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EC Declaration of Conformity

We

GOOD WILL INSTRUMENT CO., LTD.

(1) NO. 95 - 11, Pao Chung Rd., Hsin-Tien City, Taipei Hsien, Taiwan

(2) Plot 522, Lorong Perusahaan Baru 3, Prai Industrial Estate, 13600 Prai, Penang, Malaysia

declare, that the below mentioned product

SFG-830

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Law of Member States relating to Electromagnetic Compatibility (89/336/EEC,92/31/EEC,93/68/EEC) and Low Voltage Equipment Directive(73/23/EEC).

For the evaluation regarding the Electromagnetic Compatibility and Low Voltage Equipment Directive, the following standards were applied:

EN50081-1: Electromagnetic compatibility - (1992) Generic emission standard Part 1: Residential, commercial and light industry		
Conducted Emission Radiated Emission	EN 55022	class A (1994)
Current Harmonics	EN 61000-3-2	(1996)
Voltage Fluctuations	EN 61000-3-3	(1995)
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EN50082-1: Electromagnetic compatibility - (1992) Generic immunity standard Part 1: Residential, commercial and light industry		
Electrostatic Discharge	IEC 1000-4-2	(1995)
Radiated Immunity	IEC 1000-4-3	(1995)
Electrical Fast Transients	IEC 1000-4-4	(1995)
Surge Immunity	IEC 1000-4-5	(1995)
Voltage Dip/Interruption	EN 61000-4-11	(1994)

EN50081-2: Electromagnetic compatibility - (1993) Generic emission standard Part 2: Industrial Environment		
Conducted Emission Radiated Emission	EN 55011	class A (1991)

Low Voltage Equipment Directive 73/23/EEC	
Low Voltage Directive	EN 61010-1:(1993)+A2:(1995)

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1. INTRODUCTION

1.1 GOODWILL SFG-830 AWES Application

The AWES (Arbitrary Waveform Editing Software) provides a communication link between a personal computer and the SFG-830 Arbitrary Function Generator. The AWES can be compatible with Window 95 to create and edit waveforms before transferring it to the Function Generator.

The software functions are:

- Create and edit arbitrary waveforms (File/New) (Edit).
- The function of both point numbers based and time-based display makes it easily edit.
- Provide the most often use of standard waveforms. (Waveform).
- Provide Pen and Line function to do the manual editing (Edit/Pen) (Edit/Line).
- Combine waveforms by using mathematical operators including addition, subtraction and multiplication (Math)
- Transfer waveforms to the SFG-830 Arbitrary Function Generator.
- Print out waveforms (File/Print).
- Save waveforms to file (File/Save).
- Download waveforms from file (File/Open).
- Support GPIB and RS232 interface to transfer waveform (I/O).

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1.2 About Arbitrary Waveforms

The waveforms you create in this application are a series of data points. The first point, 0, is given an Y value between –1 and +1. The next point has another Y value and so on to the maximum number of data points in your waveform.

All the data points in the waveform edit window make up one Function Generator output cycle. When you send the waveform to the Function Generator, it will attempt to output all the points to the frequency you specify.

The sample rate of SFG-830 under Arbitrary waveform mode is 42.9496M sample/n, in which n = 8, 10, …. 2^{15}. In other words, the sample rate of Arbitrary waveform mode can be ranged from 5.36MHz low to 1.31Khz. The relation of output signal frequency, sample rate and the number of point is as follows:

$$\textbf{Frequency} = \frac{\textbf{Sample rate}}{\textbf{Number of point}}$$

To get a signal with a fixed frequency, there are several combinations of sample rate and number of point. It depends on the tradeoff between complexity and distortion of the desired signal.

1.3 What's New in GW SFG-830 AWES Version 2.0?

- Win95 Based provides extremely friendly user interface.
- Provide Pen and Line function to edit waveform (Edit/Pen) (Edit/Line).
- Combine waveforms by using mathematical operators including addition, subtraction, and multiplication (Math).
- Print out waveforms (File/Print).
- Support an on-line Electronic book for help (Help).

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1.4 Supported interfaces

- National Instruments GPIB-PCII/PCIIA interface card.
- National Instruments AT-GPIB or AT-GPIB/TNT interface cards.
- RS-232 serial port (COM 1,2,3 or 4) and RS-232 cable.

1.5 National Instruments interface card notes

While using the GPIB PCII/PCIIA or AT-GPIB, or AT-GPIB/TNT interface card from National Instruments, make sure that the Interrupt and DMA settings are properly set by using WIBCONF. This configuration program is comprised in the National Instruments interface card software. After selecting the proper configuration, run the IBDIAG program under the DOS prompt or WIBTEST under Windows to check the software and hardware of the interface card. For further information, please refer to the National Instrument's installation manual.

1.6 RS-232 interface

The proper RS-232 configuration and correct cable are main factors to the operation of GW SFG-830 AWES as most of the communication problems with RS-232 may be caused by improper configuration of the interface (i.e. baud rate or COM port number) or improper cable connections. To ensure accurate operation of the interface, you must set the Function Generator for RS-232 operation from the front panel to ensure the baud rate and parity settings match those in the GW SFG-830 AWES Settings dialog box.

1.7 Installation Note

While installing GW SFG-830 AWES, ensuring your operation system is WIN95 or 32-bits operation system, otherwise you cannot install this application.

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2. How to run the AWES

2.1 Introduction

The GW SFG-830 AWES Software is an easy operation software. Just run the execution file (arb.exe) that you can operate all functions to control the instrument. The arbitrary software has only one disk that includes two files.

Arb.exe ---------- execution file
Arb.hlp ---------- online help

2.2 General Operation Procedure

Step 1: Execute [Arb.exe] to enter user's operation workspace.
Step 2: To edit waveform arbitrarily which you intend to send to the instrument.
Step 3: Execute the configuration function of [I/O] by selecting [GPIB] or [RS232] to send out waveform.
Step 4: After Configuration function being set up, you can select [send out] under [I/O] function to pass on actual waveform. The SFG-830 will display "Loading Arb…." to keep sending waveform until it appears "Loading done" on the screen to complete the job.
Step 5: After sending out waveform, select [Machine sample rate] under [I/O] to change the frequency of input waveform.

Note: In Step 3, if you choose to pass on waveform through GPIB, please ensure that GPIB of SFG-830 is set to "ON", and its address is same as the GPIB address (Please refer to Section 6-9 of SFG-830 Operation Manual).

If choose RS232, the RS232 of SFG-830 should be set to "ON", and its baud rate should be same as the software as well.

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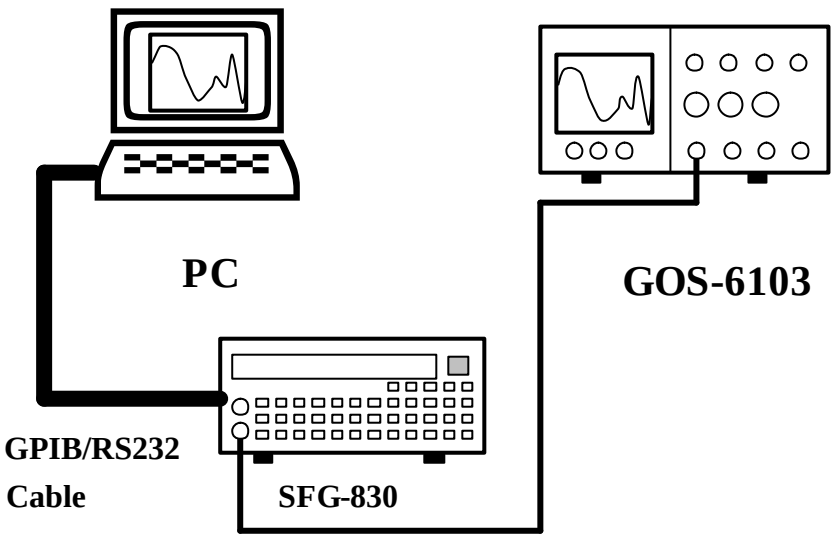
2.3 Configuration of SFG-830 and AWES Test System

Equipments:

- Personal Computer with GPIB interface.
- Win95 Environment SFG-830.
- SFG-830 Arbitrary Function Generator with GPIB interface.
- GOS-6103 GW-INSTEK 100MHz Oscilloscope.

Setup:

- **Fig. 2-3: Configuration of SFG-830 and AWES Test System.**



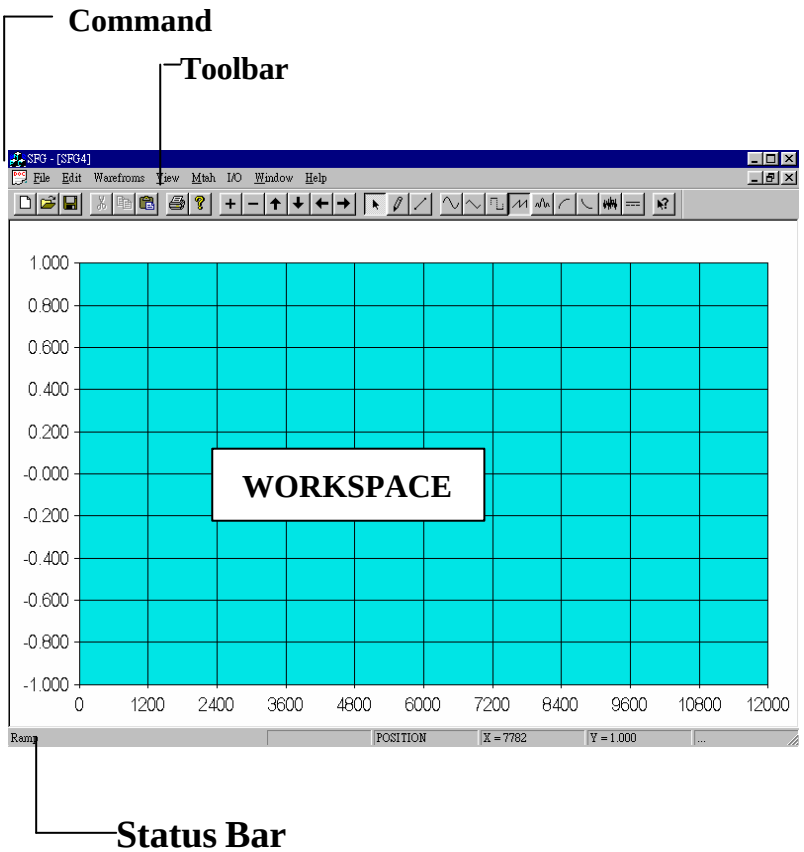
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3. USER INTERFACE INTRODUCTION

In this section, the function of each command will be introduced through the drawings thereinafter for your cross-reference. Also, you can use “on line help” for further detailed explanation.

3.1 Workspace

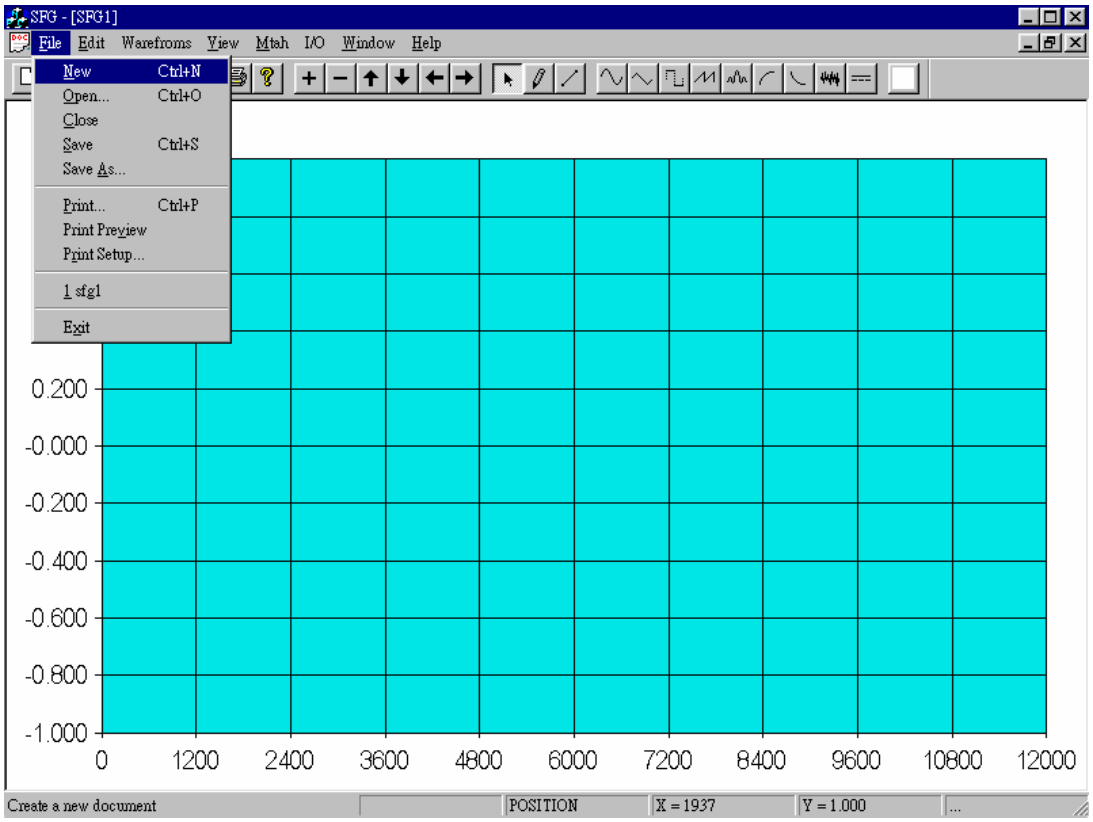
- **Fig. 3-1**



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3.2 Menu Items

- **Fig. 3-2. File Command**

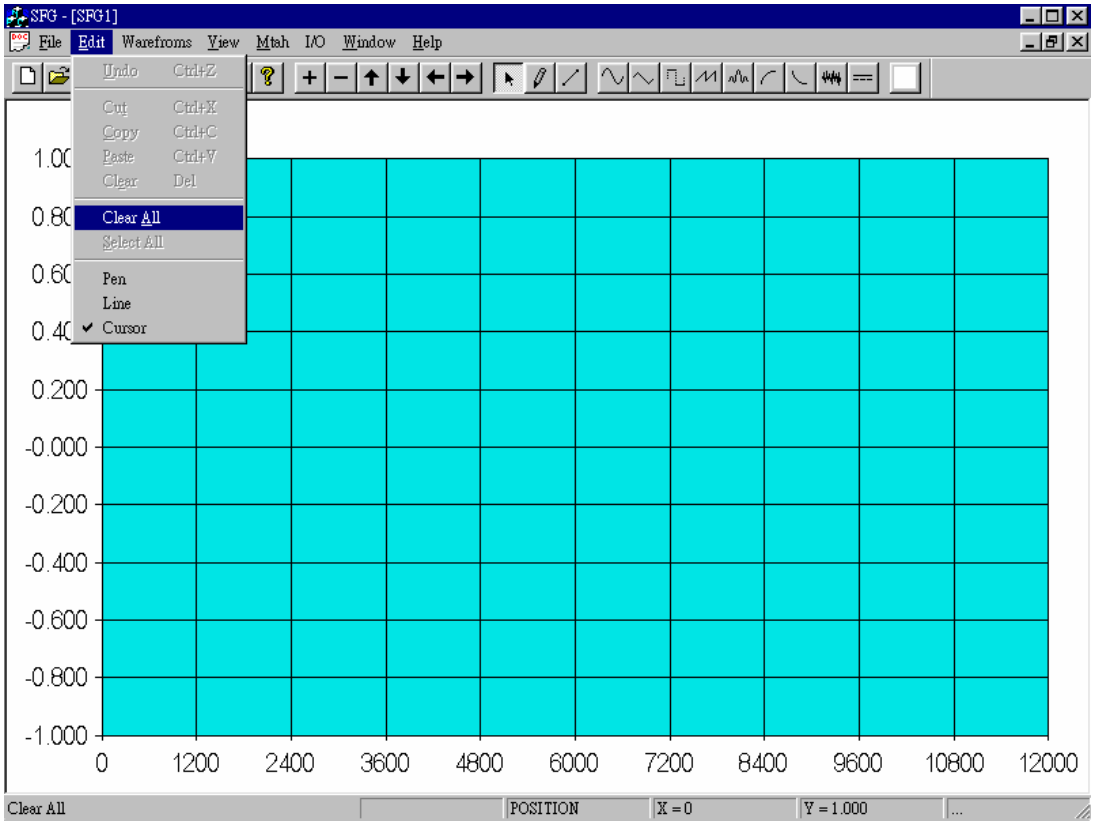


- **Definition:**

New	Develop a new workspace for waveform editing.
Open	Open the existent edited waveform.
Close	Close up a workspace of waveform editing.
Save	Save the edited waveform.
Save as	Save the edited waveform to a specific file name.
Print	Print the edited waveform.
Print Preview	Display the specific edited waveform for printing on the screen.
Print Setup	Select and connect a printer.

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- **Fig.3-3. Edit Command**

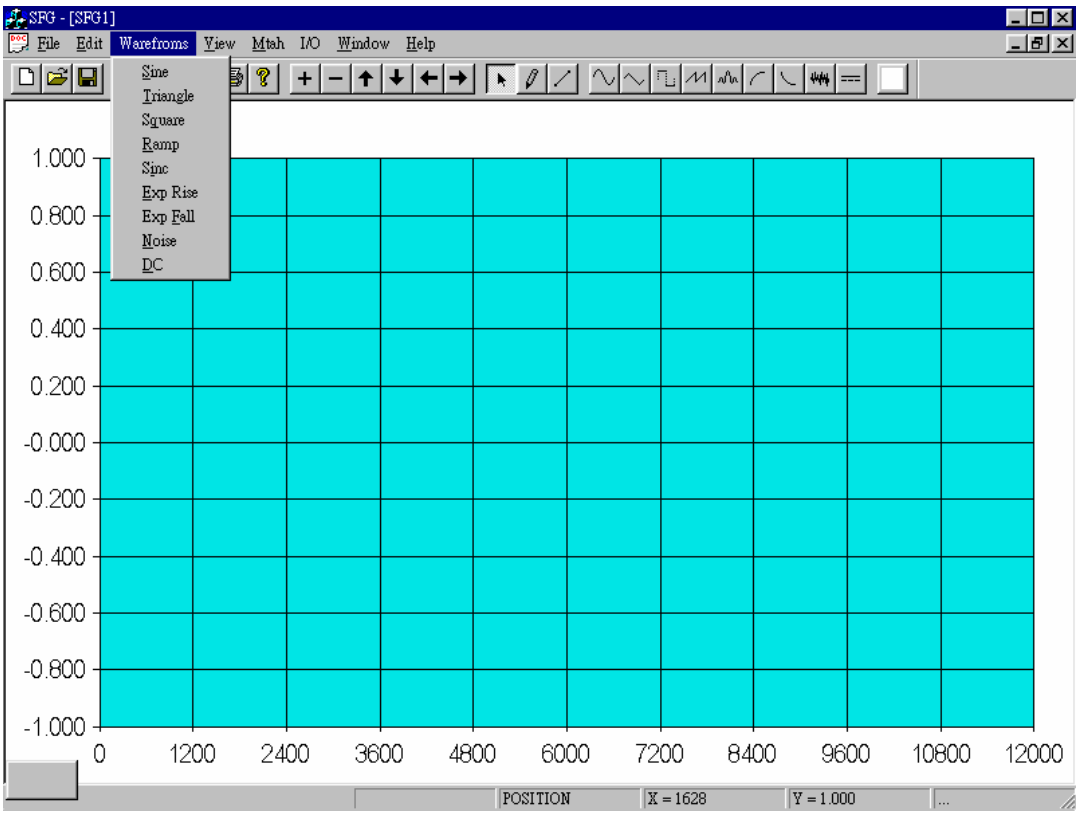


- **Definition:**

Undo	Reverse previous editing operation.
Cut	Delete data from the waveform edit window and move it to the clipboard.
Copy	Copy data from the waveform edit window to the clipboard.
Paste	Remove data from the clipboard and paste it in the waveform edit window.
Clear	Clear data from the active waveform edit window.
Clear All	Clear all data from the waveform edit window.
Select All	Select all data from the waveform edit window.
Pen	Draw the arbitrary waveform with the mouse.
Line	Draw the line waveform with the mouse.
Cursor	Change drawing mode to the select mode.

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- **Fig. 3-4. Waveform Command**

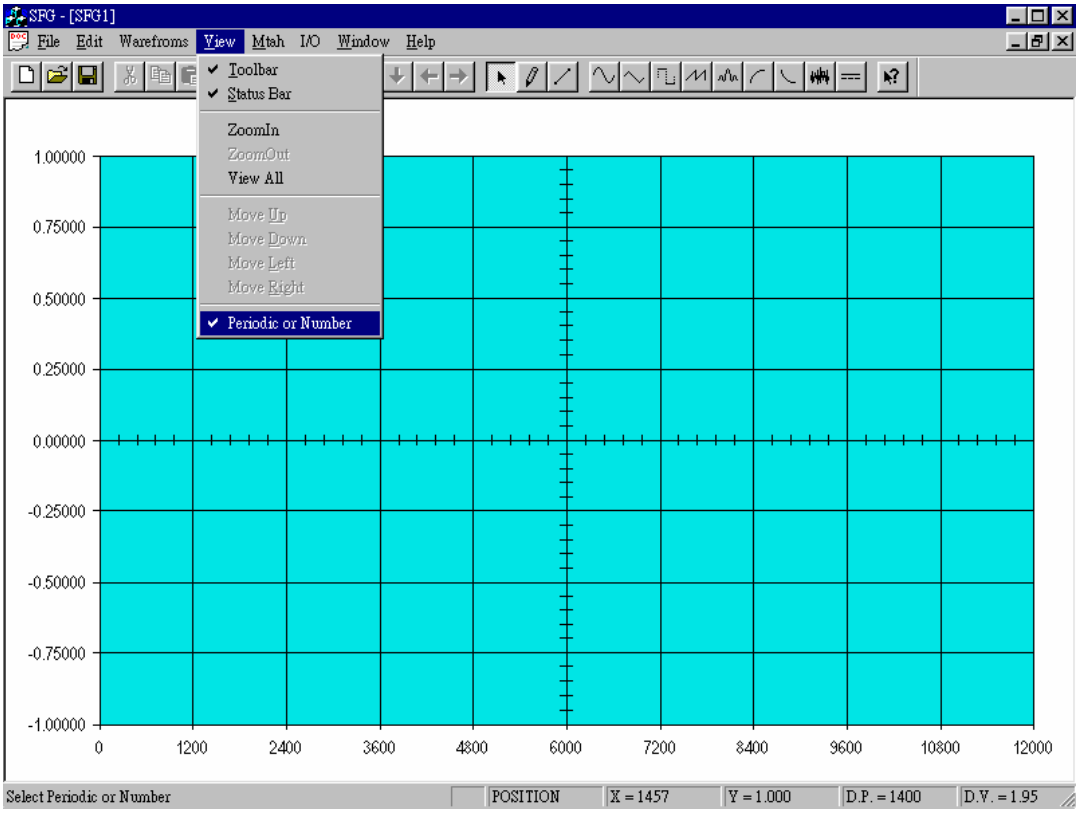


- **Definition:**

Sine	Generate Sine waveform.
Triangle	Generate Triangle waveform.
Square	Generate Square waveform.
Ramp	Generate Ramp waveform.
Sinc	Generate Sinc (sin *x*/*x*) waveform.
Exp. Rise	Generate Exponential Rise waveform.
Exp. Fall	Generate Exponential Fall waveform.
Noise	Generate noise waveform.
DC	Generate DC waveform.

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- **Fig. 3-5. View Command**

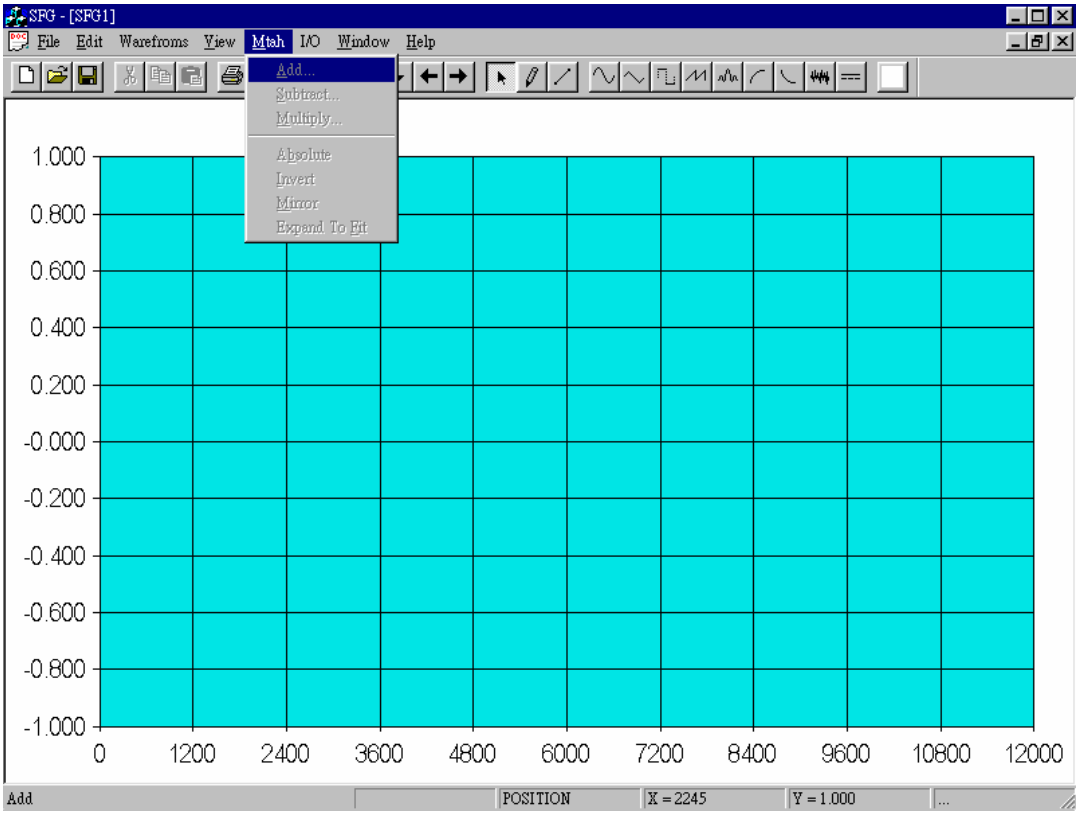


- **Definition:**

Toolbar	Provide quick access to tools.
Status Bar	Provide brief description of menu items.
Zoom In	Zoom in waveform edit window.
Zoom Out	Zoom out waveform edit window.
View All	Zoom out all areas.
Move Up	Zoom up waveform edit window.
Move Down	Zoom down waveform edit window.
Move Left	Left zoom waveform edit window.
Move Right	Right zoom waveform edit window.
Periodic or Number	Change the style of display waveform to time-based or point number.

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- **Fig. 3-6. Math Command**

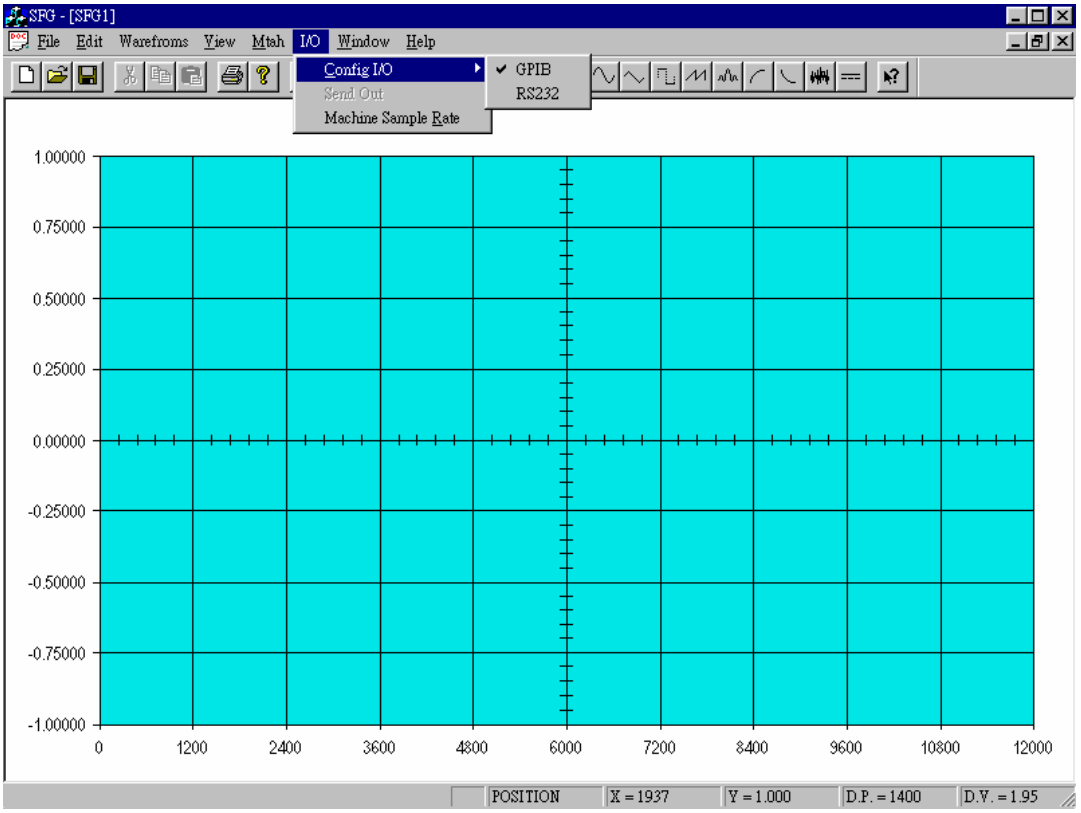


- **Definition:**

Add	Perform a point-by-point addition of the selected operands.
Subtract	Perform a point-by-point subtraction of the selected operands.
Multiply	Perform a point-by-point multiplication of the selected operands.
Absolute	Change the sign on all negative Y-value points.
Invert	Invert the waveform vertically.
Mirror	Reflect horizontally the waveform in the center of the selected range.
Expand To Fit	Stretch the waveform to fit the entire waveform edit window.

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- **Fig. 3-7. I/O Command**

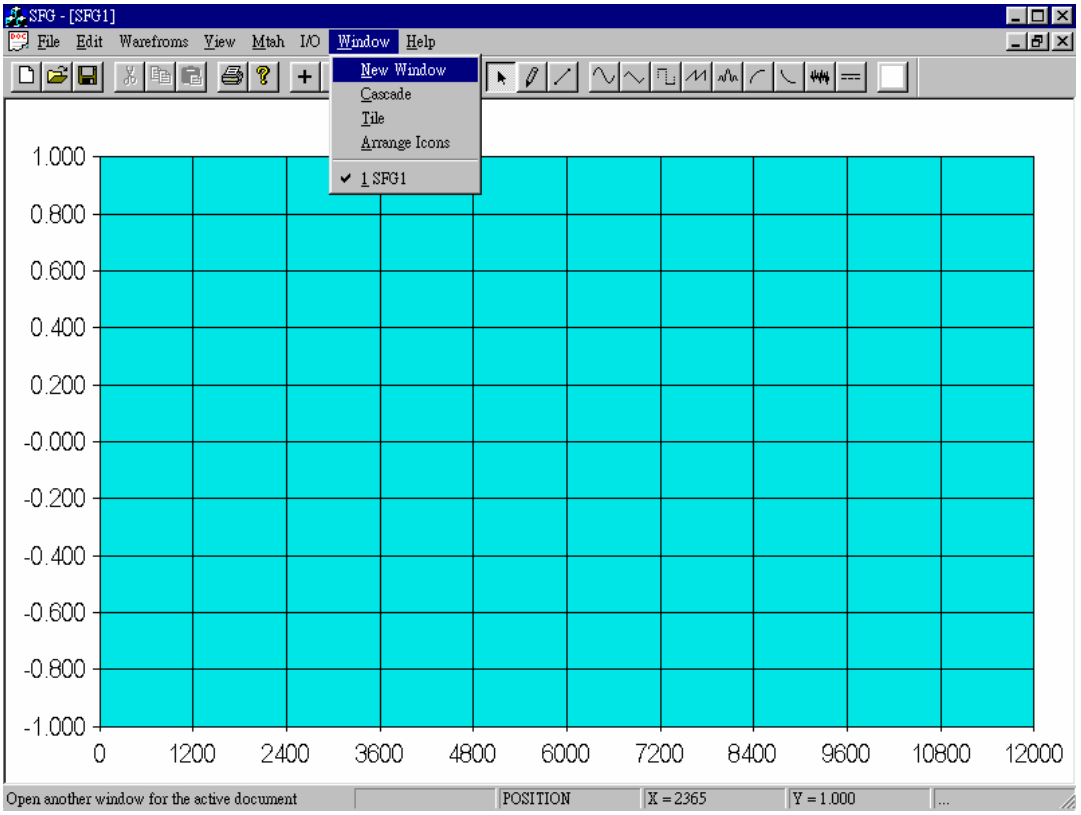


- **Definition:**

Config I/O	Configuration the environment for GPIB or RS232
Send Out	Send waveform to instrument.
Machine Sample Rate	Set the sample rate of Arbitrary waveform and send to instrument.

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- **Fig. 3-8. Window**

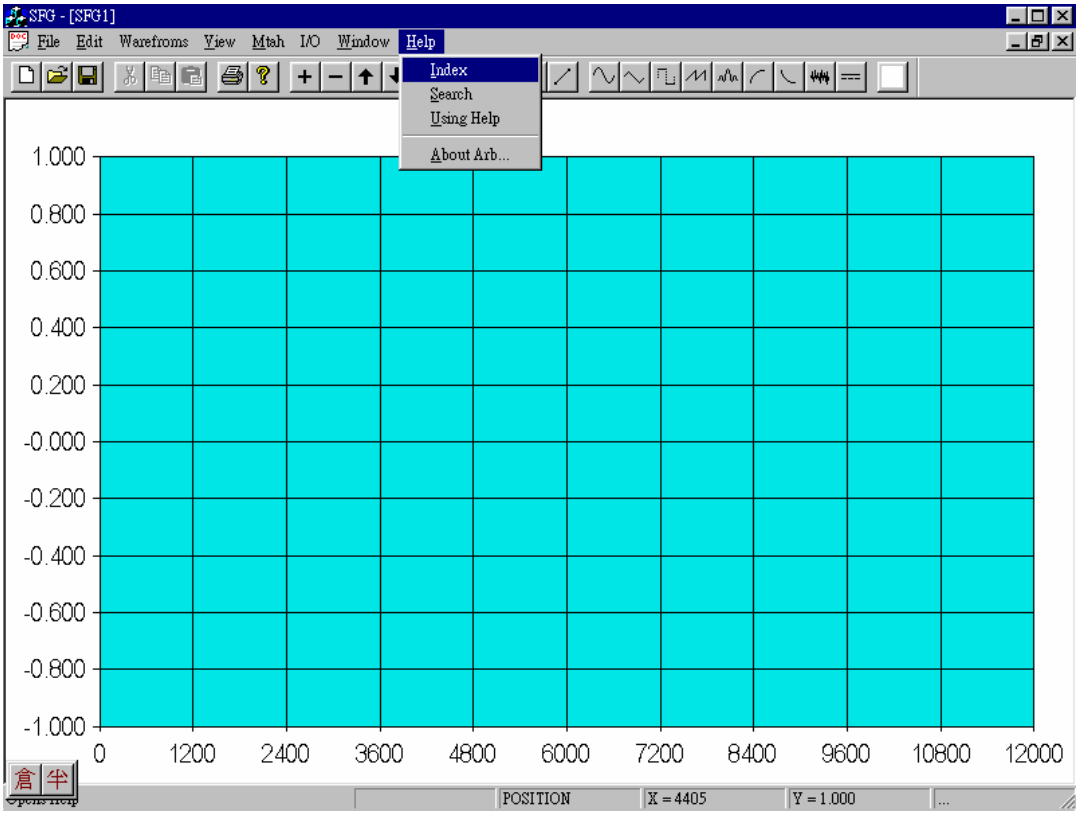


- **Definition:**

New Window	Open up a new workspace.
Cascade	Arrange windows in an overlapped fashion.
Tile	Arrange windows in non-overlapped vertical tiles.
Arrange Icons	Arrange icons of open or closed windows.

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- **Fig. 3-9. Help**



- **Definition:**

Index	Offer an index of topics.
Search	An index for you to find help topics.
Using Help	Provide a general instruction of using help.
About Arb	Display the application version number.

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3-3.Toolbar

Toolbar is a list of functions for every command which use more often. You can choose whether to display or not the Toolbar through [View] command.

 : New Command (File)

 : Open Command (File)

 : Save Command (File)

 : Cut out Command (Edit)

 : Copy Command (Edit)

 : Paste Command (Edit)

 : Print Command (File)

 : About Arb (Help)

 : Zoom In (View)

 : Zoom Out (View)

 : Move Up (View)

 : Move Down (View)

 : Move Left (View)

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 : Move Right (View)

 : Cursor (Edit)

 : Pen (Edit)

 : Line (Edit)

 : Sine (Waveform)

 : Triangle (Waveform)

 : Square (Waveform)

 : Ramp (Waveform)

 : Sinc (Waveform)

 : Exp. Rise (Waveform)

 : Exp. Fall (Waveform)

 : Noise (Waveform)

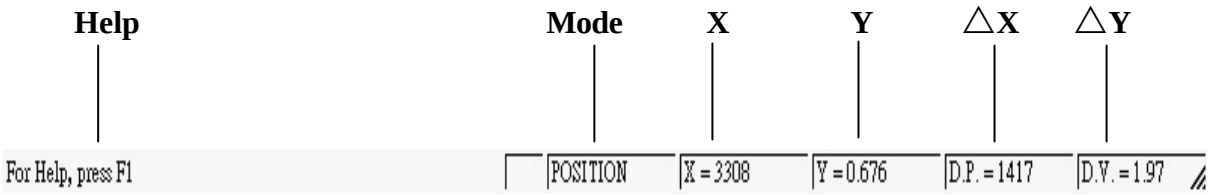
 : DC (Waveform)

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3.4 Status Bar

The Status Bar indicates the working status. You can set to let the bar appear on the screen through [View] command.

- **Status Bar**



- **Definition:**

Help	Clarify the function to the command pointed by the cursor.
Mode: Position:	Indicate the current working status is at the Cursor mode.
Draw:	Indicate the current working status is at the Pen mode.
Line:	Indicate the current working status is at the Line mode.
X	Indicate the current coordinate value is at X axis.
Y	Indicate the current coordinate value is at Y axis.
△X	Indicate the related position of X axis for the specific range is $\triangle X = X_2 - X_1$.
△Y	Indicate the related position of axis for the specific range is $\triangle Y = Y_2 - Y_1$.

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3.5 Cursor

When editing the waveform on the workspace, where would be appeared a pink cross cursor which decides the position for inserting the standard waveform.

You can click any position of the waveform to get the cursor appeared over there, then insert desired standard waveform to have it showed up behind the cursor, refer to example 3 of 4-3.

If you want to change the coordinate of cursor, you must select cursor function by using [EDIT/CURSOR] command.

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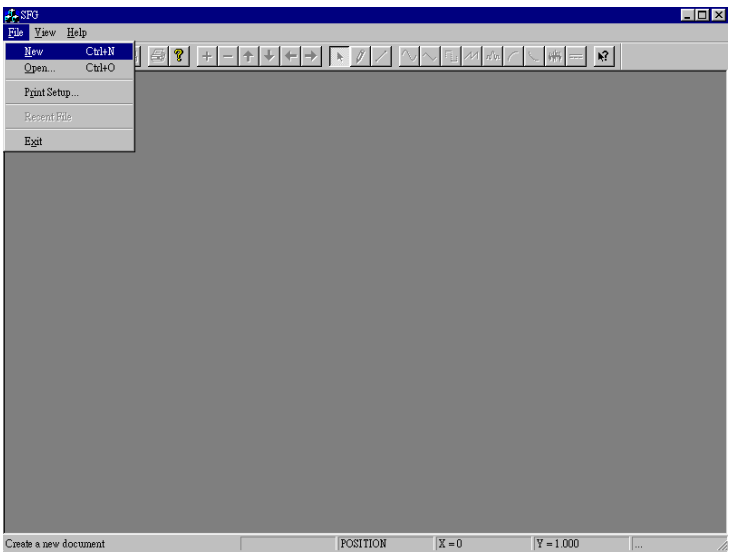
4. EXAMPLES

In this section, we exhibit three examples of how to edit the waveform for your reference. You can follow the procedure according to the steps as follows:

4.1 Example 1: To generate a PSK signal.

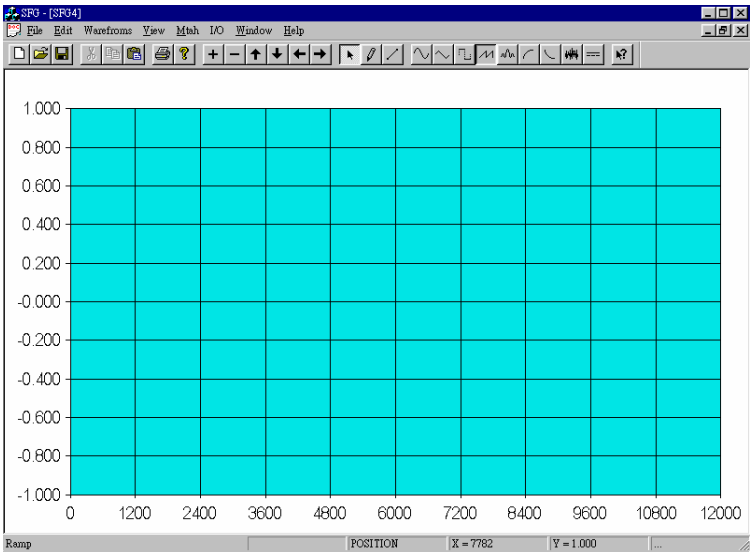
Step 1

- **Fig. 4-1: Select [File/New] to start a new waveform file.**



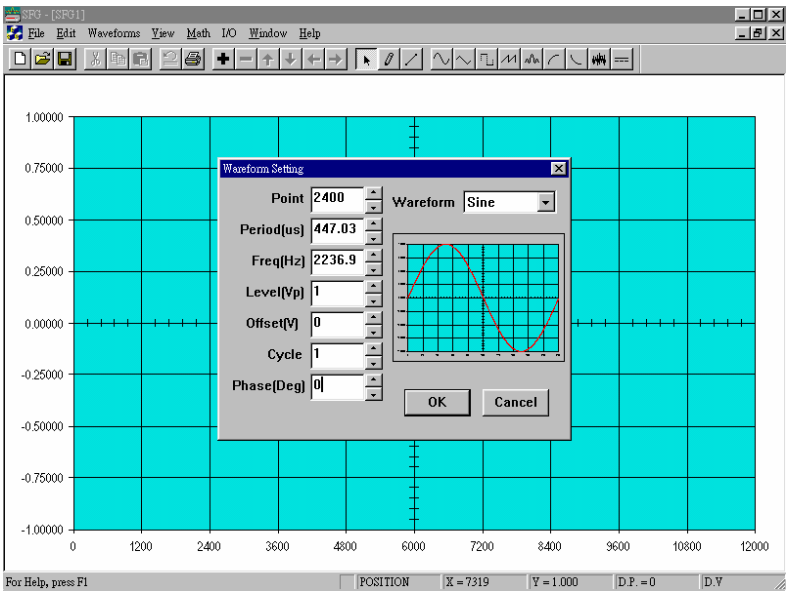
- **Fig. 4-2: After [File/New] being selected, a clear workspace will appear as shown below?**

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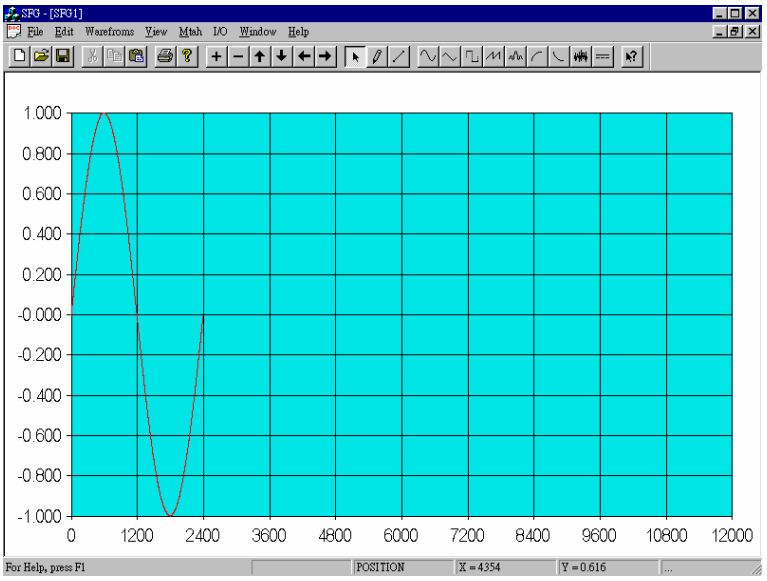
Step 2

- **Fig. 4-3: Select the [Waveform/Sine] and set the point at 2400.**



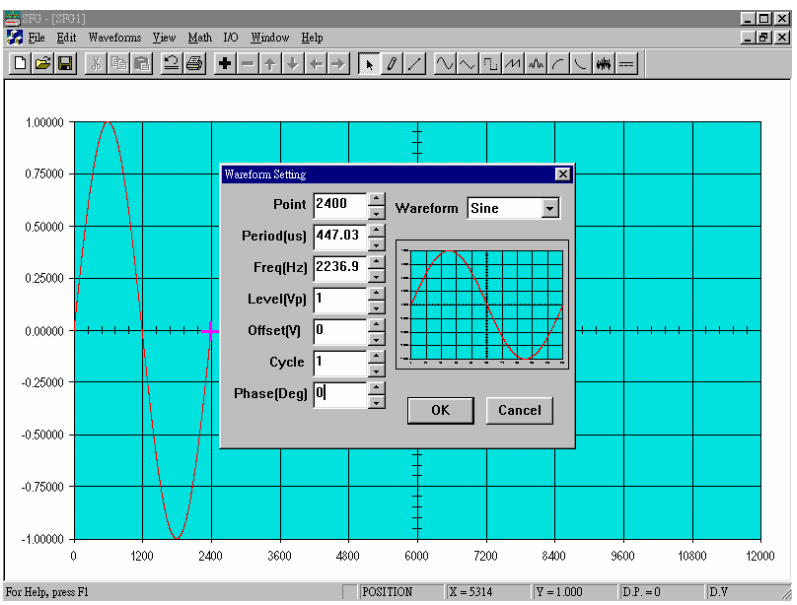
- **Fig. 4-4: A Sine waveform of 2400 points appears as shown below:**

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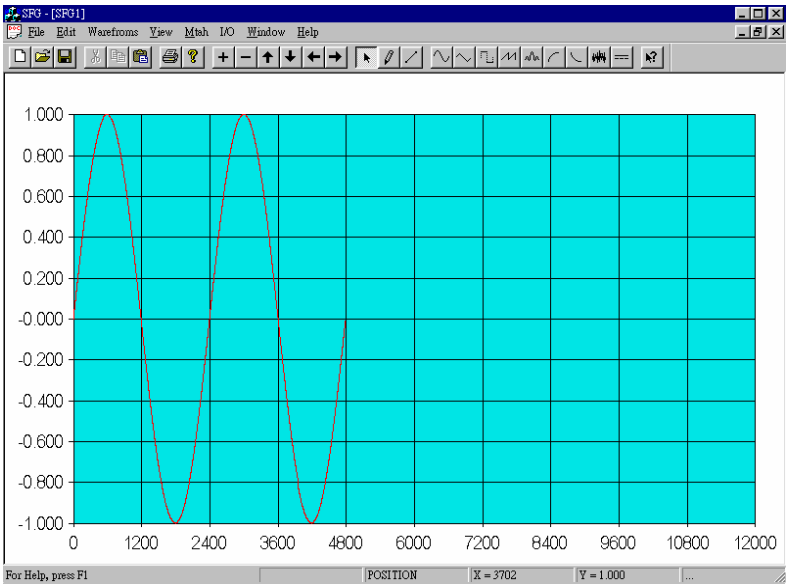
Step 3

- **Fig. 4-5: Repeat Step 2 to generate another 2400 points Sine waveform.**



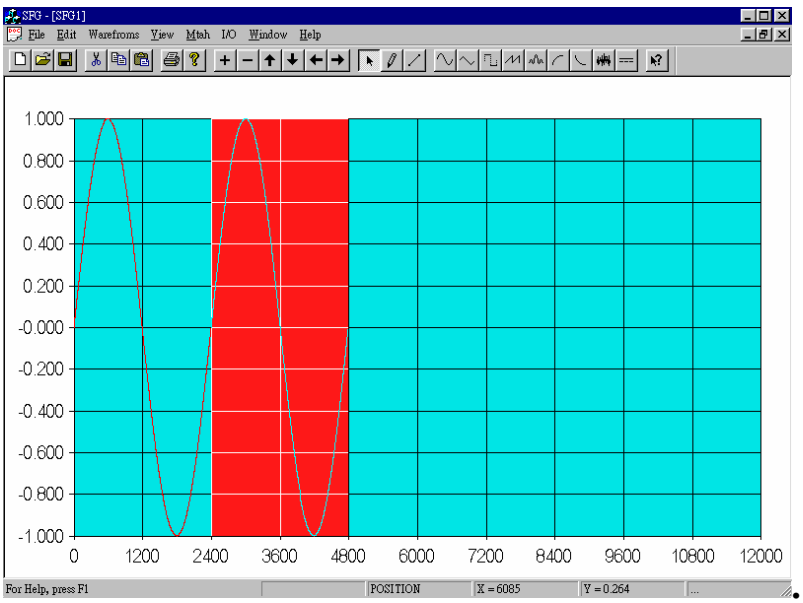
- **Fig. 4-6: Two cycle of Sine waveform appears:**

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Step 4

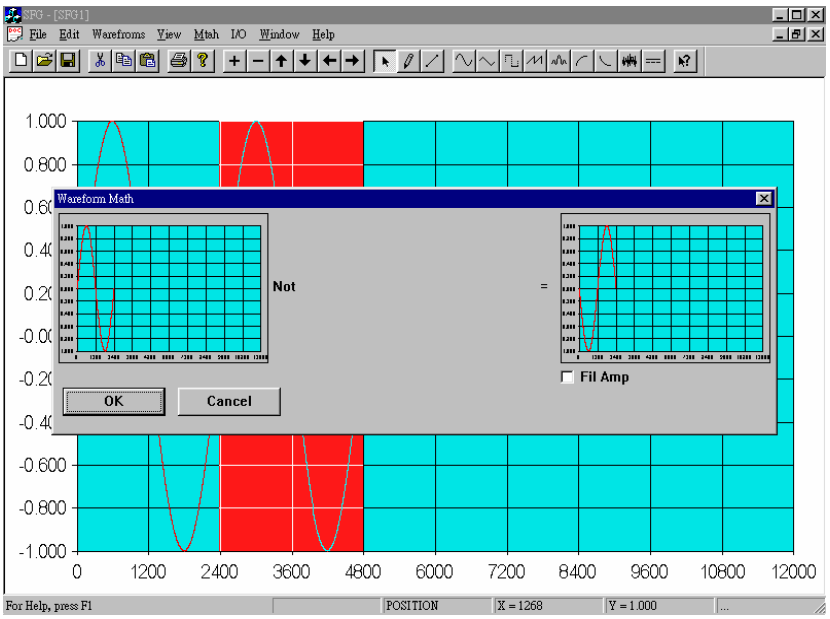
- **Fig. 4-7: Mark the range from point 2400 to point 4800.**



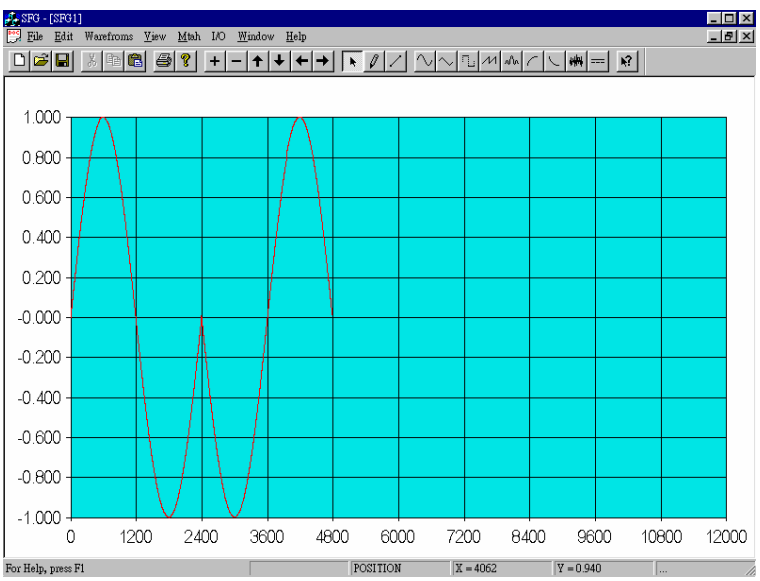
Step 5

- **Fig. 4-8: Select the [Math/Invert] function.**

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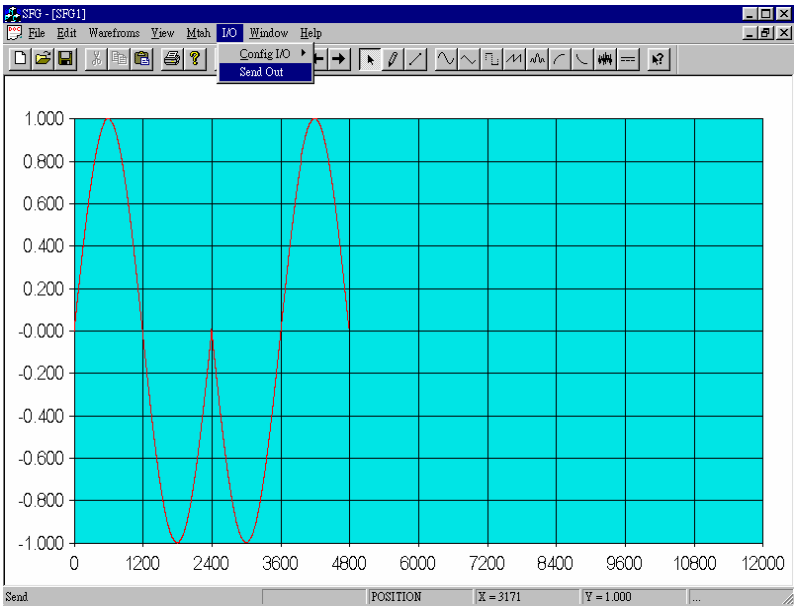
- **Fig. 4-9: PSK signal appears as shown below:**



Step 6

- **Fig. 4-10: Select [I/O / Send out] or [File/Save as] function.**

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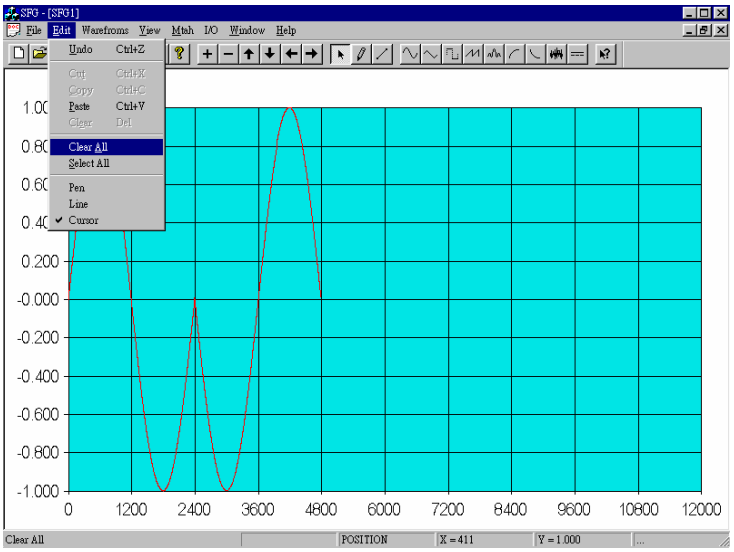
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4.2 Example 2: PSK signal II

There provide an alternative method to produce the same PSK signal with the function of mathematical operation. Please follow the procedure as below:

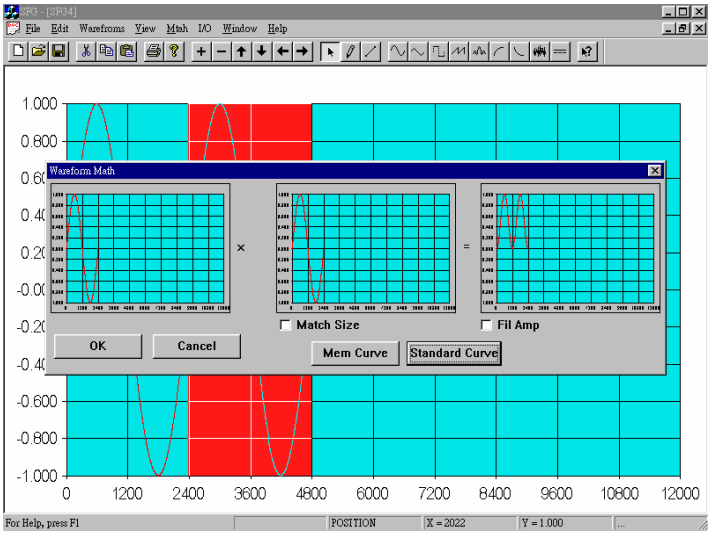
Step 1

- **Fig. 4-11: Select [Edit/Clear All] to clear the workspace.**



Step 2

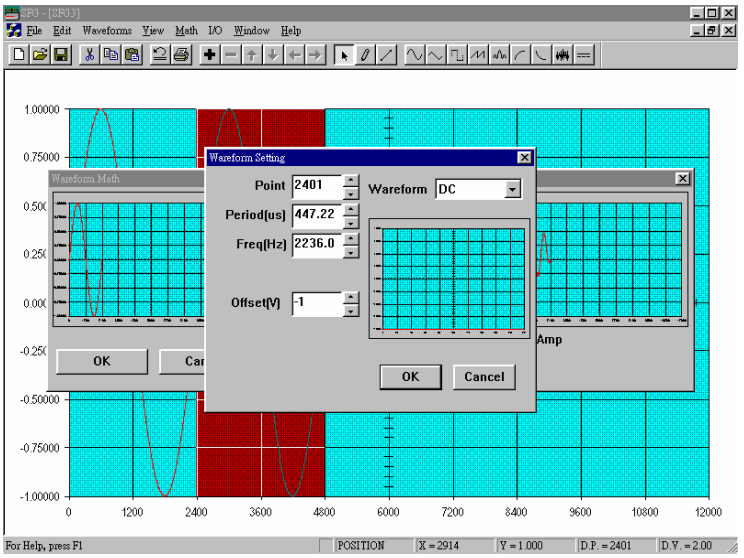
- **Fig. 4-12: Repeat the procedure from Step 2 to Step 5 of Example 1, but replace the selection of [Math/Invert] by [Math/Multiply], then press [Standard Curve].**



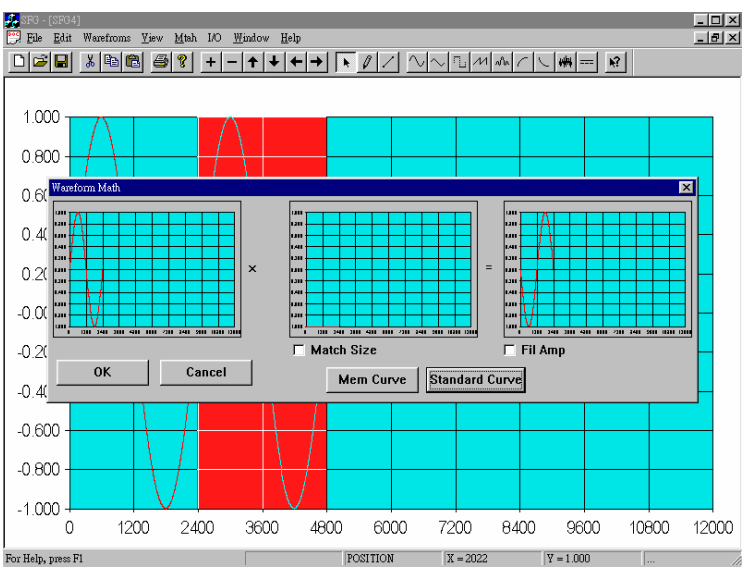
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Step 3

- **Fig. 4-13: Select DC waveform and set the offset value at –1.**

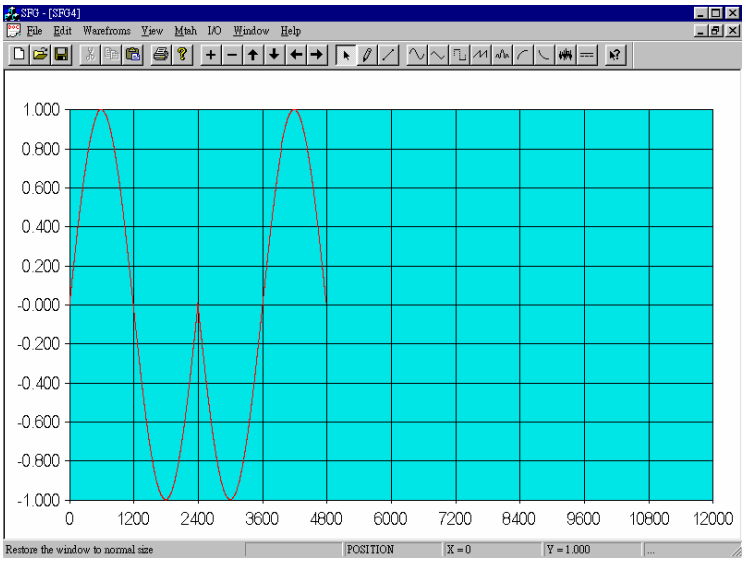


- **Fig. 4-14: The inverse phase appears after multiplying –1, then press OK.**



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● **Fig. 4-15: The same waveform as Example 1 has been produced and saved.**



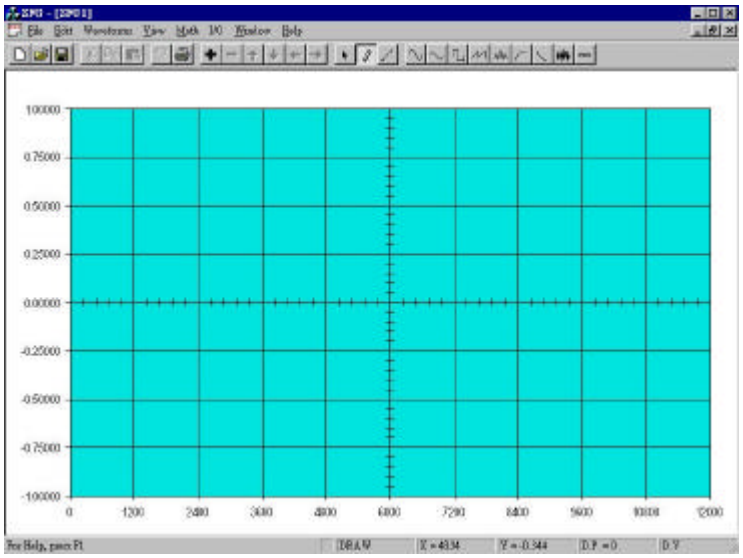
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4.3 Example 3: Manual editing with Pen and Line

This example is going to exhibit how to use the pen and line to make manual editing waveform.

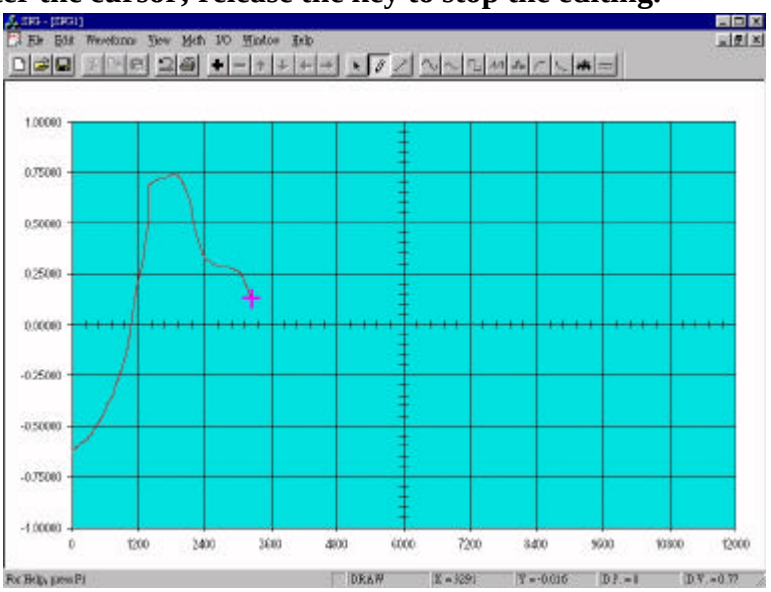
Step 1

- **Fig. 4-16: Clear the workspace and select Pen Icon from Toolbar.**



Step 2

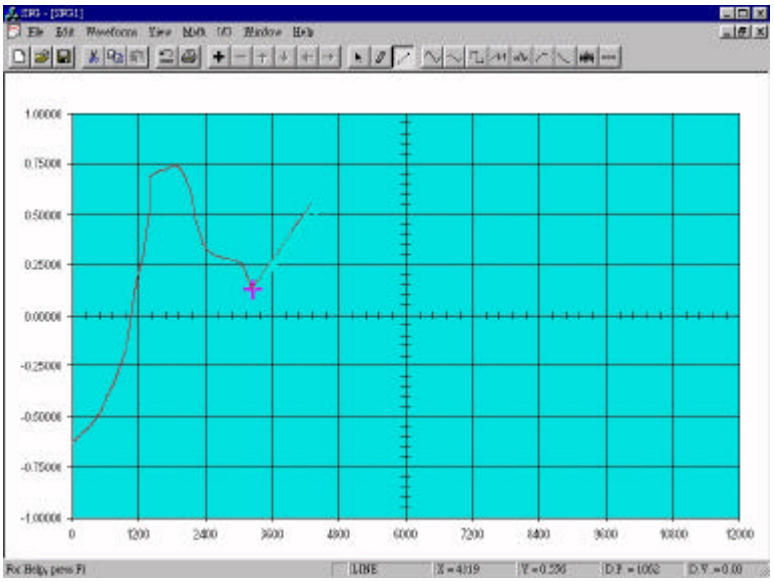
- **Fig. 4-17: Repress the left key of mouse to move the cursor, the picture will follow after the cursor; release the key to stop the editing.**



Step 3

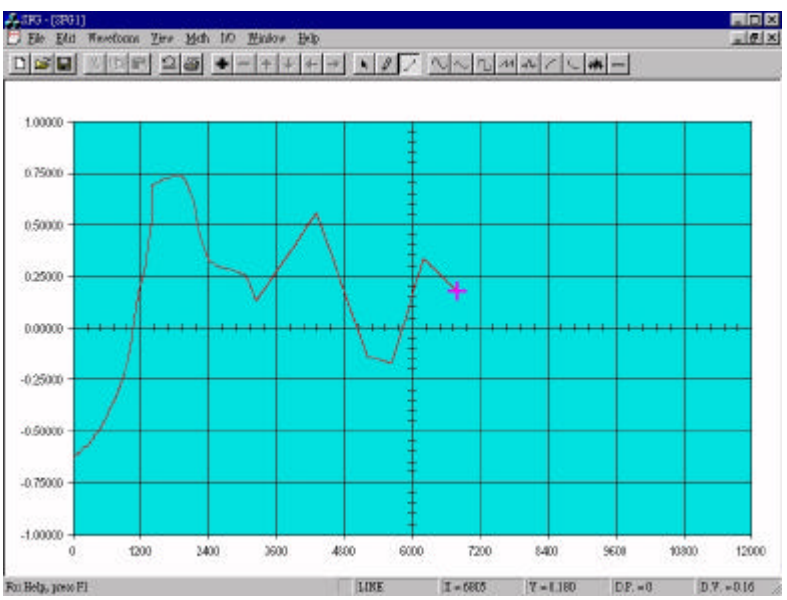
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- **Fig. 4-18: Select the Line icon to produce a piecewise waveform. Click the left key of mouse once at the starting point, the line will follow after the cursor to the end of line.**



Step 4

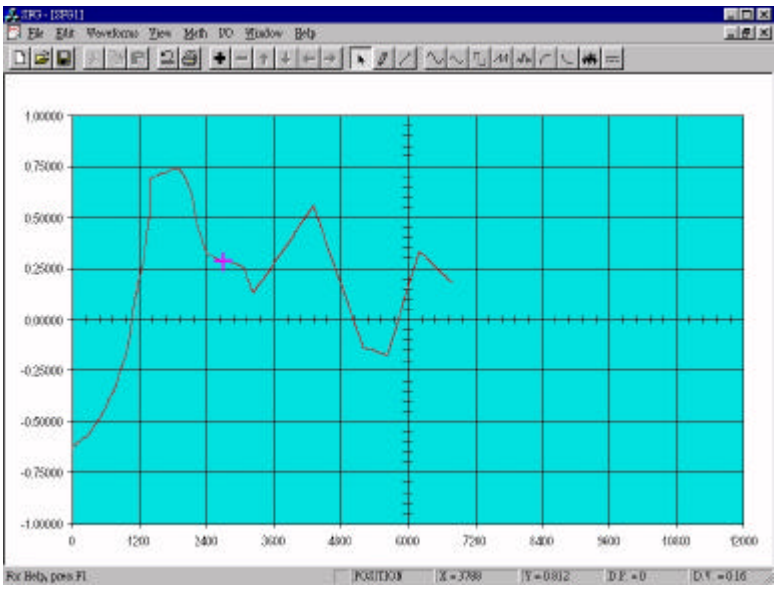
- **Fig. 4-19: Click the left key once again at the end of line to finish this segment, and start another new line or click the right key to escape the editing line; or click twice the left key to finish the whole line operation.**



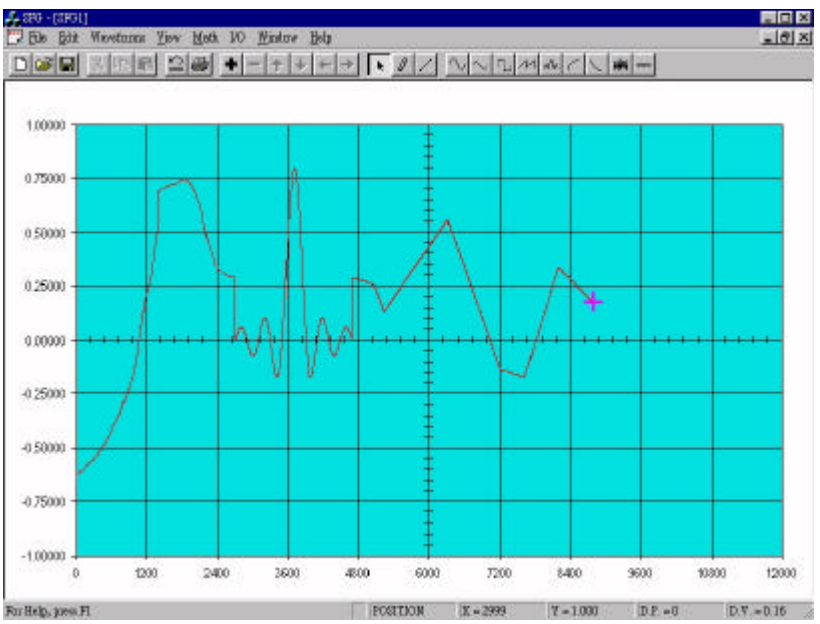
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Step 5

- **Fig. 4-20: You can insert the standard waveform in the specific position. First select the CURSOR icon, and click the left key to specify the position.**



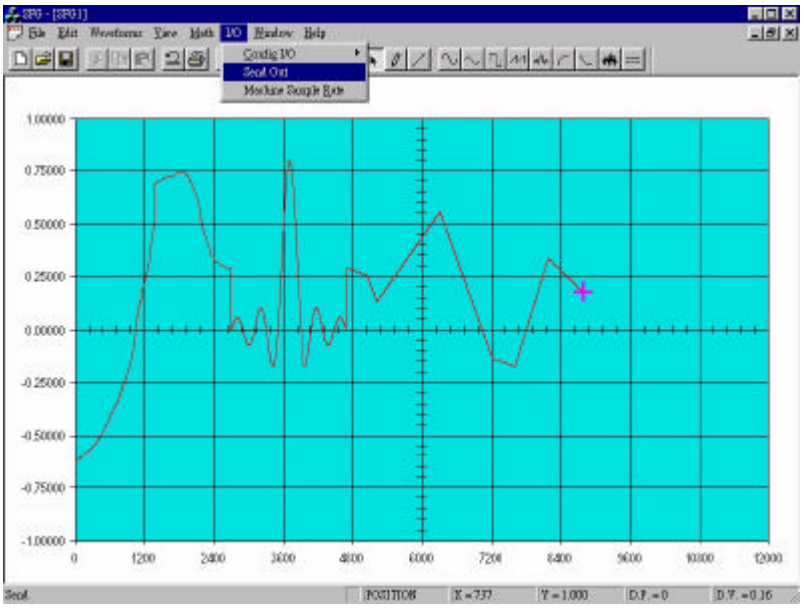
- **Fig. 4-21: Insert a standard waveform, like sinc signal with level of 0.8, and so on.**



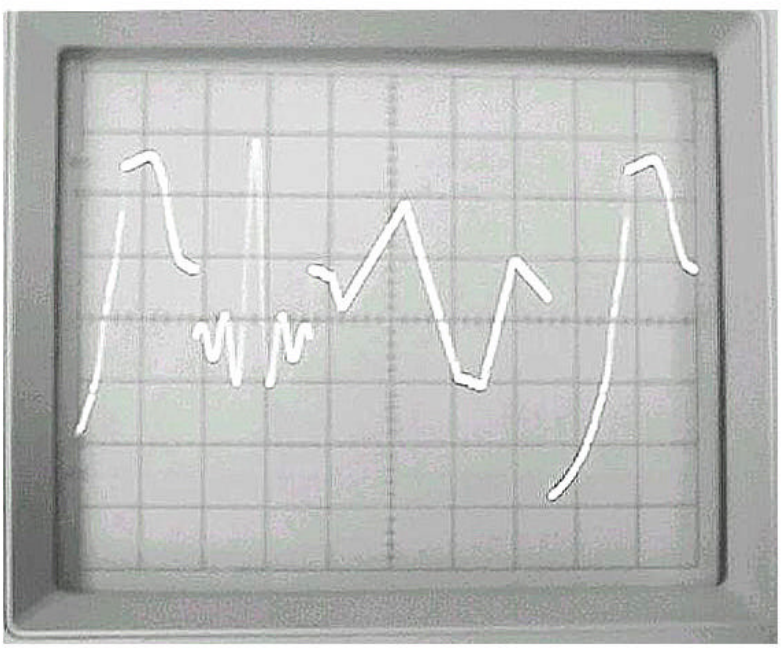
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Step 6

- **Fig. 4-22: Send out the waveform by selecting [I/O], [Send Out] to transfer the waveform to SFG830.**



- **Fig. 4-23: The practical waveform appeared on the scope shown as below.**



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