Tutorials

About the Tutorials

This chapter consists of seven tutorials. You have selected the one that is highlighted in red:

- Tutorial 1 - Fundamentals

- Tutorial 2 - Working with Channels

- Tutorial 3 - Triggering

- Tutorial 4 - Working with Special Modes

- Tutorial 5 - Working with Subchannels

- Tutorial 6 - Arbitrary Waveform Generator

- Tutorial 7 - Using the Graphical Waveform Editor

Each section is a self-contained tutorial. If you are new to GageScope®, it is recommended that you do the tutorials in the order they are presented, as each section assumes you have gone through the previous material.

Tutorial 6: Arbitrary Waveform Generator

GageScope® has the unique ability to connect to Arbitrary Waveform Generators (CompuGen cards) sold by Gage Applied Technologies Inc. The primary step in achieving this connectivity is to create a rich set of waveforms within the GageScope® software. The waveforms created in GageScope® can then be uploaded to an appropriate CompuGen card.

There are three different ways to create arbitrary waveforms from within GageScope®:

- Equation

- Predefined

- Standard Waveforms

In this tutorial, we will go through the unique features of each of the methods outlined above. It is assumed that you have launched GageScope® prior to starting this tutorial.
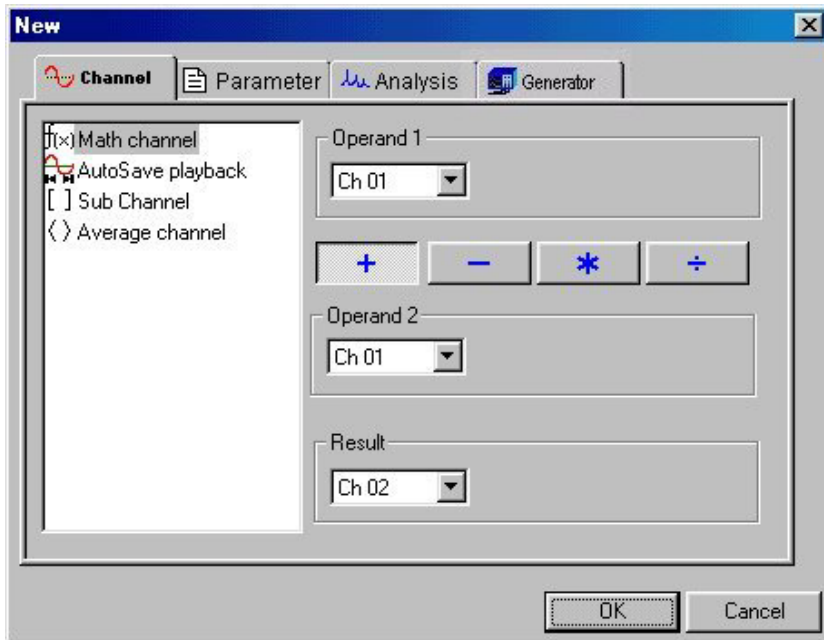
Waveform Generation using Equation as an input

1   Click **File** menu from the menu bar.
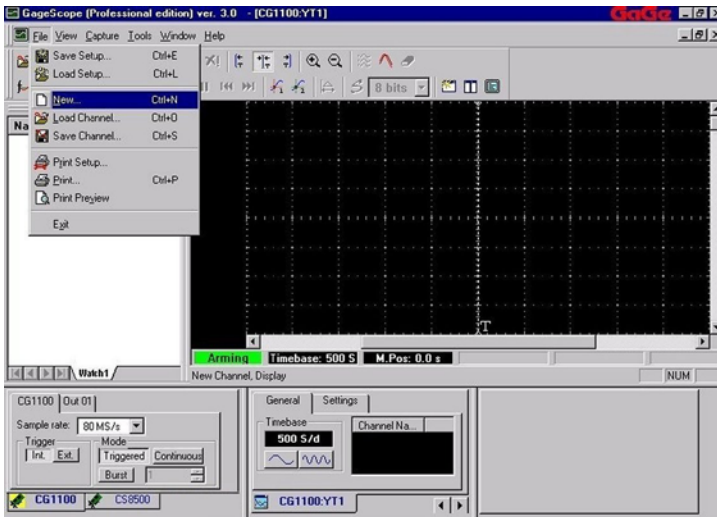
It can be clearly observed that the Channel Control at the bottom right hand of the GageScope® screen is blank. This is due to the fact that no channel is currently active.

**2**   Select **New** from the drop down menu. You will see the following window:

3 Click on the **Generator** tab. You will notice that the Equation text is highlighted as a default.
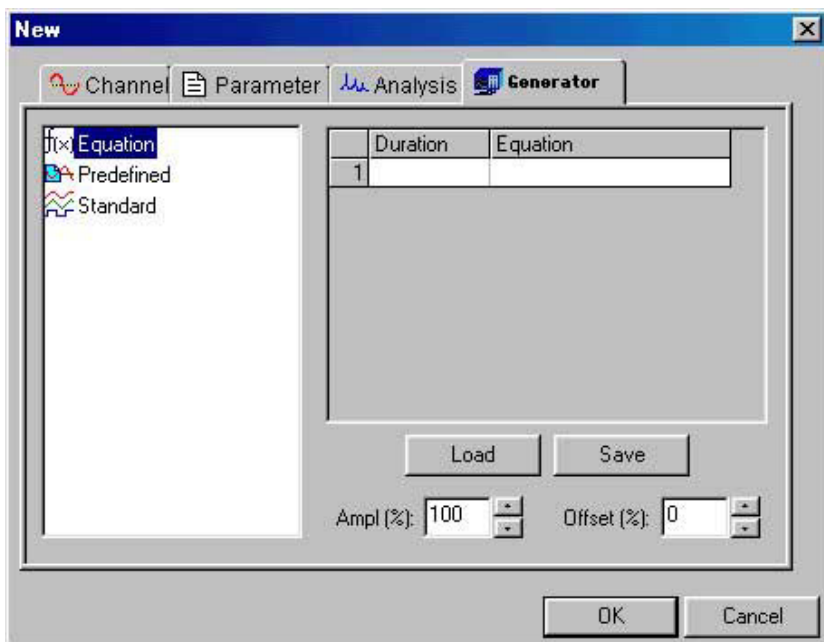
Using controls in window shown above, users can type in an equation to generate a specific signal.

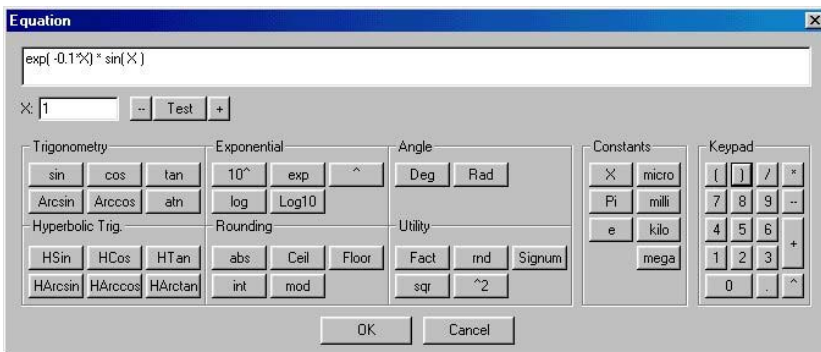4   Click inside the text box under the label **Equation**, brings up the Equation editor dialog box as shown below:
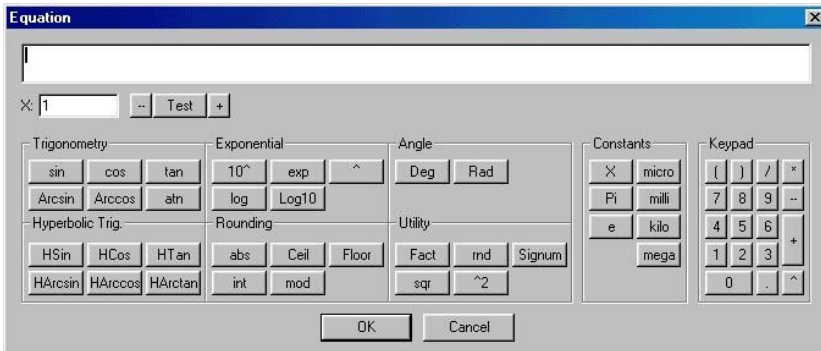
There is an entire range of functions provided here. See the **Reference** Section of this manual for a complete listing of these functions.

We will attempt to create a simple equation at this stage. Later on we will show that more complex signals can be created using controls provided in the Equation editor dialog box above.

5   Let us now create the equation for generating a constant frequency sine wave.

Type **Exp[-0.1*X] * Sin[X]** in the text box either using keyboard or the buttons provided in Equation Editor dialog box. After entering the complete equation,
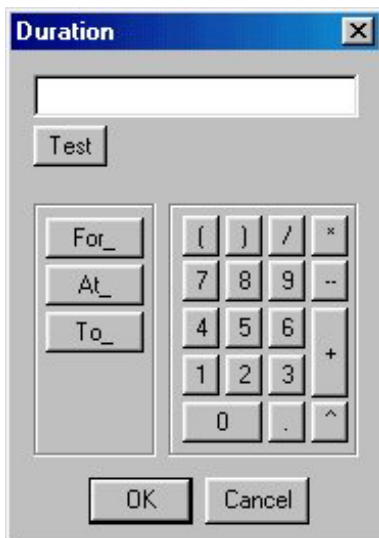

Click **OK**.

6   **New** dialog box appears again. Notice that the equation typed in the previous step, is shown in the text box beneath the **Equation** label.
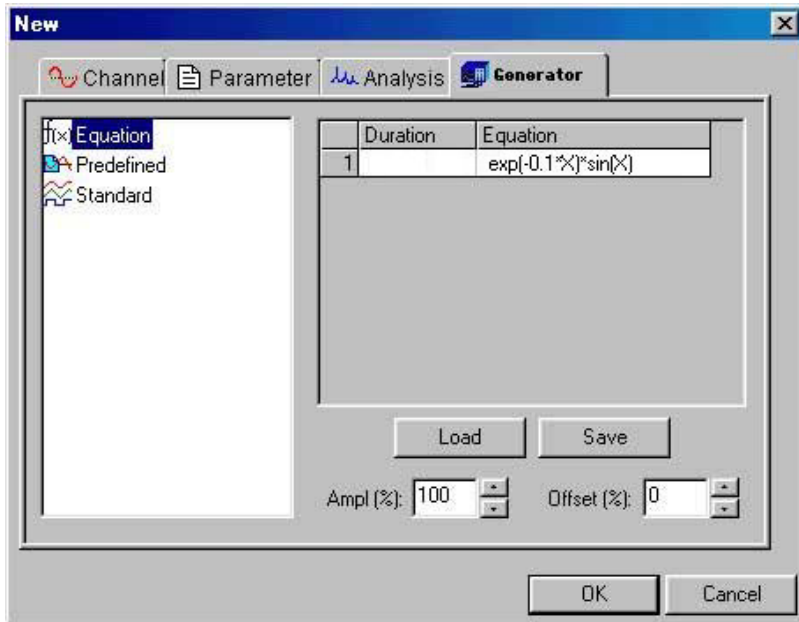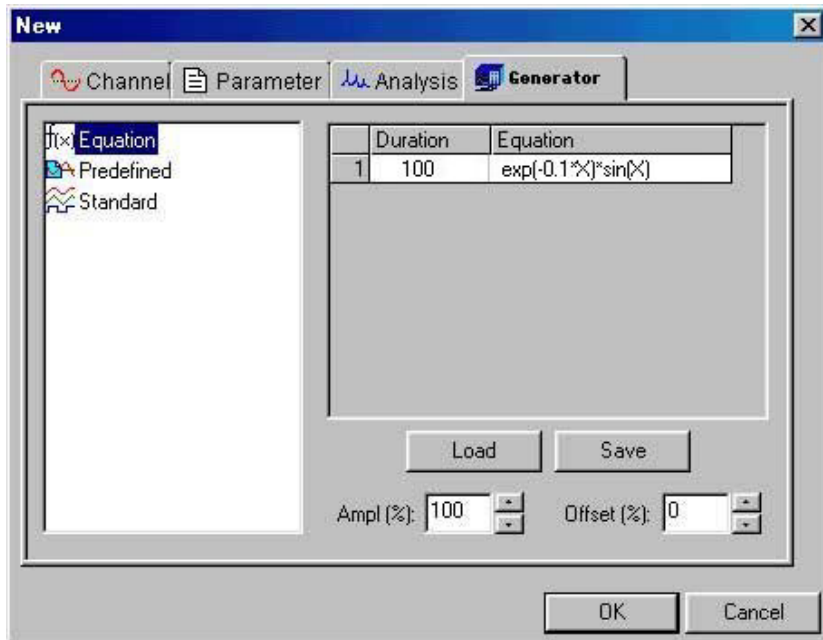
7 Click inside the text box on the left of the typed equation. This is the text box right under the **Duration** label.

Type in 100 in the text box. These are the total number of samples for the waveform. Click **OK**.
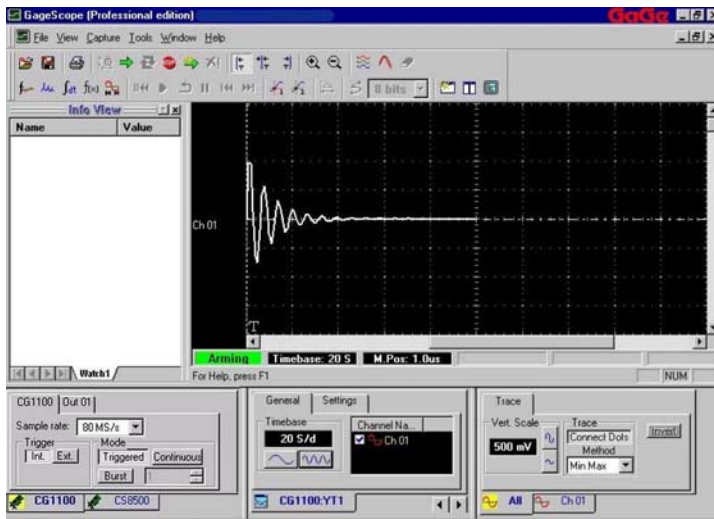
8 The New dialog box appears, showing the duration to be 100 samples.
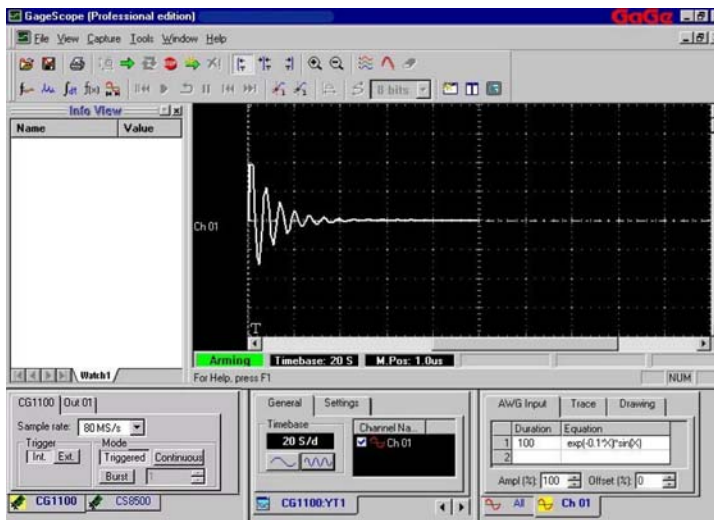

Click **OK**.

9   Damped sinusoid will be displayed in GageScope® as follows:

This signal can be saved as a sig file to be uploaded to an AWG.

10   Click on **Ch 01** tab located in the bottom of Channel Control display. You will notice that **AWG Input** tab appears in the Channel Control as shown below:
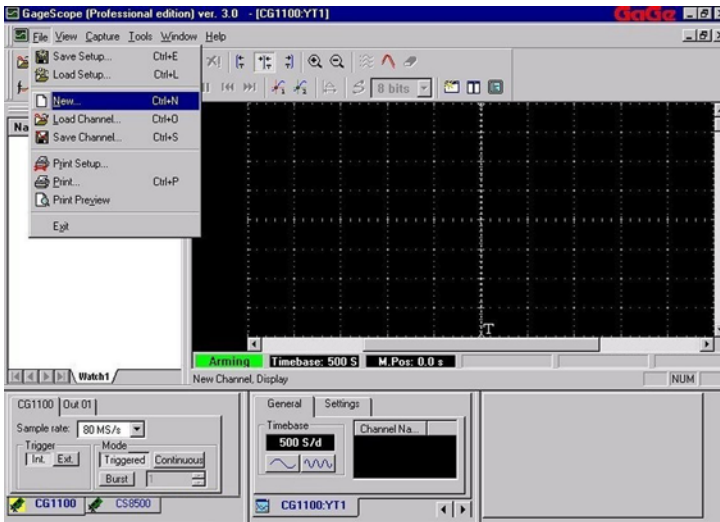

The parameters can be modified using controls in the channel control above.
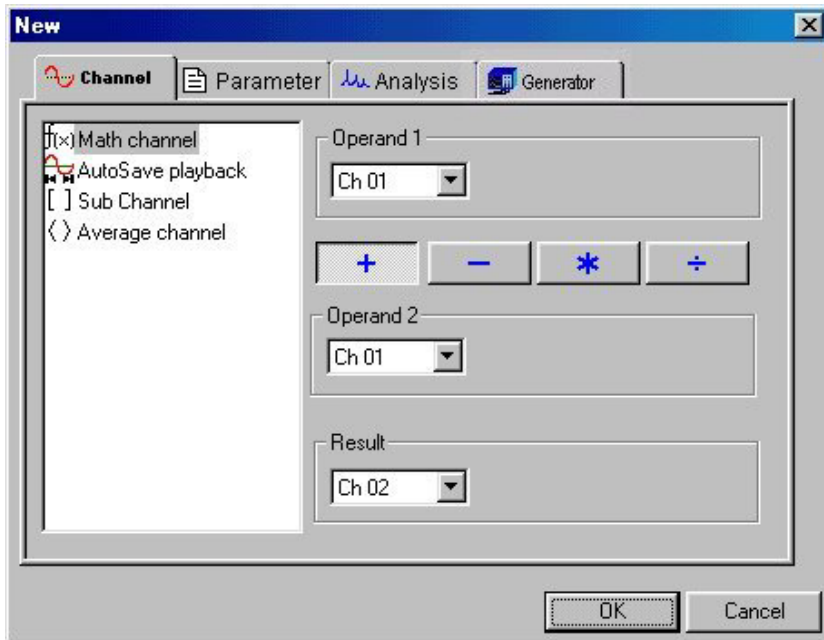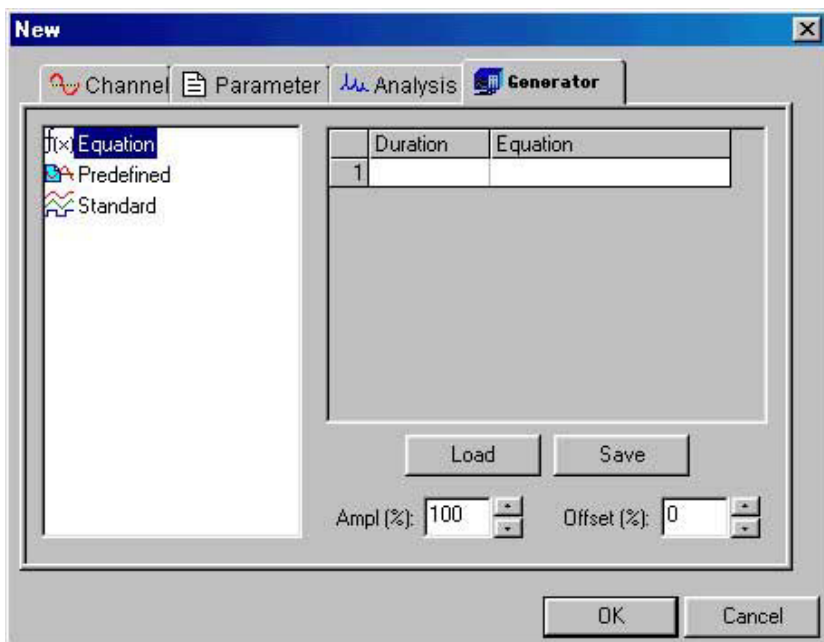
Predefined Waveforms

1   Click **File** menu from the menu bar.

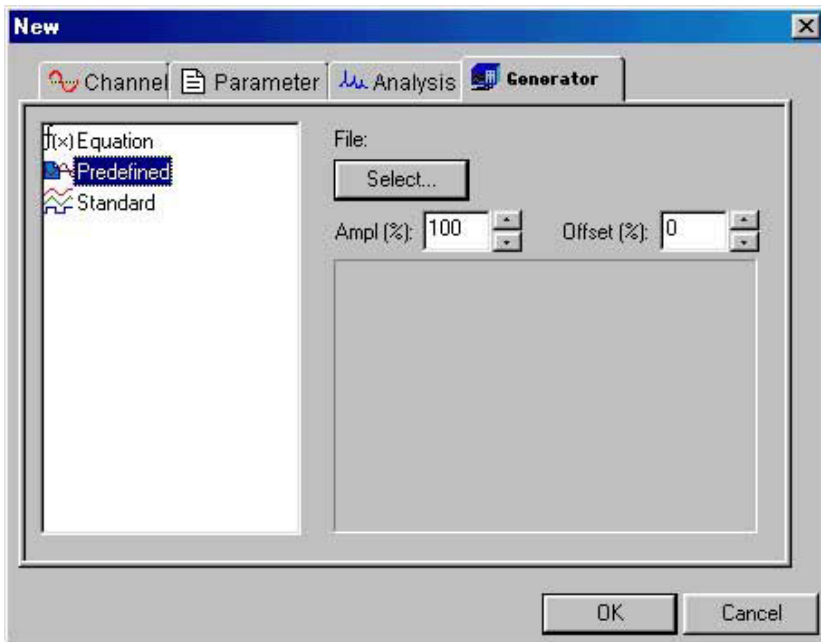2   Select **New** from the drop down menu. You will see the following window:

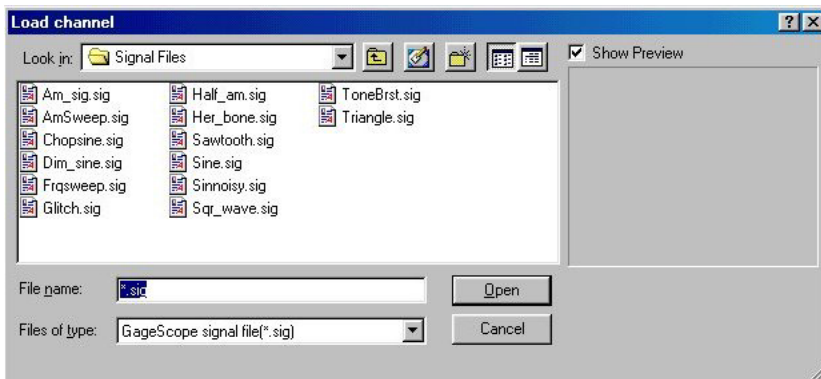**3** Click on the **Generator** tab. You will notice that the Equation text is highlighted as a default.

Using controls in window shown above, users can enter an equation to generate a specific signal.
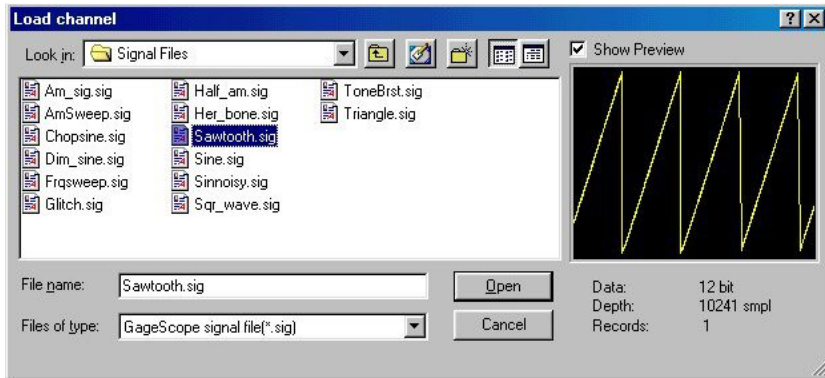
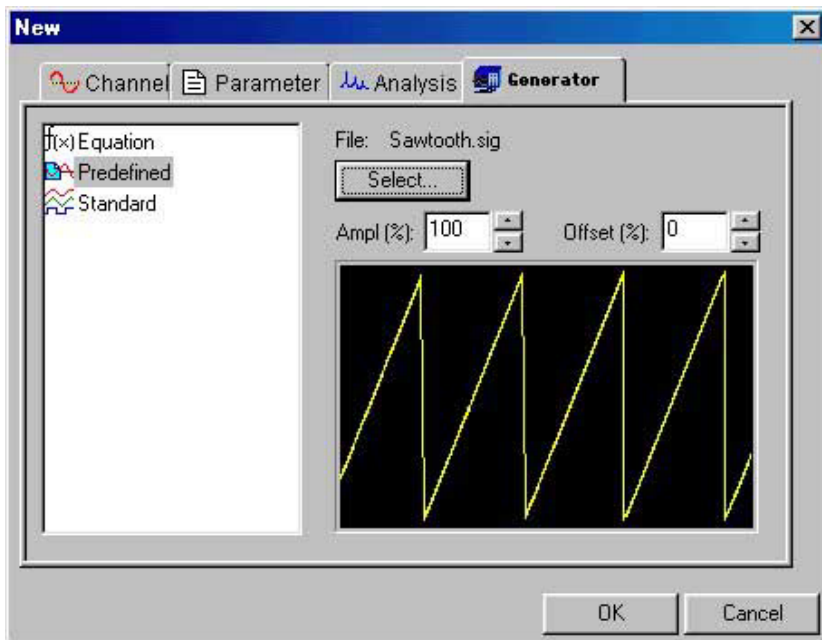4   Click **Predefined** from the list in the dialog box. Click **OK**.

5   Click **Select**. You will see the **Load Channel** window as follows:

6   The dialog box shows that there are several types of signals stored for use. Click on **Sawtooth.sig**. The signal appears in the Preview window.
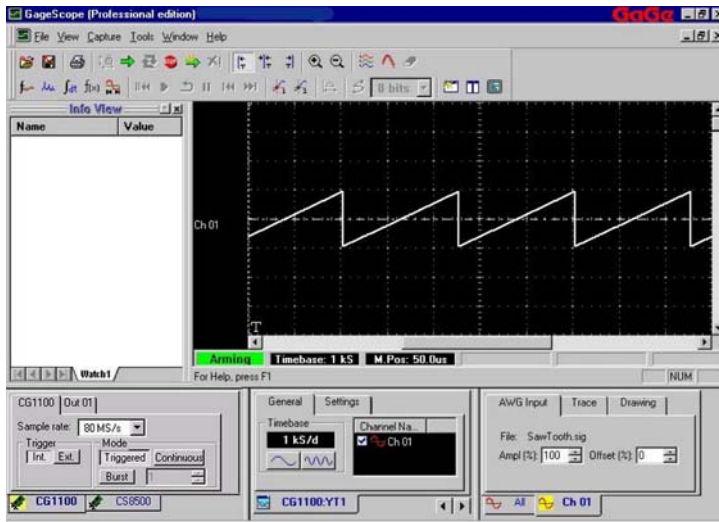
7 Click **Open**. The predefined signal appears in the New window as a Preview.

8 To load the Sawtooth signal file in GageScope, click **OK**. If you do not wish to load the signal at this point, click **Cancel**.
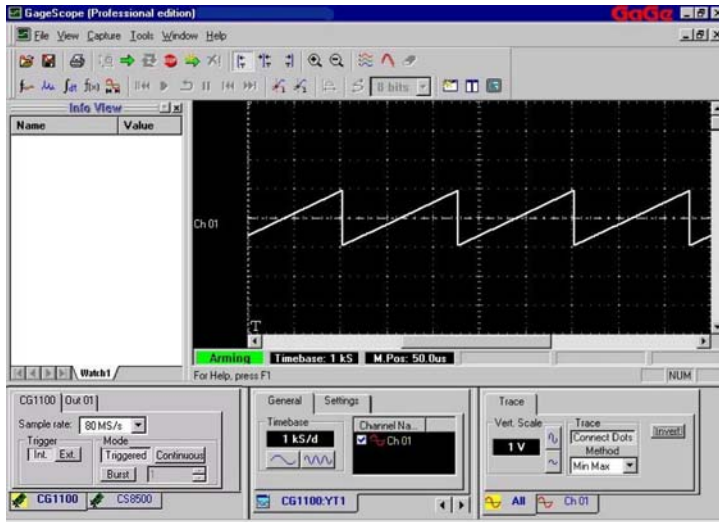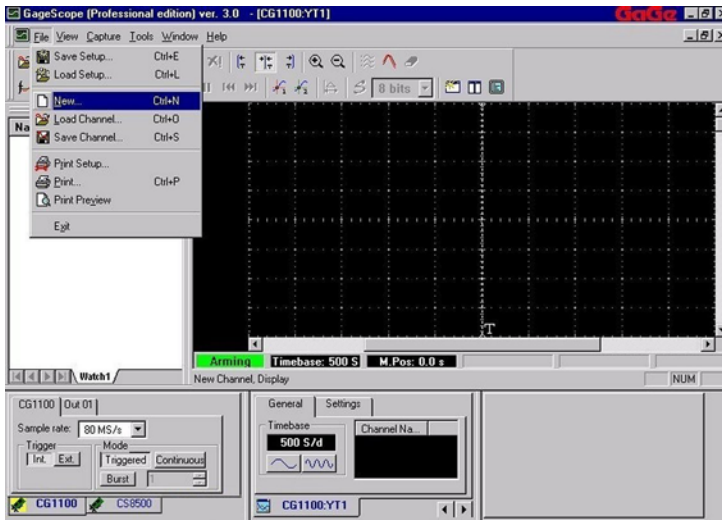
9 Clicking **Ch 01** tab in the channel control, brings up the **AWG Input** tab at the top of the control. Click **AWG Input** tab to view the associated property page as follows:
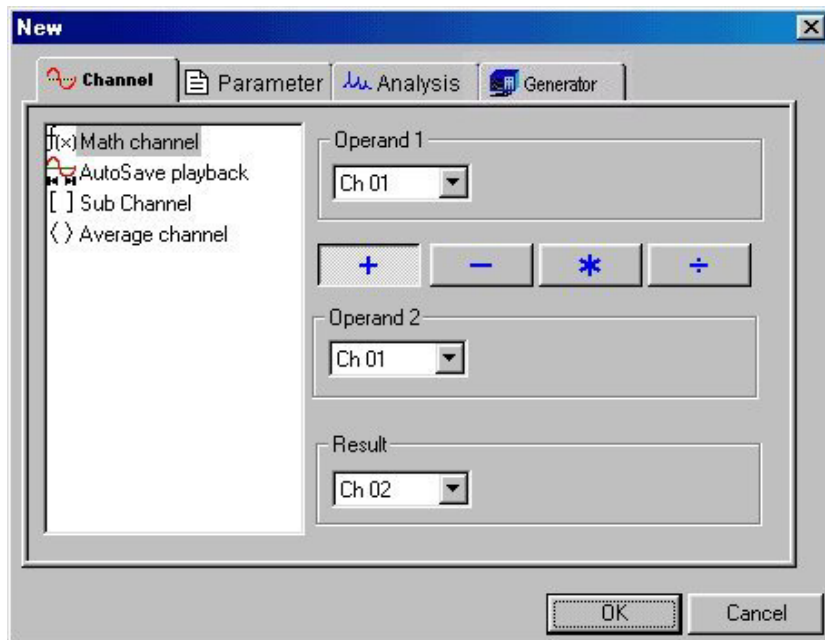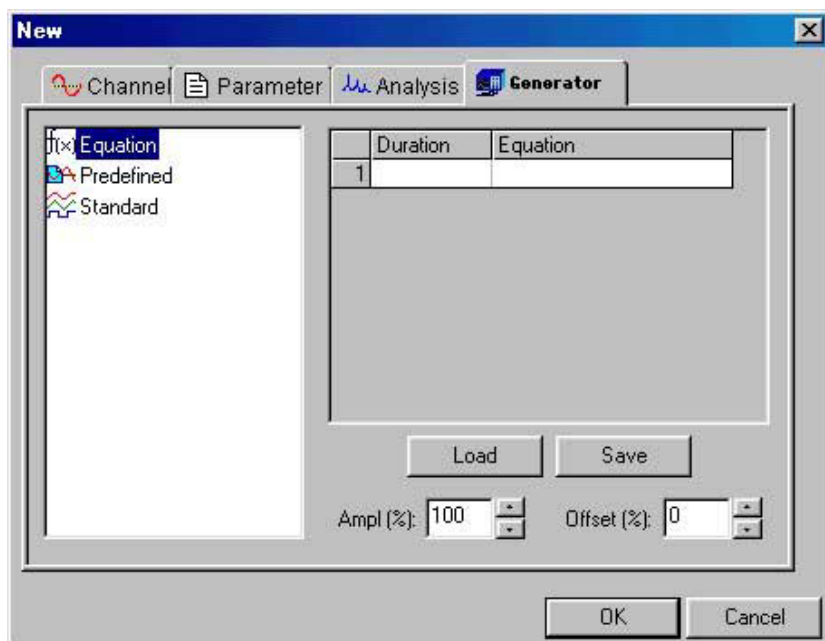
Standard Waveform Generation

1 Click **File** menu from the menu bar.

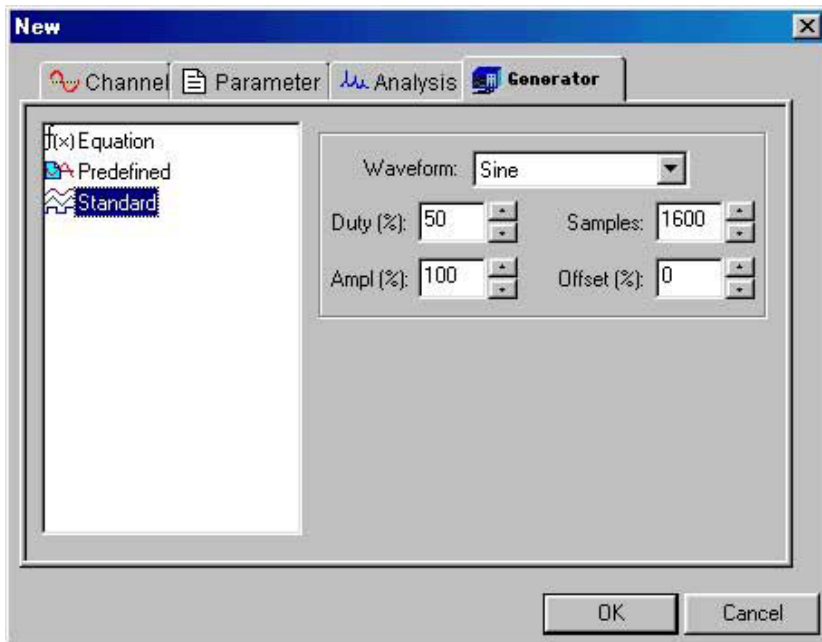**2** Select **New** from the drop down menu. You will see the following window:

3 Click on the **Generator** tab. You will notice that the Equation text is highlighted as a default.

Using controls in window shown above, users can specify an equation to generate a specific signal.

**4**   Click **Standard** from the list in the dialog box. Click **OK**.

5   One can observe that the Sine waveform is the default selection. Click on the scroll down arrow in the Waveform text box. You will find out that there are three different types of standard waveforms available for selection. These are **Sine**, **Square**, and **Triangle** as shown below:
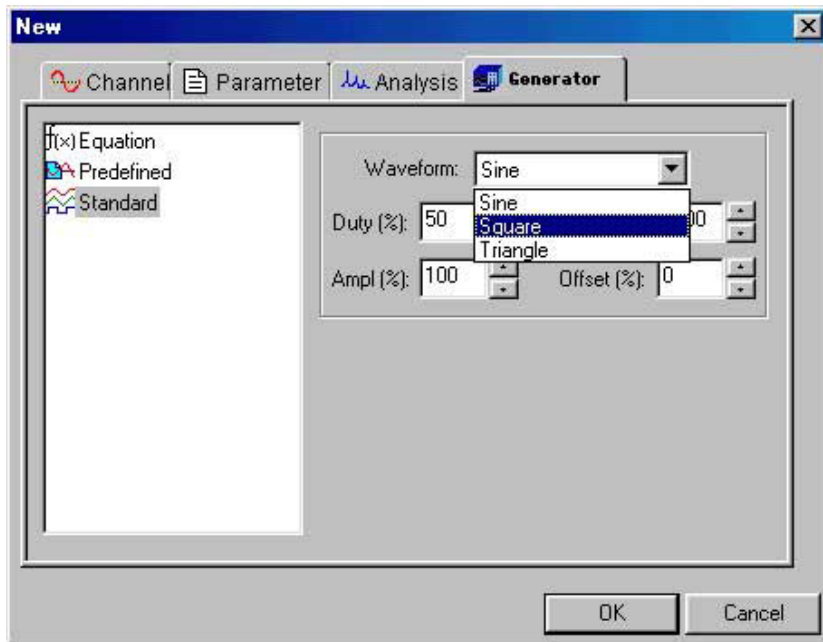
6   Select **Square** from the drop down list. Click **OK**.
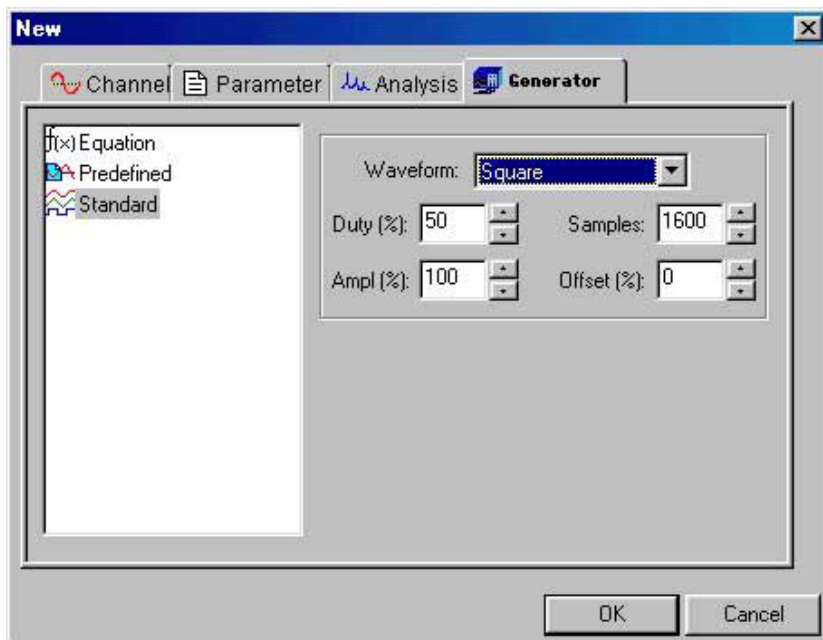

The resulting window shows the default settings for input parameters: **Duty**, **Samples**,

Amplitude and **Offset**. Users can choose to change these parameters depending on their particular application.

In the current setting, a single cycle of a Square wave will be generated with 50% duty cycle. The total number of samples within one cycle of this wave will be 1600. The amplitude of the wave is 100% referenced to the input range selected. There will be no DC Offset.

7   Click **OK**. A single cycle Square wave will be displayed in GageScope®:
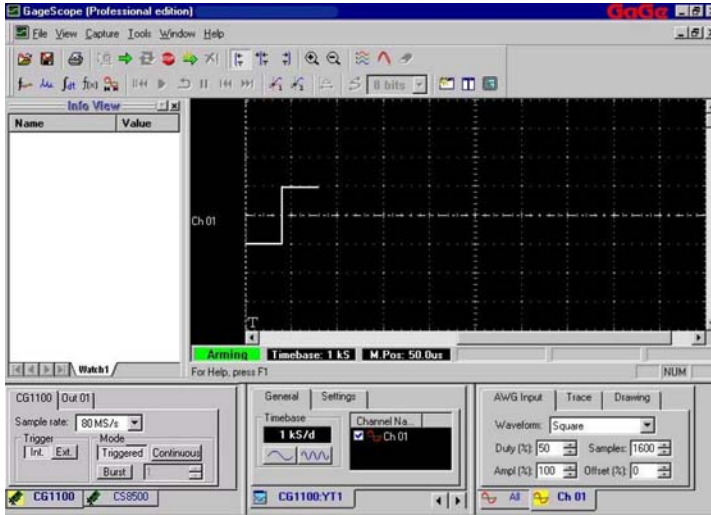
Note that Channel 1 displays the generated Square wave. The AWG Input tab has been selected and consequently the AWG property page appears in the bottom right hand corner of GageScope® display.

Refer to the Reference section of this manual on further details for arbitrary waveform generation.