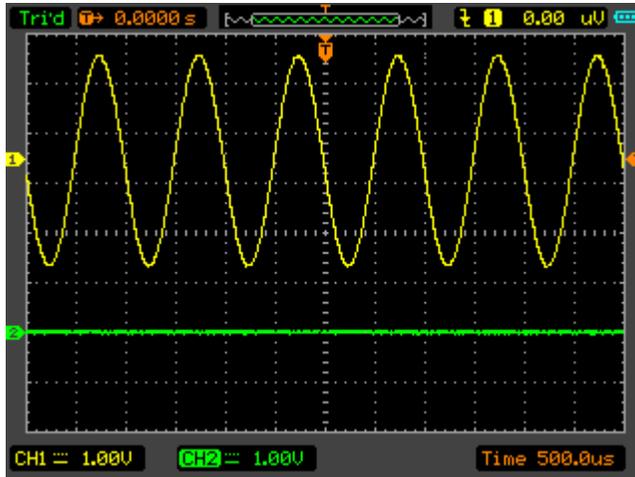
Chapter 4 Application Examples

This chapter focuses on the following topics:

◆ Generate the simple waveform

◆ Generate Arbitrary Waveform

4.1 Generate the Simple Waveform

To generate a simple waveform, please do these steps as follows:

1.   Open the software.
2.   Choose the waveform type in the right control panel.
3.   Move your mouse to the waveform screen.
4.   Press the mouse left button and move, draw your own waveform.
5.   Then you can see your own waveform in the oscilloscope.
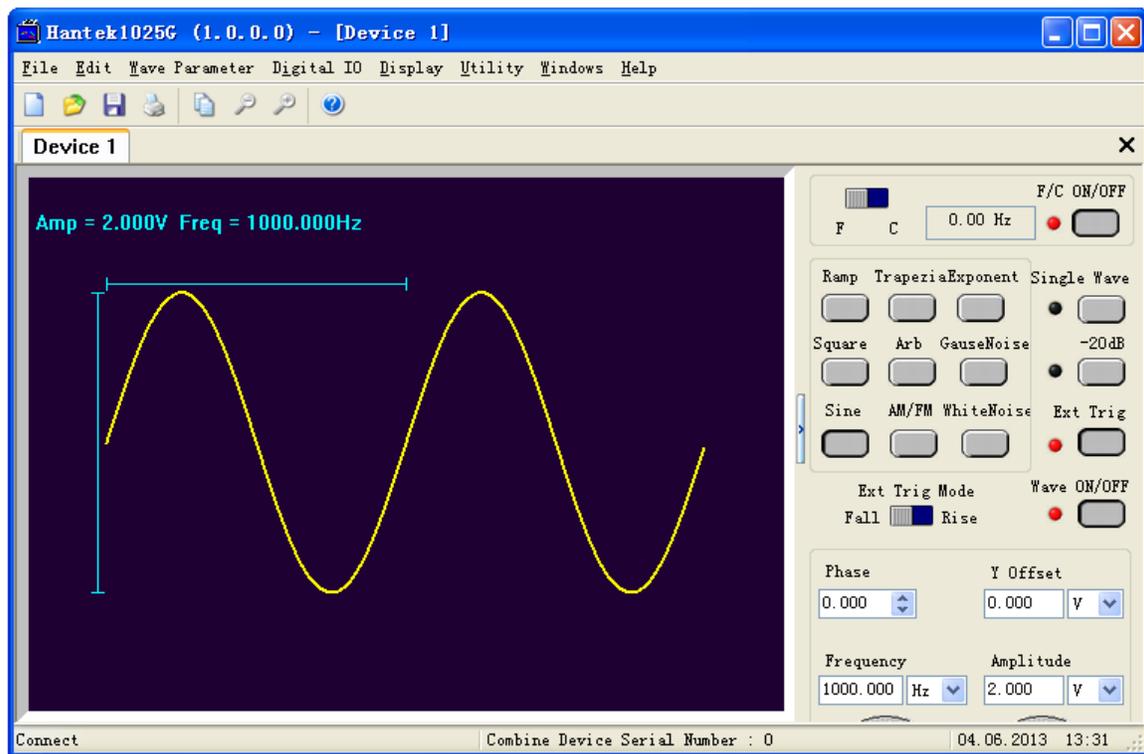
4.2 Generate Arbitrary Waveform

To generate a arbitrary waveform, please do these steps as follows:

1. Open the software.
2. Choose the "Arb" waveform in the right control panel.
3. Move your mouse to the waveform screen.
4. Press the mouse left button and move, draw your own waveform.
5. Then you can see your own waveform in the oscilloscope.
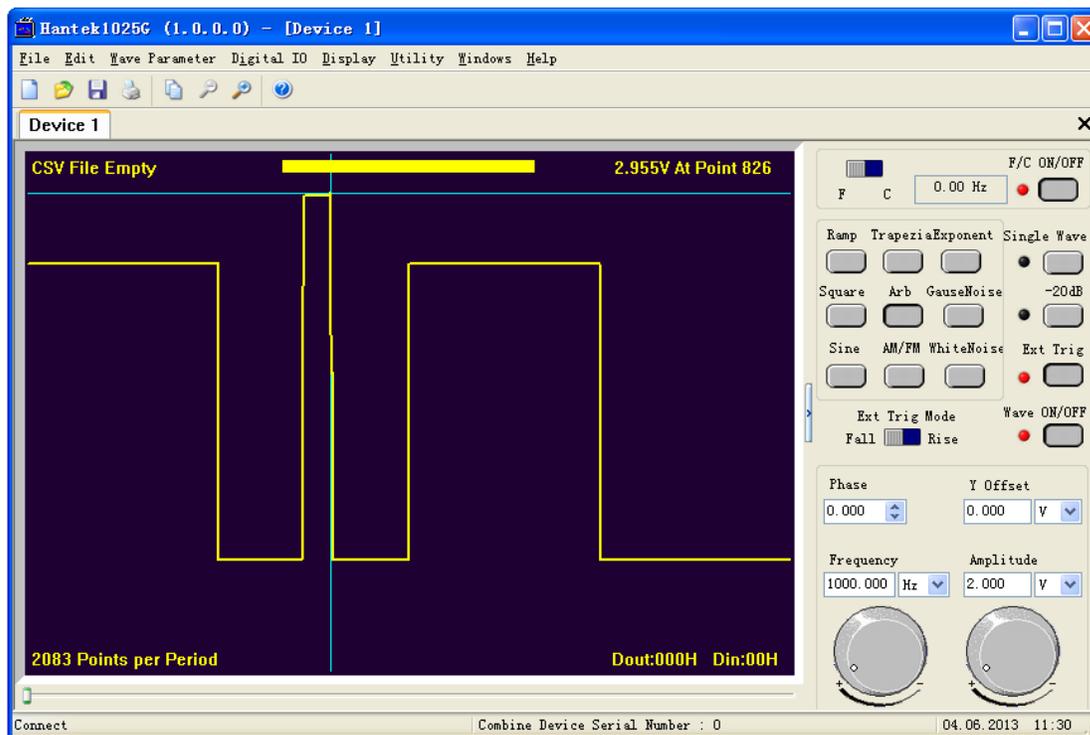
6. Click "Edit"->"Edit Points", you can change the voltage of each point.
7. Click "Edit"->"Zoom In" or "Zoom Out", you can zoom in or out the waveform screen.
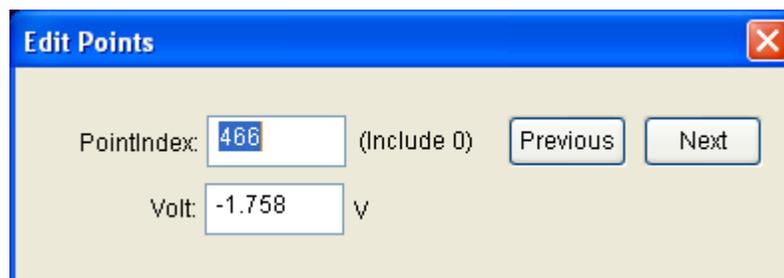
Appendix

◆ Hardware specification

◆ Cleaning and Maintenance

Hardware Specification

Waveform Output Channel	
Frequency Range	sine: 1Hz(DC)~75MHz other waveform: 1Hz(DC)~25MHz
Frequency Resolution	0.1％
DAC Clock	200MHz
Channels	1CH waveform output
The sampling rate	200Msa/s
Memory Depth	4KSa
Vertical Resolution	12 Bits
Stability	<30ppm
Amplitude	±3.5V Max.
Output Impedance	50 Ω
Output Current	50mA Ipeak=100mA
System BW	25M
Harmonic Wave distortion	-50dBc(1KHz), -40dBc(10KHz)
Frequency Counter Channel	
Range	DC~50MHz
Input Amplitude	400mVpp~18Vpp
Coupling Mode	DC
Accuracy	±Time Base Error ±1 Count
Input Impedance	> 100KΩ
Digital Input and Output	
12 Bits Output 6 Bit Input	12 Bits Digital Generator and GO 6Bit GI
Level	LVCMOS
Working Environment	
Working Temperature	0~70 Centigrade
Working Humidity	0~95%
Weight	300g

Cleaning and maintenance

Cleaning

In order to maintain the cleanliness of equipment, you need to check whether the channels are dusty or not. Please clean the out surface of the equipment follow these matters.

1.   Use velvet cloth contact the surface of the equipment.

2.   Pease do not use any corrosive or chemistry.

Caution

Please make sure the equipment is dry enough before going to work. Avoid mangling the equipment or hurting body because of water!

In order to not mangle the equipment, you should not put it in fog, water or impregnate.

Maintenance

Don't put the equipment under the sun for a long time. Put it in wind to the best of one's abilities