



九齊科技股份有限公司  
Nyquest Technology Co., Ltd.

User Manual

# Quick-IO

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## Easy I/O Output Signal Programmer

**Version 4.2**

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## 1 Introduction

*Quick-IO* is a graphic-interface IC developing tool, which saves programmers from wasting time on complex I/O control by intuitive graphic settings. It not only offers a simple graphic interface, but also brings the convenience of efficient programming on sophisticated I/O actions.

### Contents:

- [1.1 What is \*Quick-IO\*](#)
- [1.2 Getting Started](#)
- [1.3 The Main Interface of \*Quick-IO\*](#)

### 1.1 What is *Quick-IO*

*Quick-IO* is Nyquest's graphic-interface IC developing software, which users could draw complex voice-synchronizing output signal with its simple tools. Files made by *Quick-IO* could be applied to NY2, NY3, NY4, and NY5 series, besides its signals could be exported as independent files for further use.

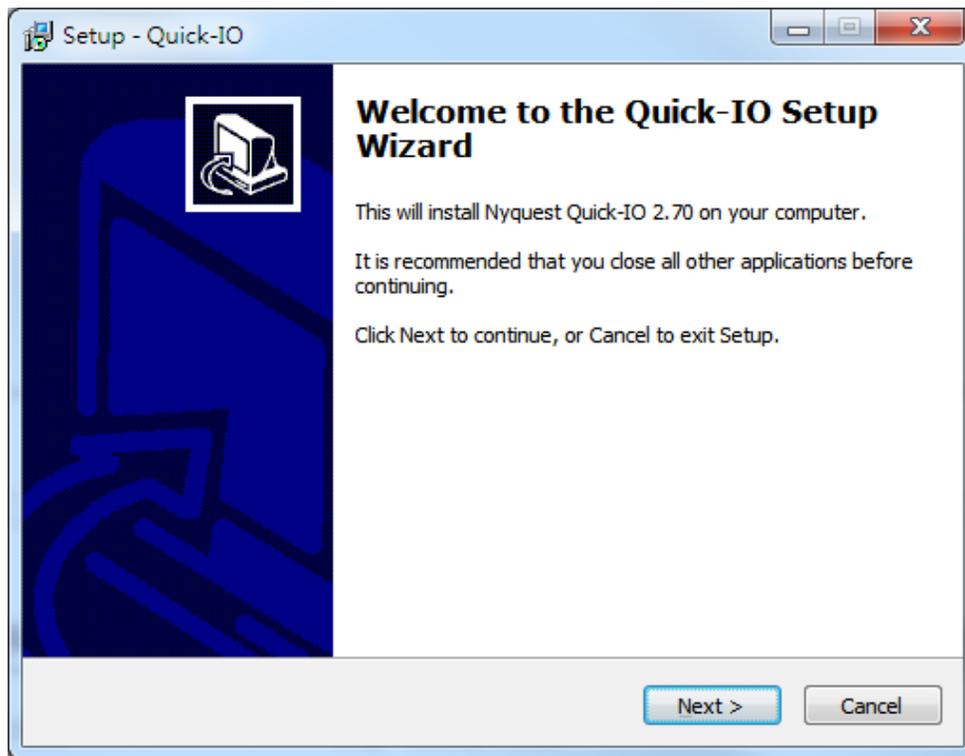
### 1.2 Getting Started

Please contact Nyquest Technology to acquire the updated *Quick-IO* program. To install *Quick-IO*, unzip the **.zip** file to a specific folder and then double-click on the **.exe** file in the folder to start the installation. Follow the instructions of the installation wizard to complete installation.

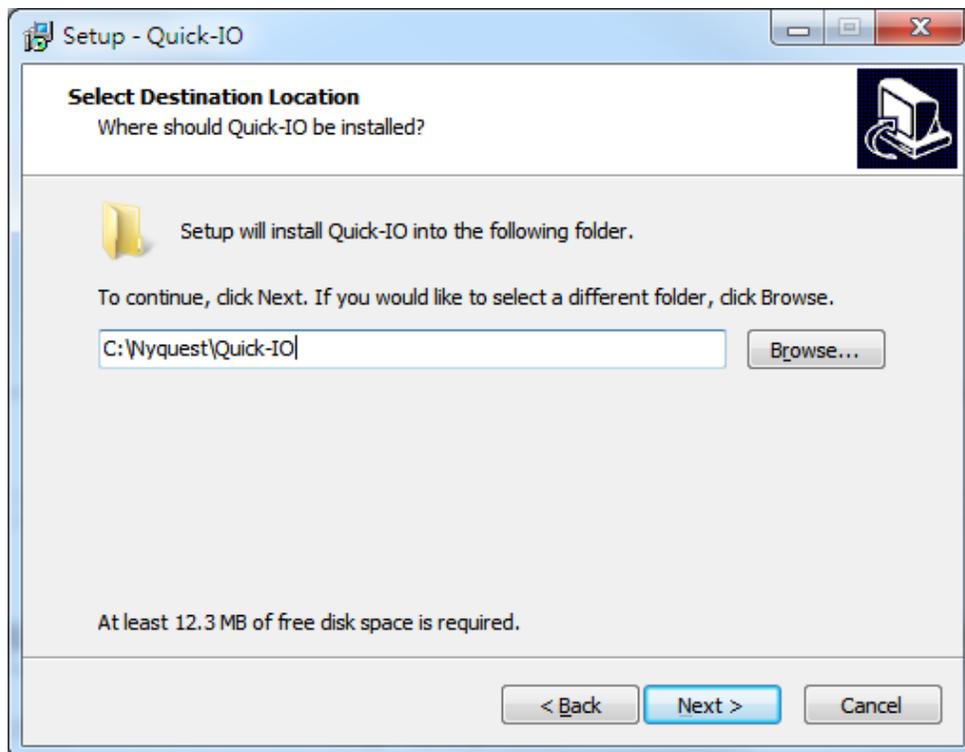
#### System Requirements

- ◆ A PC with Pentium 1.3GHz or higher CPU, Windows 7/ 8/ 10/ 11.
- ◆ At least 1G RAM.
- ◆ At least 2G hard disk free space.
- ◆ A display card and monitor that support 1366x768 resolution or higher.

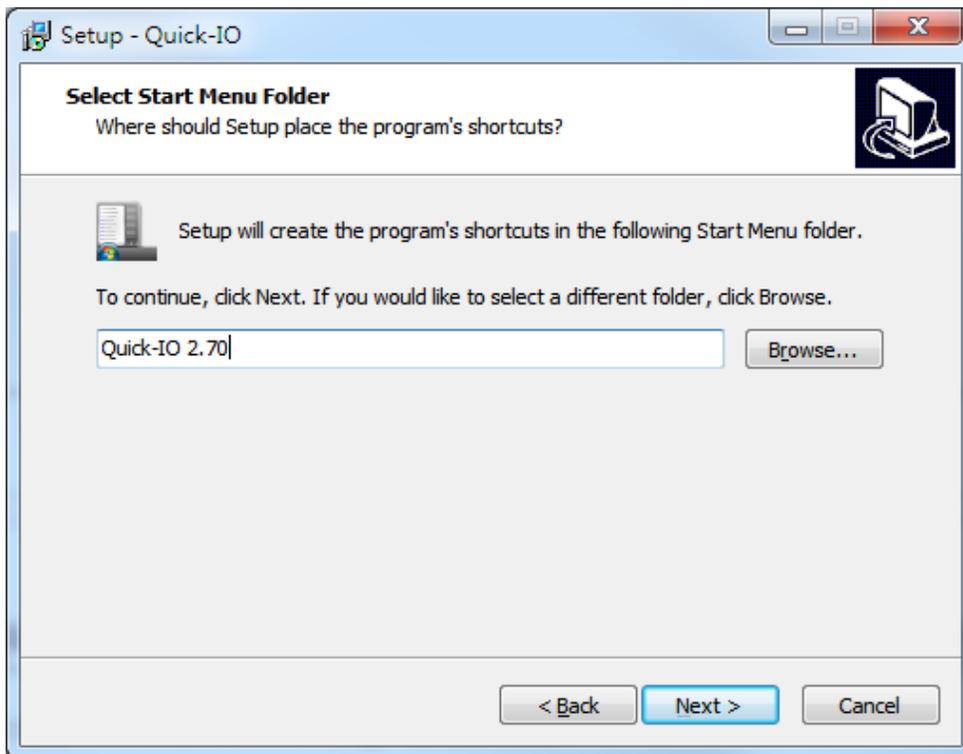
Step 1: Click on the installation file of *Quick-IO* for getting start.



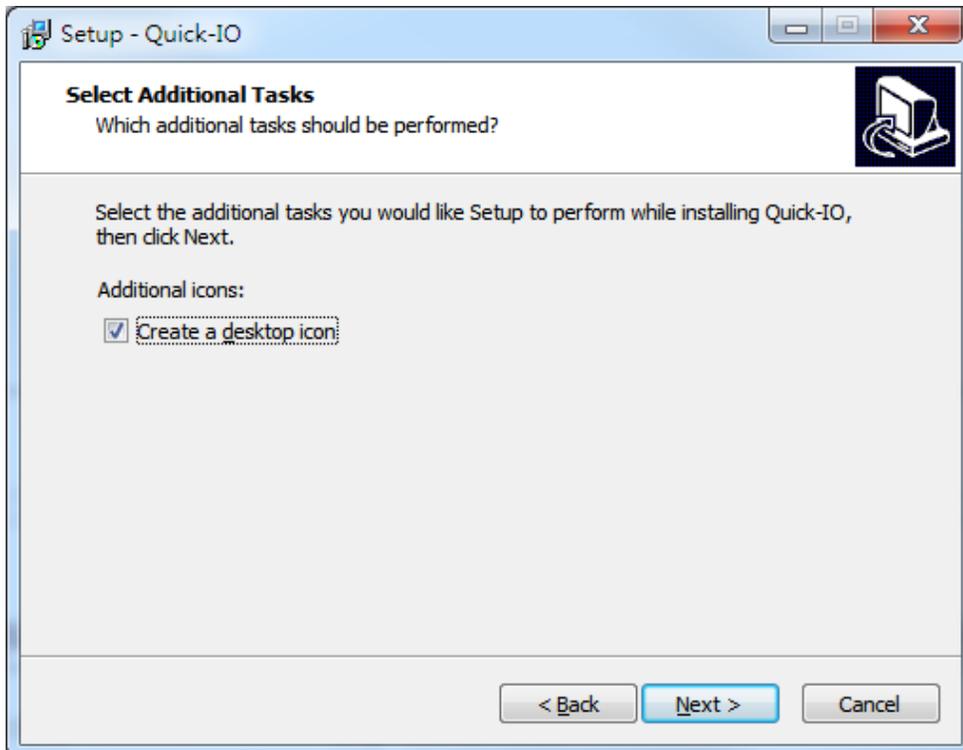
Step 2: The default destination location. If user wants to change location, please press Browse to select a different folder. Then press Next.



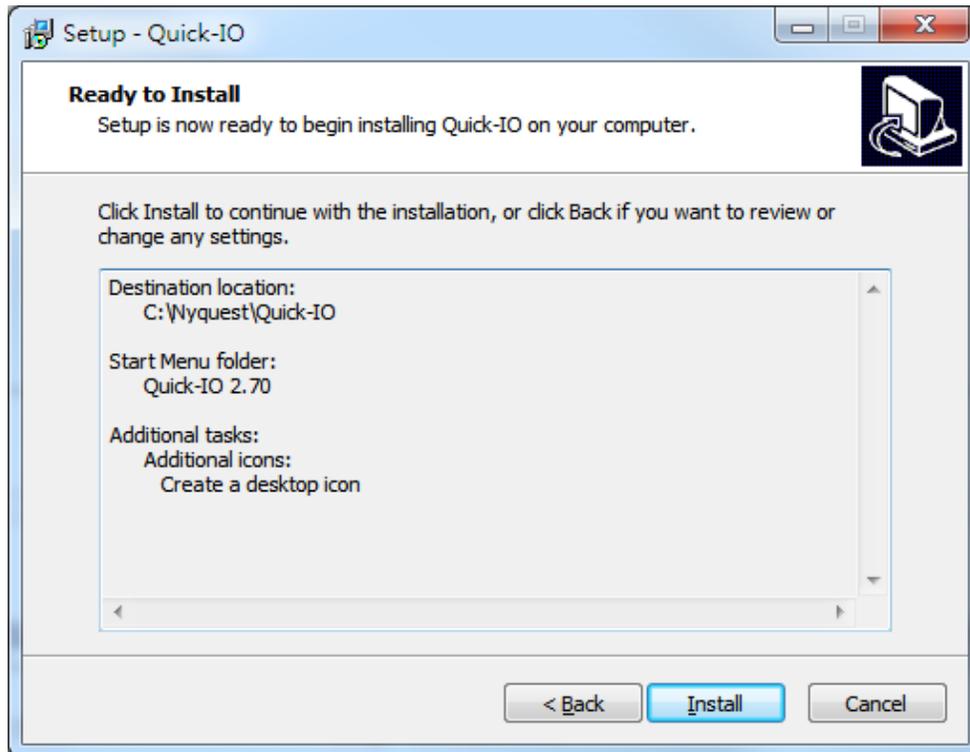
Step 3: The default start menu folder. If user wants to change, please key in the desired folder name or press Browse to select folder. Then press Next.



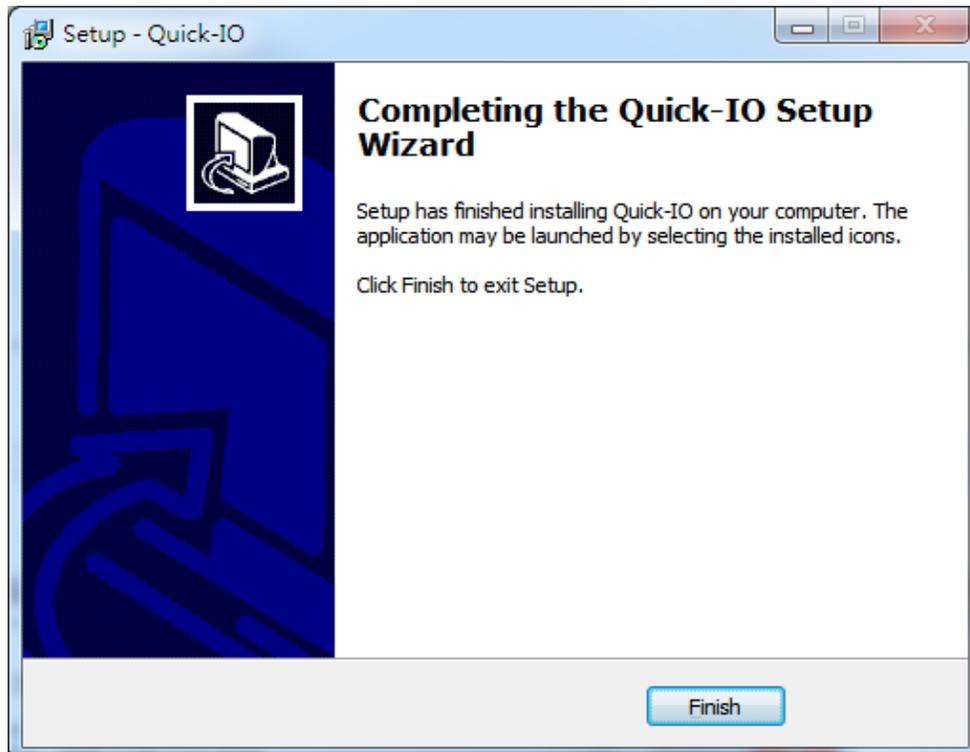
Step 4: Tick to build a shortcut on desktop or not. Then press Next.



Step 5: The setup wizard will show the installation settings. If the settings are correct, please click on Install for getting started.

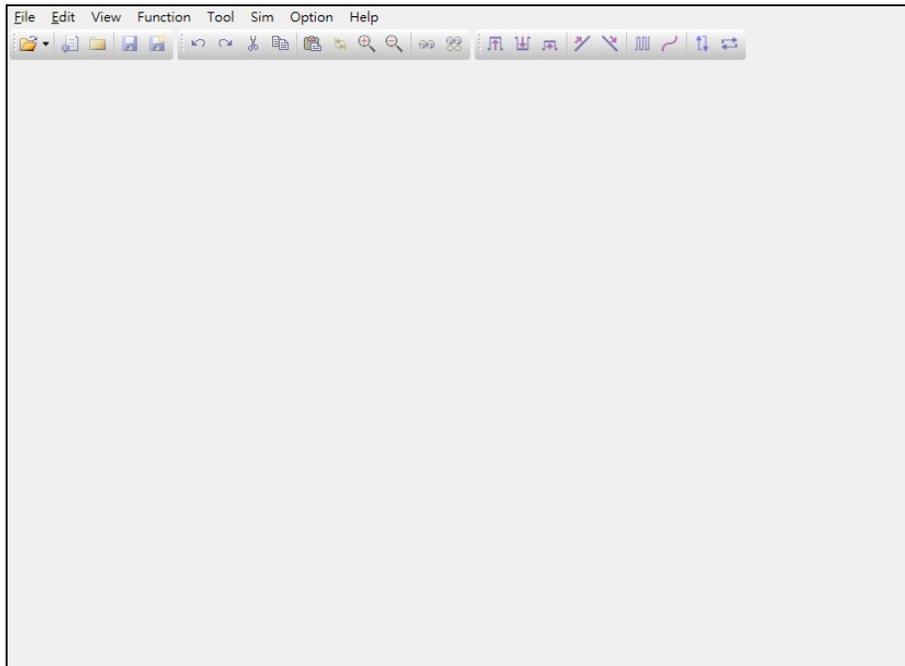


Step 6: After completing the installation, a pop-up dialogue will be shown to inform user. Please press Finish to exit setup.

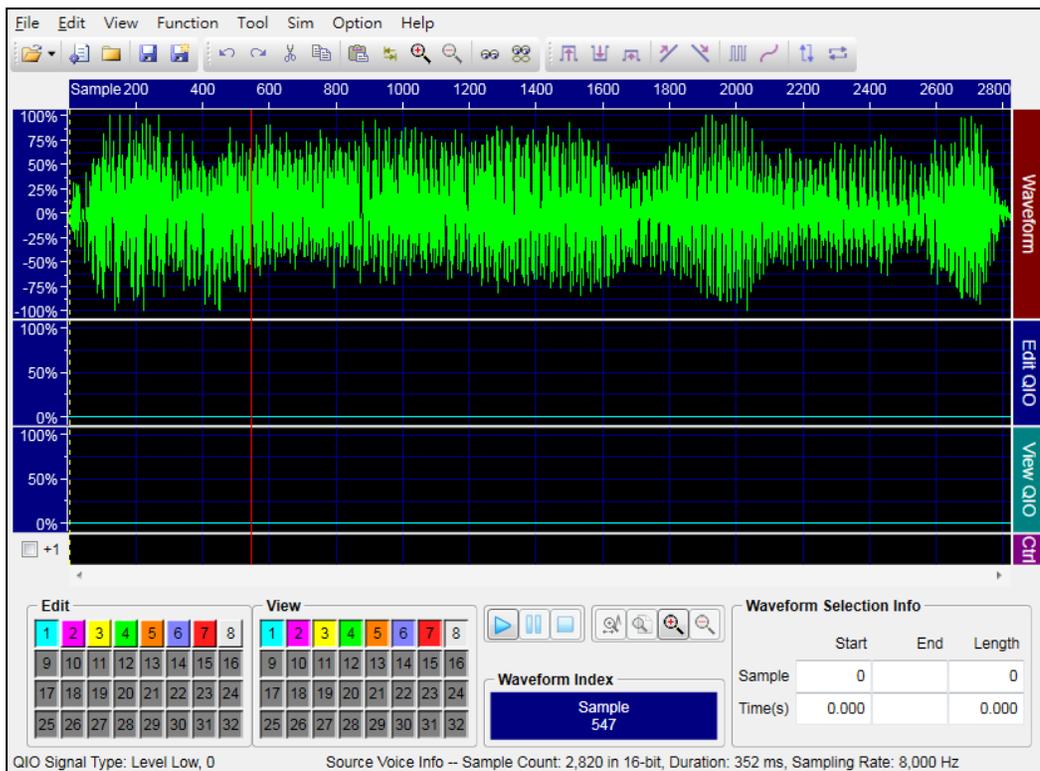


### 1.3 The Main Interface of Quick-IO

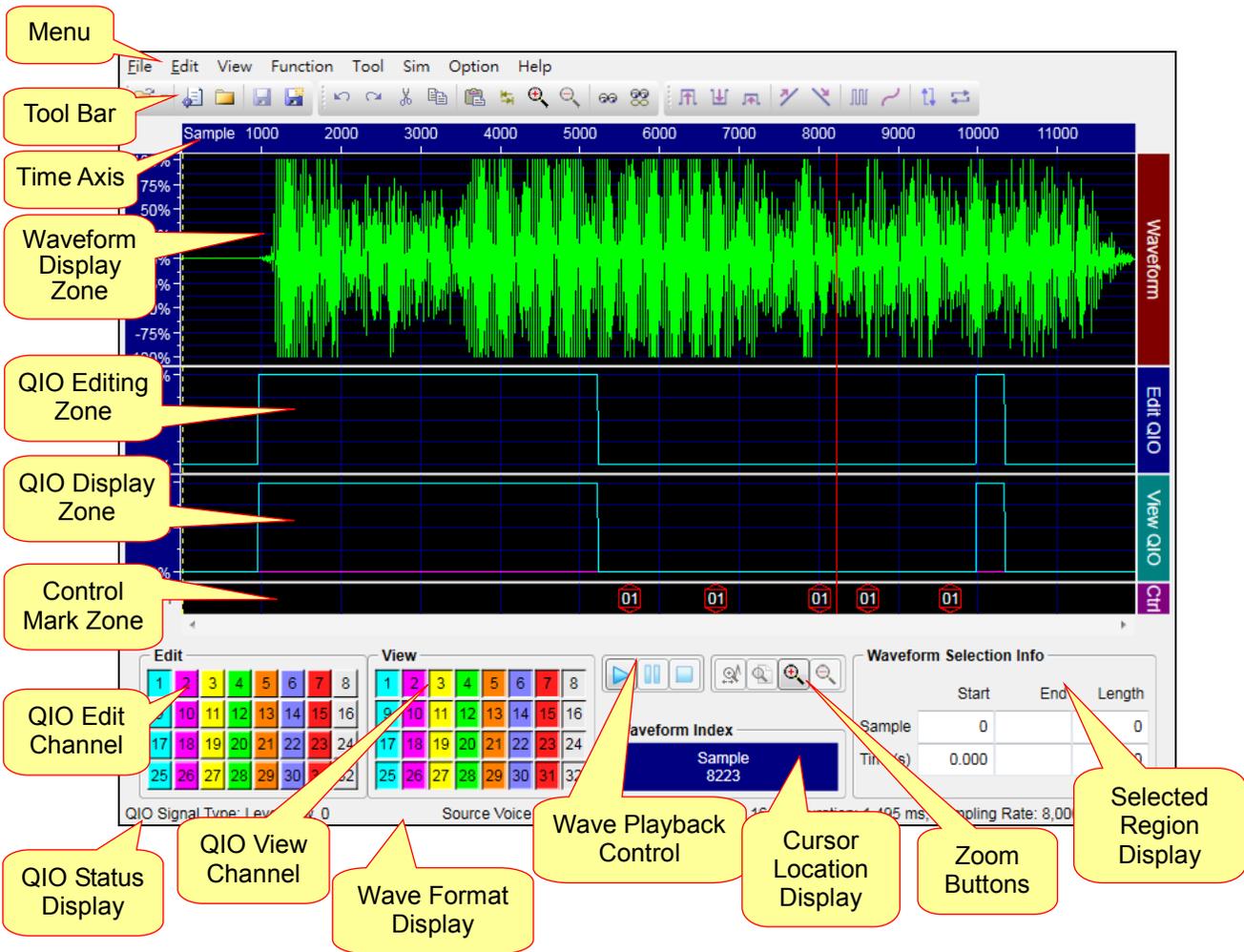
When executing Quick-IO, the main window will appear.



Execute [File/Open] to open a wave file (.wav, .nyq, .nyw or .mp3), and then start to edit functions.



After editing, the window is like the picture below in substance:



## 2 Basic Operations

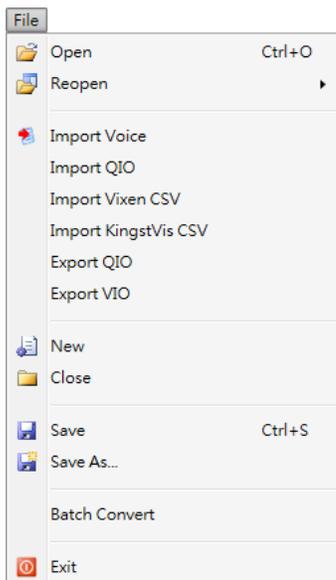
This chapter details basic functions of *Quick-IO* and all operation skills.

### Contents:

- [2.1 \[File\] Menu](#)
- [2.2 \[Edit\] Menu](#)
- [2.3 \[View\] Menu](#)
- [2.4 \[Function\] Menu](#)
- [2.5 \[Sim\] Menu](#)
- [2.6 \[Options\] Menu](#)
- [2.7 \[Help\] Menu](#)
- [2.8 Buttons](#)
- [2.9 Quick Menu](#)
- [2.10 Ctrl Menu](#)

### 2.1 [File] Menu

The File menu provides commands for dealing with file status. Click [File] on Menu Bar, and the menu is shown below.



#### 2.1.1 Open

Open a file. File extension name: .wav (wave), .nyq (*Quick-IO* wave), .nyw (*Q-Sound* wave) or .mp3. (mp3 file)

## 2.1.2 Reopen

Reopen an edited file.

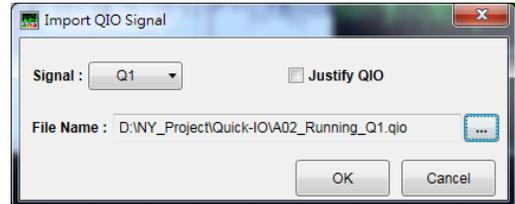
## 2.1.3 Import Voice

Import a voice file.

## 2.1.4 Import QIO Signal

Import QIO signals to current file. (File extension name: .qio)

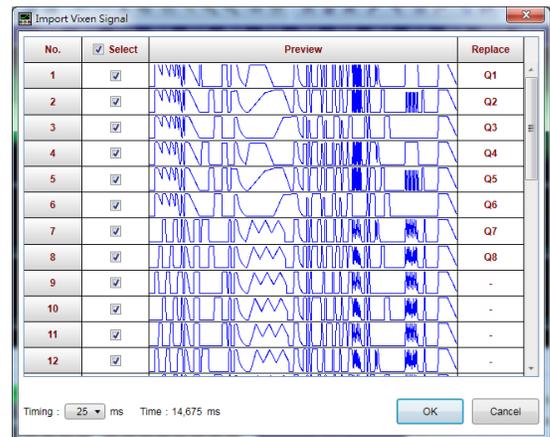
- (1) Signal: Select the channel of signal.
- (2) Justify QIO: Tick to align .qio with sound length evenly along both the left and right margins.
- (3) Press  for reselecting file.



## 2.1.5 Import Vixen Signal

Import the Vixen CSV signal, the filename extension is .csv.

- (1) Tick the desired signal.
- (2) Replace: Replace the selected serial number of signal.
- (3) Timing: Set the timing.

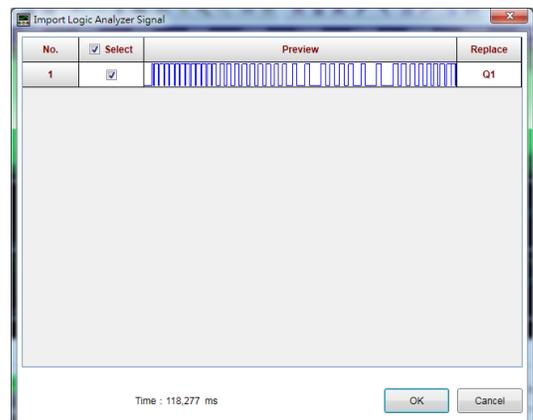


## 2.1.6 Import Logic Analyzer Signal

Import the logic analyzer CVS, the filename extension is .csv.

- (1) Tick the desired signal.
- (2) Replace: Replace the selected serial number of signal.

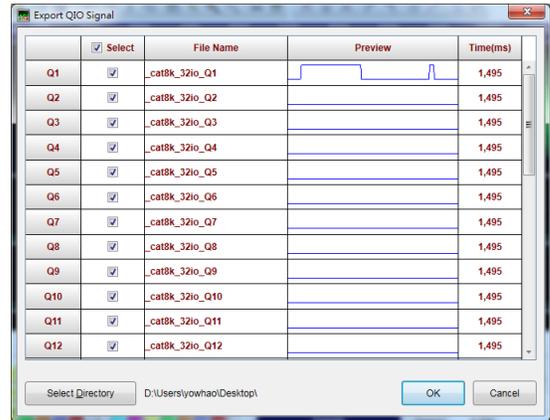
**Note: Only supports KingstVIS and Saleae.**



## 2.1.7 Export QIO Signal

Export current QIO signals to new files. (File extension name: .qio)

- (1) Select Directory: Select the directory would store signal files.
- (2) Tick for exporting QIO signals. The default filename is XXX\_Qn.qio, n means channel. The filename could be changed.



## 2.1.8 Export VIO File

Export the VIO signals, the file extension name is .vio.

## 2.1.9 New

Clean the existing QIO signal data.

## 2.1.10 Close

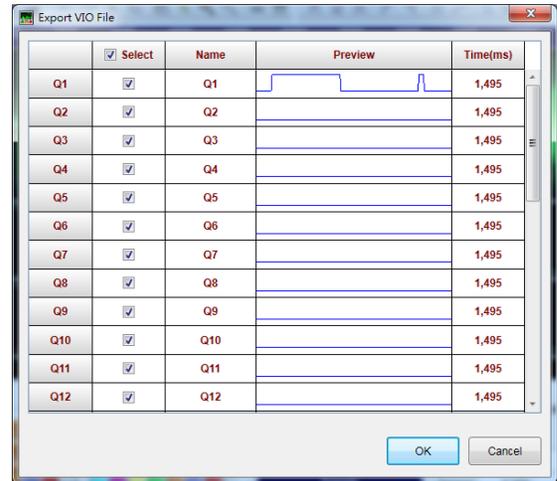
Close current file.

## 2.1.11 Save

Save current file.

## 2.1.12 Save as

Save current file as another name.

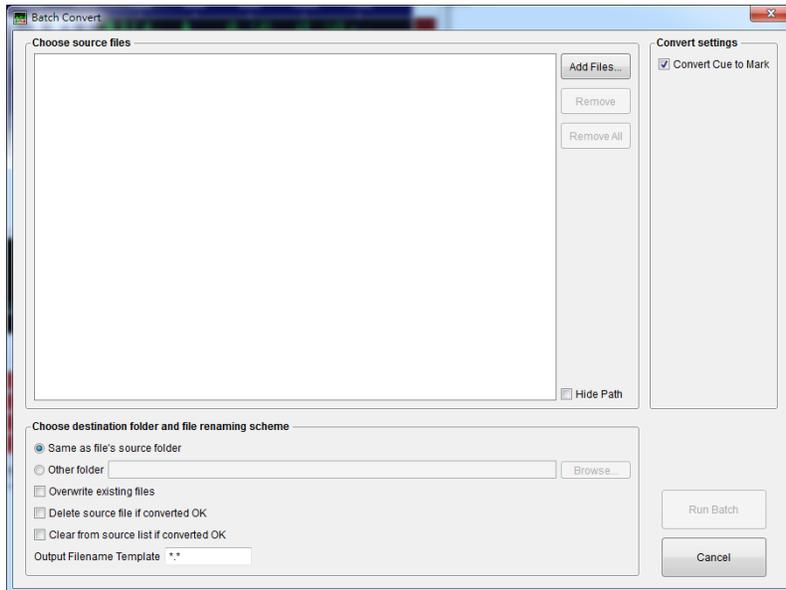


### 2.1.13 Batch Convert

The Batch Converter window will pop up when user achieves the function on File menu. There are two modes—Audio File to NYQ File and Replace Audio—for the converter function.

#### 2.1.13.1 Audio File to NYQ File

User can select the desired audio files, convert setting and output path through the Audio File to NYQ File mode. Once “Run Batch” is executed, *Quick-IO* will convert source files to .nyq file format.



(1) Choose source files:

To add or remove files. User can click “Add Files”, “Remove” or “Remove All” buttons on source file panel.

(2) Convert settings:

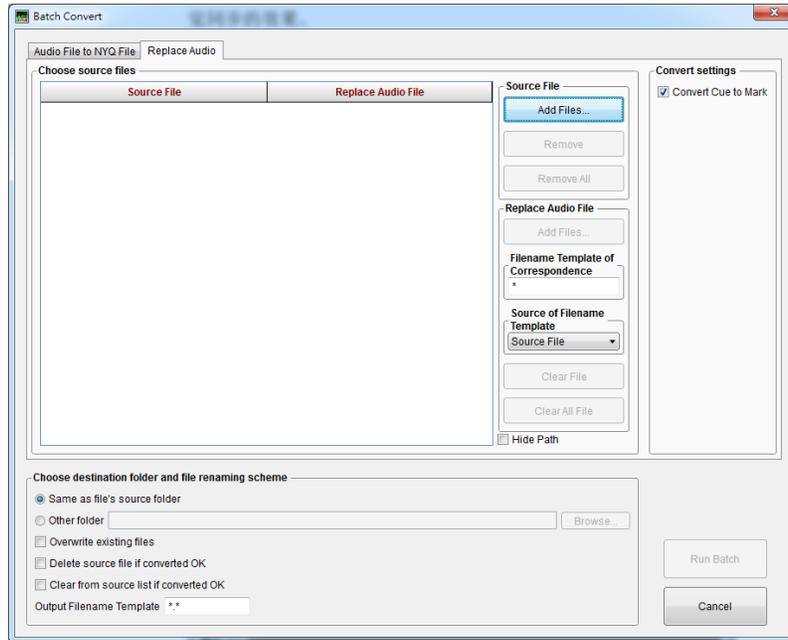
The Batch Converter function only supports Convert Cue to Mark function, please refer to [2.2.8 Convert Cue to Mark](#).

(3) Choose destination folder and file renaming scheme:

User can set the output folder and filename renaming scheme.

### 2.1.13.2 Replace Audio

User can select the source audio, replace audio files, convert setting and output path through the Replace Audio mode. Once “Run Batch” is executed, *Quick-IO* will replace the original file with the source file.



(1) Choose source files:

User can set Add Files, Remove, and Remove All from the Source File column, or set Add Files, Clear File, and Clear All File from the Replace Audio File column. The Add Files setting can correspond to the Filename Template of Correspondence and Source of Filename Template to reach the effect of the source file.

(2) Convert settings:

The Batch Converter function only supports Convert Cue to Mark function, please refer to [2.2.8 Convert Cue to Mark](#).

(3) Choose destination folder and file renaming scheme:

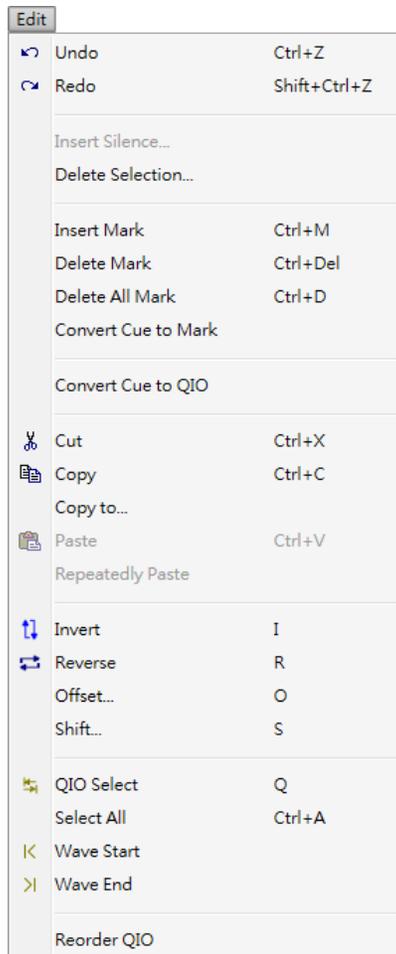
User can set the output folder and filename renaming scheme.

### 2.1.14 Exit

Close *Quick-IO* program.

## 2.2 [Edit] Menu

**Edit** menu provides commands for editing exiting QIO data. Click [Edit] on Menu Bar, and the menu is shown below.



### 2.2.1 Undo

**Undo** command reverses the last action.

### 2.2.2 Redo

**Redo** command redoes the last undone action.

### 2.2.3 Insert Silence

**Insert Silence** command inserts a period of silence into the audio section at the cursor location, and the unit of its length could be “millisecond” or “samples”. Both the waveform and the QIO data would be split into two parts, and the right part would be right shifted by the inserted silence.

### 2.2.4 Delete Selection

**Delete Selection** command removes the highlighted region. Both the waveform and the QIO data would be cut after the command is confirmed.

### 2.2.5 Insert Mark

**Insert Mark** command inserts the last used M mark at the cursor location.

### 2.2.6 Delete Mark

**Delete Mark** command removes M mark of selection.

### 2.2.7 Delete All Mark

**Delete All Mark** command removes all M marks.

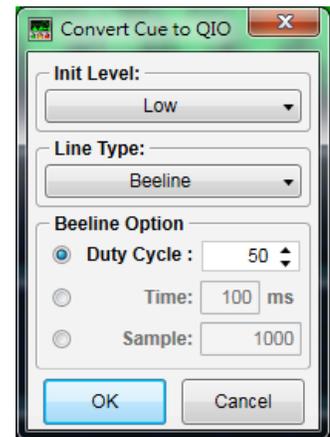
### 2.2.8 Convert Cue to Mark

**Convert Cue to Mark** command converts the cues of waveform to M marks.

### 2.2.9 Convert Cue to QIO

Convert Cue to QIO command converts all the cue of voice signals to QIO.

- (1) Init Level: The initial level can select Level Low to pull low the QIO signals to the lowest position, 0%. Alternatively, Level High to pull high the QIO signals to the highest position, 100%.
- (2) Line Type: Select the converted QIO type as Beeline or Ramp line.
- (3) Beeline Option: User can set the flashing ration from Duty Cycle, or set the signal duration via Time and Sample in the Beeline option.



### 2.2.10 Cut

**Cut** command removes only highlighted QIO data of current editing channel to the active clipboard. User can select a QIO signal or multiple QIO signals, if select multiple QIO signals whose number must be identical to the cut signals or a hint will be shown when pasting on.

### 2.2.11 Copy

**Copy** command copies the highlighted QIO data of current editing channel to the active clipboard. User can select a QIO signal or multiple QIO signals, if select multiple QIO signals whose number must be

identical to the copied signals or a hint will be shown when pasting on.

### 2.2.12 Paste

**Paste** command replaces currently highlighted QIO data with that from the active clipboard. If there is no highlighted region, paste command will replace QIO data from cursor's location to end of the voice or till the data of clipboard is over.

### 2.2.13 Repeatedly Paste

**Repeatedly Paste** command repeatedly replaces currently highlighted QIO data with that from the active clipboard. The number of highlighted QIO data must be identical to the active clipboard.

### 2.2.14 Copy to

**Copy to** command copies both highlighted waveform and QIO data to a new file.

### 2.2.15 Invert

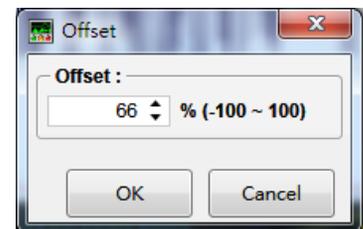
**Invert** command inverts the values of highlighted QIO data, so that values of the highlighted will be changed from original X to (100-X).

### 2.2.16 Reverse

**Reverse** command reverses the order of highlighted QIO data.

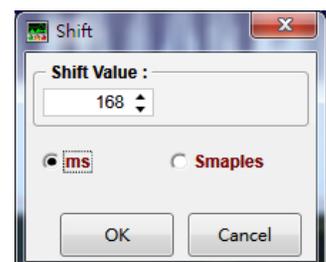
### 2.2.17 Offset

**Offset** command adds an integer value to all the currently highlighted QIO data, and the value can be positive or negative. Parameter allows any integer between -100 and 100: a positive offset shifts UP all highlighted QIO data whereas a negative offset shifts DOWN all highlighted QIO data. When the value is shifted to over 100% or under 0%, it will stay at the limit (100% or 0%).



### 2.2.18 Shift

**Shift** command shifts the highlighted QIO data to right or left by an integer value, and the value can be positive or negative. A positive value shifts all highlighted QIO data to right whereas a negative value shifts all highlighted QIO data to left. The QIO data shifted to out of the highlighted area will disappear. The unit of the shift value can be either millisecond or sample.



### 2.2.19 QIO Select

**QIO Select** command highlights the same QIO Signal Type as which of the cursor's location (as Waveform Index shows), and only the same QIO Signal Type adjacent to the cursor's location would be highlighted.

### 2.2.20 Select All

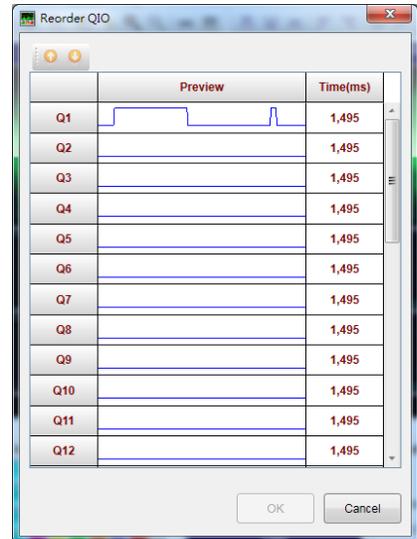
**Select All** command selects the entire QIO data of current editing channel. It can also be realized by double-click in the "Edit QIO" area.

### 2.2.21 Wave Start / Wave End

**Wave Start / Wave End** command moves the waveform index to the start (end) of waveform.

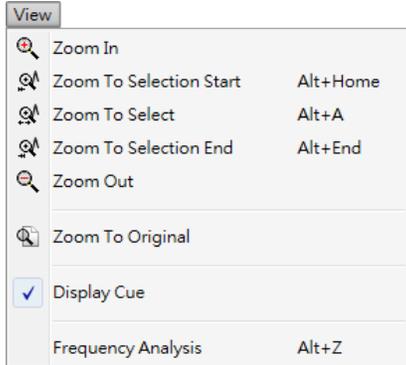
### 2.2.22 Reorder QIO

**Reorder QIO** command can sort the sequent of the signal order.



### 2.3 [View] Menu

The **View** Menu offers commands that allow users to zoom in or out on the waveform and QIO data.



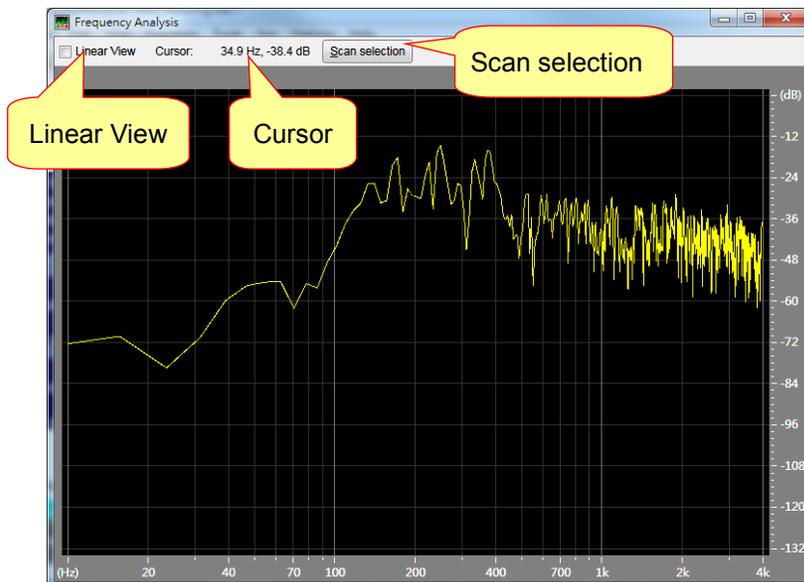
Menu Item	Function
Zoom In	Show more detail of the waveform and QIO data
Zoom To Selection Start	Zoom the selected waveform and start of QIO data to the far left of the window.
Zoom To Select	Zoom the highlighted waveform or QIO data to fit the window
Zoom To Selection End	Zoom the selected waveform and start of QIO data to the far right of the window.
Zoom Out	Show less detail of the waveform and QIO data
Zoom to Original	Show the entire waveform and QIO data
Display Cue	Show the cue on the waveform

**Note:** The scroll wheel of mice is also applicable for zooming in or out.

#### Frequency Analysis

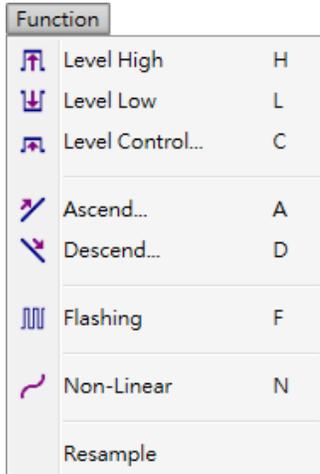
Frequency Analysis is used to view the current frequency distribution. The analyzed spectrum corresponds to the Start of Waveform Selection Info in main screen. In this box, the X axis represents frequency (unit Hz) and the Y axis represents the corresponded frequency amplitude (unit dB.). The obtained analyzed frequency is based on 1024 sampling points via FFT algorithms.

- ◆ Linear View: provides user to swift the linear view of frequency scale (X axis).
- ◆ Cursor: shows the corresponding frequency and amplitude of cursor location.
- ◆ Scan selection: compute the mean value of selected waveform to show the mean frequency distribution.



## 2.4 [Function] Menu

In **Function** menu, there are basic graphic tools, such as Level Low and Level High, for editing QIO signals. These basic tools offer users to draw simple geometric lines, such as straight lines, slopes, and curves.



### 2.4.1 Level High

**Level High** sets the currently selected QIO data to the ceiling, namely the signals would be brought to 100%, but there are different meanings between NY2/NY3 series and NY4/NY5/NY5+ series.

For NY2 and NY3 series, Level High always means “active” no matter “drive” or “sink” output will be applied, so it could be low signals when sink output applied, or it could be high signals when drive output applied as well.

For NY4, NY5 and NY5+ Series, Level High always means “output high signals”.

### 2.4.2 Level Low

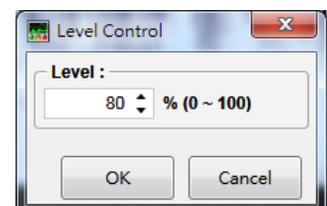
**Level Low** sets the currently selected QIO data to the bottom, namely the signals would be brought to 0%, but there are different meanings between NY2/NY3 series and NY4/NY5/NY5+ series.

For NY2 and NY3 series, Level Low always means “inactive” no matter “drive” or “sink” output will be applied, so it could be high signals when sink output applied, or it could be low signals when drive output applied as well.

For NY4, NY5 and NY5+ Series,, Level Low always means “output low signals”.

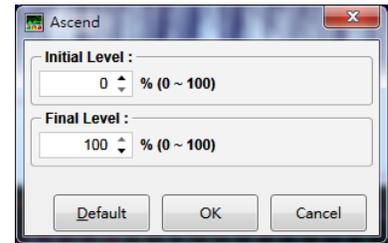
### 2.4.3 Level Control

**Level Control** sets the currently selected QIO data to a specific level. Any word can be keyed in, but only integer between 0 and 100 is valid in the Level Control dialog box.



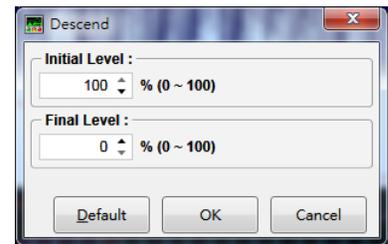
**2.4.4 Ascend**

**Ascend** command replaces the highlighted QIO data with a positive slope, which increases QIO signals from the initial level to the final level gradually during the highlighted period. Any integer between 0 and 100 is allowed to set in the dialog boxes, but please note that the value of final level must greater than the value of initial level. An error message will show if the initial level is greater than the final level, since it is not an ascending slope.



**2.4.5 Descend**

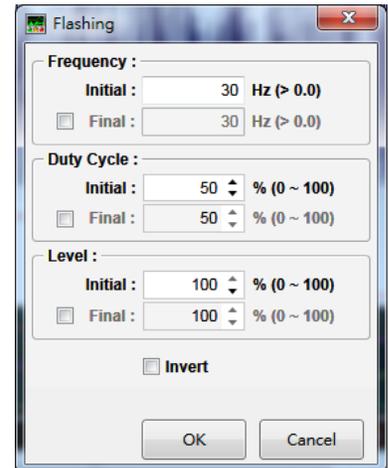
**Descend** command replaces the highlighted QIO data with a negative slope, which decreases QIO signals from the initial level to the final level gradually during the highlighted period. Any integer between 0 and 100 is allowed to set in the dialog boxes, but please note that the value of initial level must greater than the value of final level. An error message will show if the final level is greater than the initial level, since it is not a descending slope.



**2.4.6 Flashing**

**Flashing** replaces the currently highlighted QIO data with signals alternating between 100% and 0% (flashing data) according to the flashing frequency and duty cycle. The frequency must be positive, and if it is greater than half of the wave file’s sampling rate, all the highlighted QIO data will become 100%.

The frequency decides the flashing cycle changes of 100% and 0%. The duty cycle decides the duration ratio of 100% and 0%, and it can be any integer between 0 and 100. The level decides the data changes on non 0%. The “Invert” option inverts the flashing data.

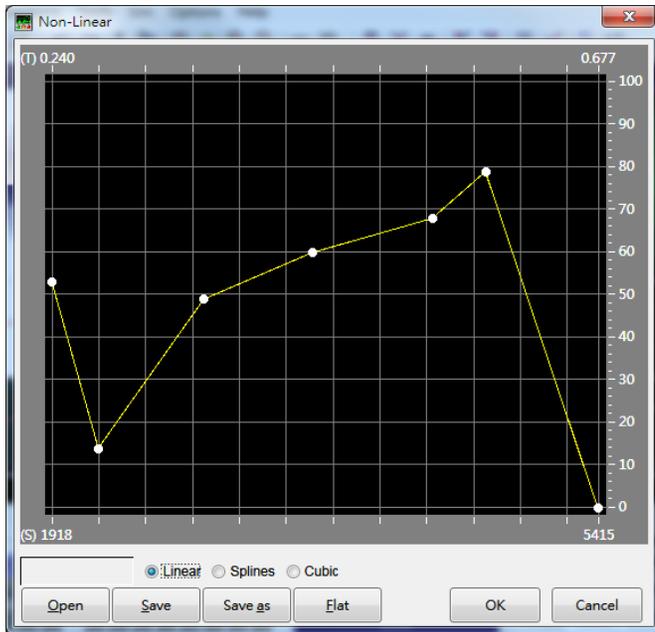


**2.4.7 Non-Linear**

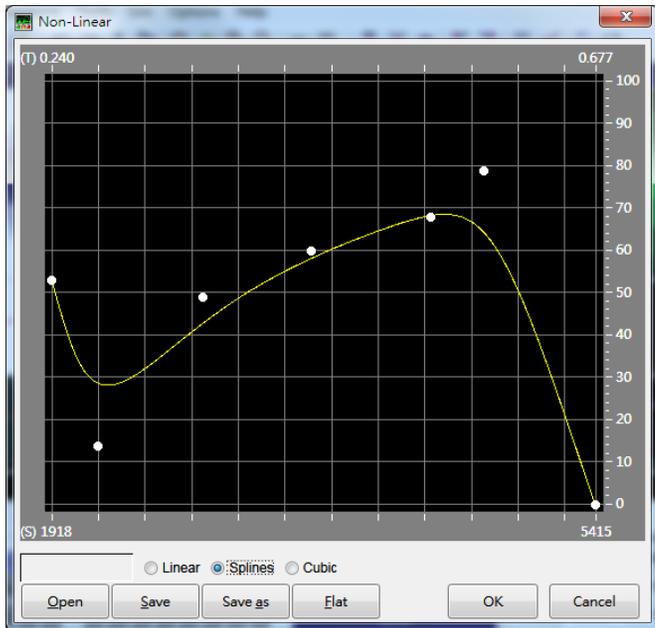
**Non-Linear** allows users to draw a curve quickly for the highlighted region. The top of the graph area represents 100% output level whereas the bottom represents 0% output level, and users can add or drag a control point by clicking in the graph window. Users can drag any point out of the graph area to eliminate it. The graph can be cleared and reset as default by clicking “Flat” bottom on the right.

Three Modes are available for editing signals, namely Linear, Splines and Cubic, as shown in the following below.

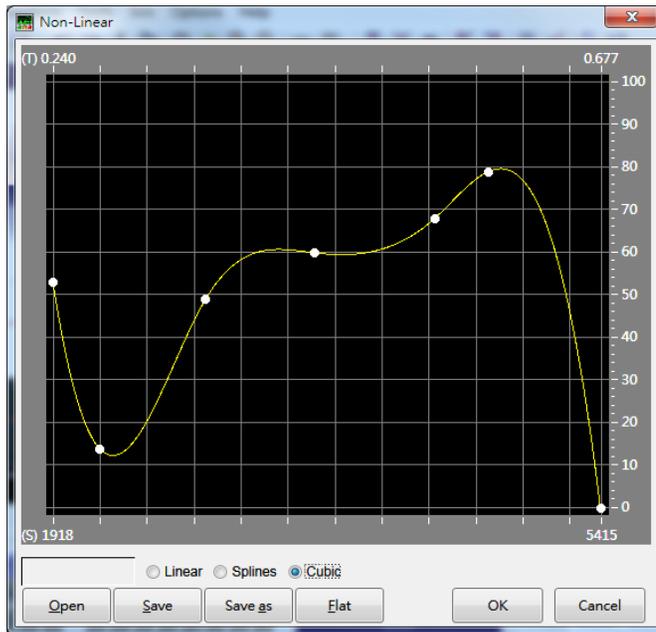
Linear: When users select “Linear” mode, lines become straight between two control points.



Splines: When users select “Splines” mode, the lines users draw are curves and the control points are not necessarily falling on the curve.



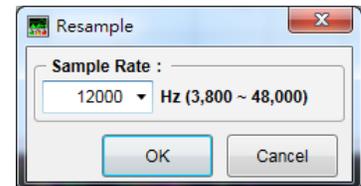
Cubic: When users select “Cubic” mode, the lines users draw are curves and the control points must fall on the curve.



Besides, the graph could also be saved by clicking “Save” and “Save as” button on the right, and it will be saved with “.gph” extension.

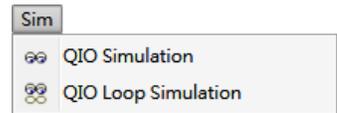
### 2.4.8 Resample

Execute the resample function from [Function] menu, user can use the resample function alone to resample the sound file.

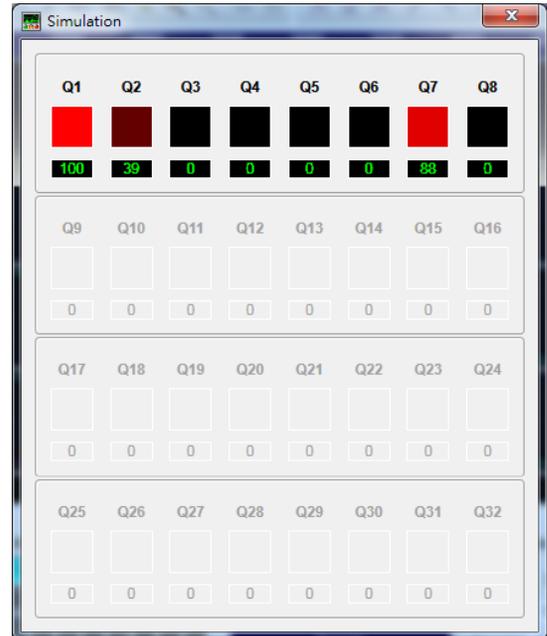


## 2.5 [Sim] Menu

**Sim** menu (see right picture) is used for on-screen simulation to check whether I/O actions are correct or not. **QIO Simulation** runs the simulation once only while **QIO Loop Simulation** runs the simulation repeatedly until the simulation window is closed.

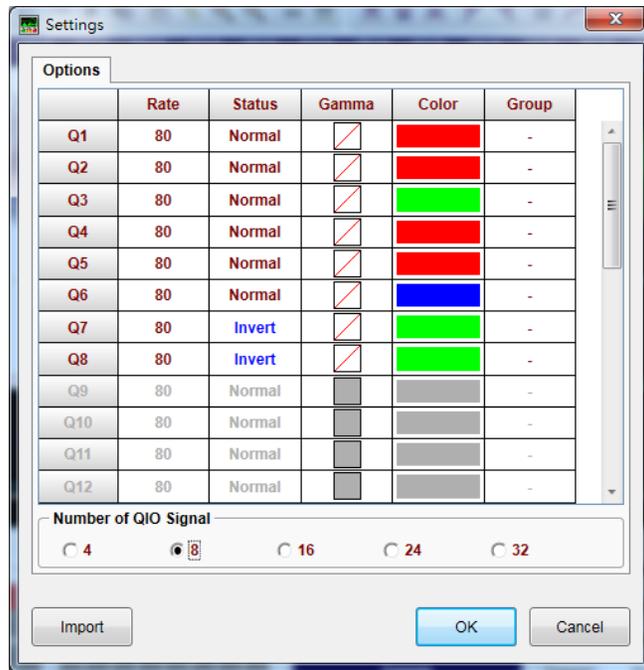
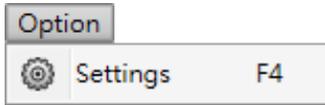


During simulation, each I/O status will show as a radiating block independently, and the status of QIO data is under each radiating block. The higher the QIO data, the brighter the radiating block is. Please see [\[Option\] Menu](#) for more details about QIO status setting.



## 2.6 [Option] Menu

**Option** menu is used for setting the numbers, the electrical characteristics, and the displaying colors in simulation of QIO.



### 2.6.1 Rate

**Rate** sets the PWM frequency of individual QIO channels. It means the refresh rate (i.e. frame rate) and the default is 80Hz. The refresh rate affects not only the PWM resolution but also the IC’s memory consumption. In general, the higher the refresh rate, the larger the memory consumption. Therefore, it’s highly recommended to keep the refresh rate as low as possible. For information about how the PWM resolution is affected by the refresh rate, please refer to [PWM Resolution](#).

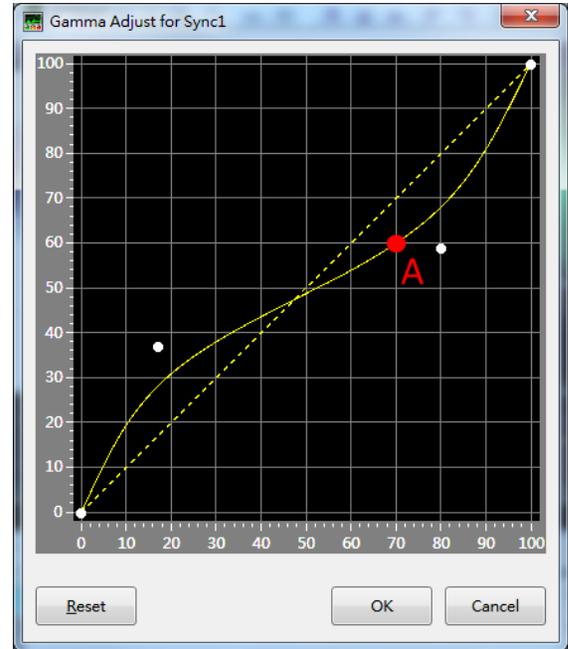
### 2.6.2 Status

There are two statuses for each QIO channel: one is “Normal” (default), and the other is “Invert”. The “Invert” status inverts the QIO data, while the “Normal” status keep the QIO data as what it shows.

### 2.6.3 Gamma

**Gamma** (Gamma Adjust) is used as compensation for the non-linearity between physical output of the controlled device and the PWM duty cycle. When a LED connected to an IC output, its brightness is controlled by the duty cycle of the PWM (Pulse Width Modulation) wave on that output. The ratio of PWM duty cycle to output intensity is equal, but the ratio of human sense of brightness to output intensity is not. So, Gamma Adjust can be applied easily to fix the gap between physical output and human sense of brightness.

Gamma Adjust allows users to draw a curve, like the operation of [Non-Linear](#), to describe the relationship between the QIO signal level (shown on the horizontal axis) and the actual output PWM duty cycle (shown on the vertical axis). As shown in the example below, we can create a curve so that 70% QIO signal level now corresponds to 60% PWM duty cycle at point A.



#### 2.6.4 Color

**Color** sets the desired colors for each QIO channel used in Simulation.

#### 2.6.5 Group

**Group** can simulate the combination of multi QIO signals as color mixing lights.

#### 2.6.6 Number of QIO Signal

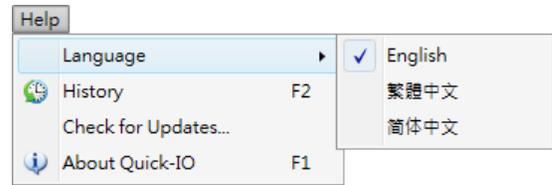
**Number of QIO Signal** allows 5 options: 4, 8, 16, 24 and 32. The memory usage will be less effective when using higher number of QIO signal, so it is recommended to select as few QIO signal as possible.

#### 2.6.7 Import

Import the [Option] settings from other files.

## 2.7 [Help] Menu

**Help** Menu provides information about *Quick-IO*, including its revision history and the contact information for technical support.



### 2.7.1. Language

*Quick-IO* is available in English, Traditional Chinese or Simplified Chinese.

### 2.7.2. History

See the revision history of *Quick-IO*.

### 2.7.3. Check for Updates...

Check for the latest version of *Quick-IO*. This function will connect to the Internet.

### 2.7.4. About Quick-IO

Show the current *Quick-IO* version.

## 2.8 Buttons

Buttons on the toolbar can access some frequently used commands such as Open File, save, QIO Simulation, etc.

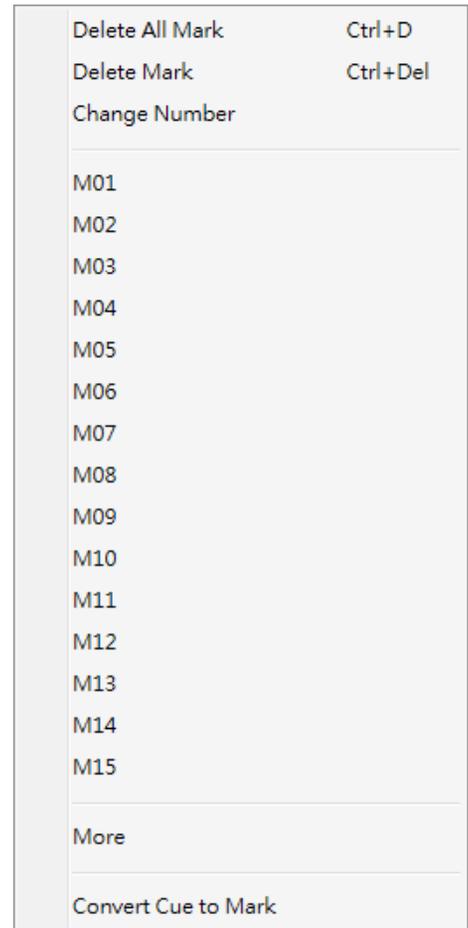
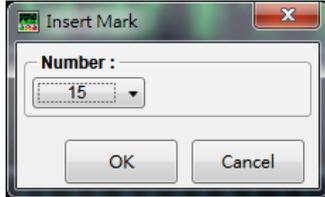


## 2.9 Quick Menu

**Quick Menu** is available by right clicking in Edit QIO and View QIO area, and it provides a convenient way for accessing the most frequently used commands.

## 2.10 Ctrl Menu

**Ctrl Menu** is available by right clicking on the Ctrl Zone (Control Mark Zone), and it provides a convenient way to insert marks for executing background path. There are 255 M (Background Path) marks as quick selections. Each of them can be inserted in the Ctrl Zone area at anytime and anywhere. When user clicks on “More” or press “Ctrl+M”, user can assign M mark number via the “InsertMark” dialog box (as below). To add an M mark (e.g. M01), simply select an M item (e.g. M01) from the menu, or double left-click on the Ctrl Zone; press hotkey “M” on Ctrl Zone is also available. On the left corner of the Ctrl Zone, user can tick “+1” for adding mark number sequentially. The M mark will be labeled with the same number as the corresponding M item, and it can be selected or dragged by left clicking on it. To remove an M mark, select it and then choose “Delete Mark” from the Ctrl Menu or the hotkey “Ctrl+Del”. To remove all M marks, just choose “Delete All Mark” from the Ctrl Menu.



### 3 Advanced Editing Tool

**Tools** menu offers tools to make complicated output controls with easy steps. It used to take lots of time and efforts writing sophisticated program to realize subtle actions, but that can be realized by computer-aid programming with a few parameter settings easily and quickly now.

**Contents:**

- [3.1 Q-Action](#)
- [3.2 Q-Color](#)
- [3.3 Power-Meter](#)
- [3.4 Animator](#)

#### 3.1 Q-Action

Q-Action is designed for applications having dynamic reactions with waveform, such as:

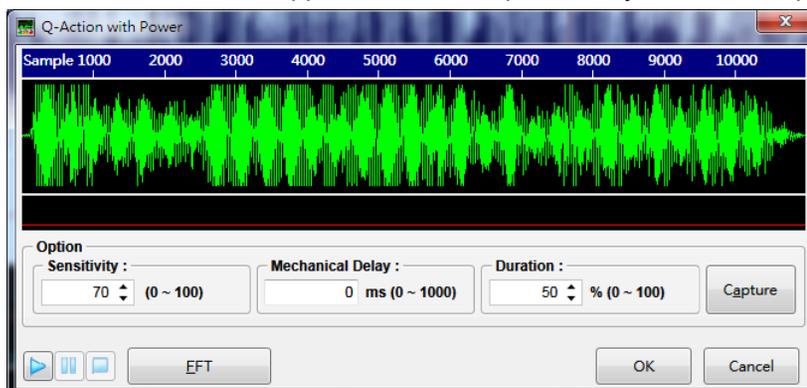
- Interactive mechanical actions
- Interactive Lamp Flashing Dynamics

Q-Action has four operating modes:

- a. [With Power](#)
- b. [With Level](#)
- c. [With Envelope](#)
- d. [With Beat Detection](#)

##### 3.1.1 Q-Action with Power

This mode is designed for the type of application in which, for example, the doll's mouth opens and closes with the rhythm that it looks like the doll is talking. In normal approach, user has to determine how the mouth should move by examining the waveform, and then use the basic functions Level High or Level Control to generate the suitable output. Now with the artificial intelligence, Q-Action can determine the necessary switching points of the output according to the variations of voice power intensity. If the result generated by Q-Action with Power is not fully satisfied, commands like Level High and Level Low are still applicable to make precise adjust for the output.



### 3.1.1.1 Sensitivity

This parameter controls the sensitivity of Q-Action. It ranges from 0 to 100. Normally, the higher the sensitivity, the more switching actions there will be. For a normal human talking wave file, the reasonable sensitivity is between 50 and 75.

### 3.1.1.2 Mechanical Delay

This parameter is to compensate for the delay between the output electrical signals and the actual mechanical actions. For most motor mechanism, a mechanical delay between 100 and 200ms normally exists. Using this parameter, the delay can be easily compensated for good result.

### 3.1.1.3 Duration

This parameter specifies how long the active level will last. It ranges from 0% to 100%. In a simple word, the larger the duration percentage, the longer the doll's mouth opens for a word.

### 3.1.1.4 Capture Button

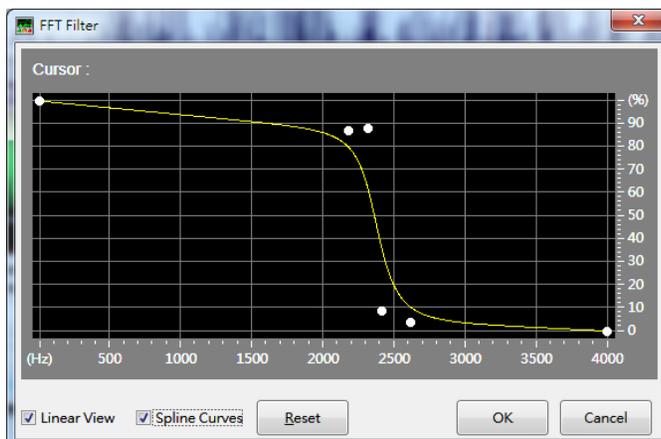
The Capture Button allows users to preview the Q-Action result according to the current settings.

### 3.1.1.5 FFT Filter

FFT Filter (fast Fourier transform filter) is the function that could adjust the waveform frequency of Q-Action. It could only be executed in Q-Action, and doesn't affect the original audio. The X axis represents frequency (Hz), and the Y axis represents the percentage of frequency distribution (%).

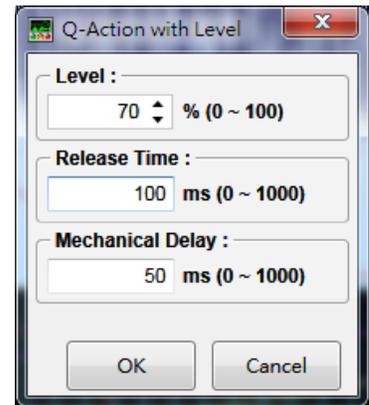
- ◆ Linear View: provides user to swift the scale between linear and logarithm.
- ◆ Spline Curves: provide user to adjust curves.
- ◆ Cursor: shows the corresponding frequency and percentage of cursor position.
- ◆ Reset: resets the curve as initial value.

After setting, press OK, the waveform of Q-Action would be changed because of the use of FFT Filter.



### 3.1.2 Q-Action with Level

Q-Action with Level aims to provide a much better flashing dynamic result than the past. In this mode, Q-Action behaves as a level monitor of the voice amplitudes. When the voice amplitude in the selected period exceeds the user-defined threshold, the QIO data will be “ON” (switched to 100%), but QIO data will not necessarily drop to “OFF” (switched to 0%) immediately when the voice amplitude falls back under the threshold because the “ON” status will last for a period equaling the user-defined Release Time. Within this period, if the voice amplitude rises over the threshold again, the counting of release time will be restarted.



In traditional hardware flashing dynamics, there are usually only one or two thresholds (normally 50% and 75%) available, and sometimes it is really hard to use a signal threshold to get a satisfying result over the whole voice period. Now with Q-Action with Level, virtually any threshold you like can be applied. For example, set a lower threshold for the whisper part of a speech and a higher threshold for the louder part to get a fully satisfying result. On the other hand, as the traditional hardware flashing dynamics provides no release time, the output signal often appears “switching too much” for controlling an LED and is completely unsuitable for driving a motor or a mechanism. With Q-Action with Level, the overly switching can be greatly reduced by setting a suitable Release Time. It makes the output signal so stable that it is suitable for driving not only a LED but also a motor.

#### 3.1.2.1 Level

This parameter represents the Threshold. When voice amplitude in the selected period exceeds this threshold, the QIO data will be “ON” (switched to 100%).

#### 3.1.2.2 Release Time

This parameter represents the period of time for the “ON” status to last. With a suitable release time set, the QIO data will not drop to “OFF” immediately when the voice amplitude falls back under the threshold and hence provide a more stable output signal for driving a motor or a mechanism.

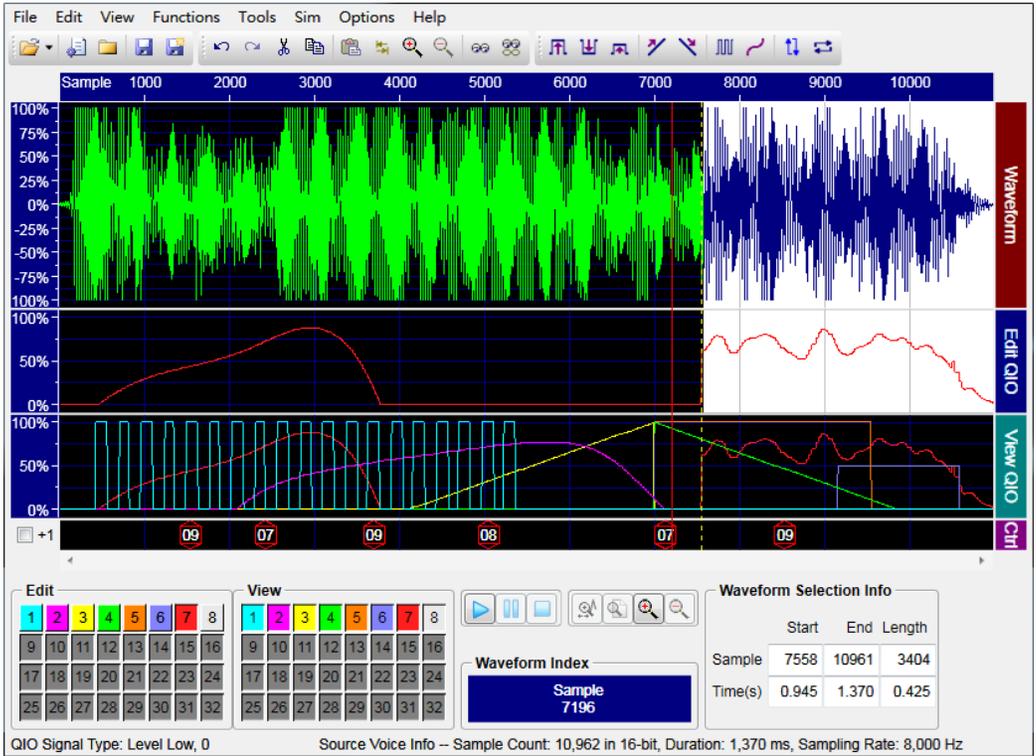
#### 3.1.2.3 Mechanical Delay

This parameter is to compensate for the delay between the output electrical signals and the actual mechanical actions. For most motor mechanism, a mechanical delay between 100 and 200ms normally exists. Using this parameter, the delay can be easily compensated for good result.

### 3.1.3 Q-Action with Envelope

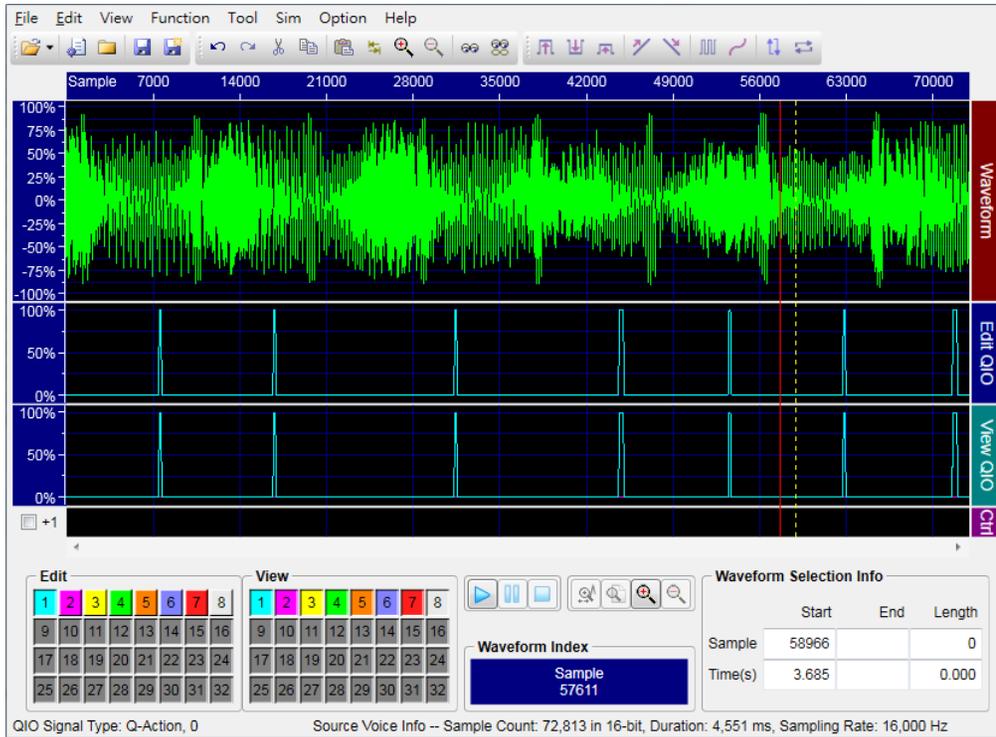
Q-Action with Envelope provides an output signal whose outline is the envelope profile of the voice power intensity of a wave file. Normally, Q-Action with Envelope is used for providing a very smooth LED display for the wave file of light music. For example, it makes the LED become dimmer and dimmer as the piano sound gets weaker and weaker. Q-Action with Envelope can also be used for a human speaking wave file to produce an impressive result.

The figure below shows the result produced by Q-Action with Envelope.



### 3.1.4 Q-Action with Beat Detection

Q-Action with Beat Detection provides the rhythm of the music and marks the timing of the beat. The following illustration shows the result of using Q-Action with Beat Detection.

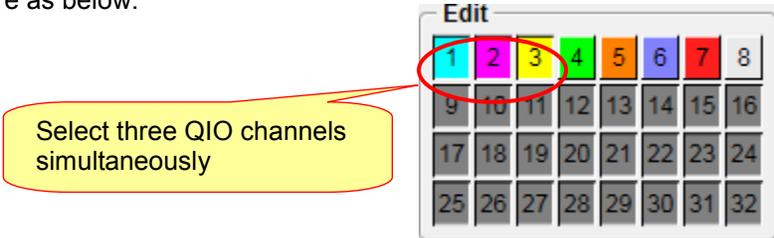


### 3.2 Q-Color

Q-Color is designed to help users to complete the application with interactive RGB (Red, Green and Blue) color control. As we know, most colors in visible light spectrum can be obtained by mixing three primary colors RED, GREEN and BLUE with precisely controlling the relative brightness for each color. Thus, using three QIOs to control three primary color LEDs, most colors can be composed. But the difficult is how can we determine the relative intensity of each primary color to get a desired color? Don't worry! Q-Color offers different ways for easy and interesting color mixing. When three QIO channels selected simultaneously, the color editing work can be easily done with four operating modes. (To select three QIO channels simultaneously, press Ctrl and click on desired channels in Edit zone.)

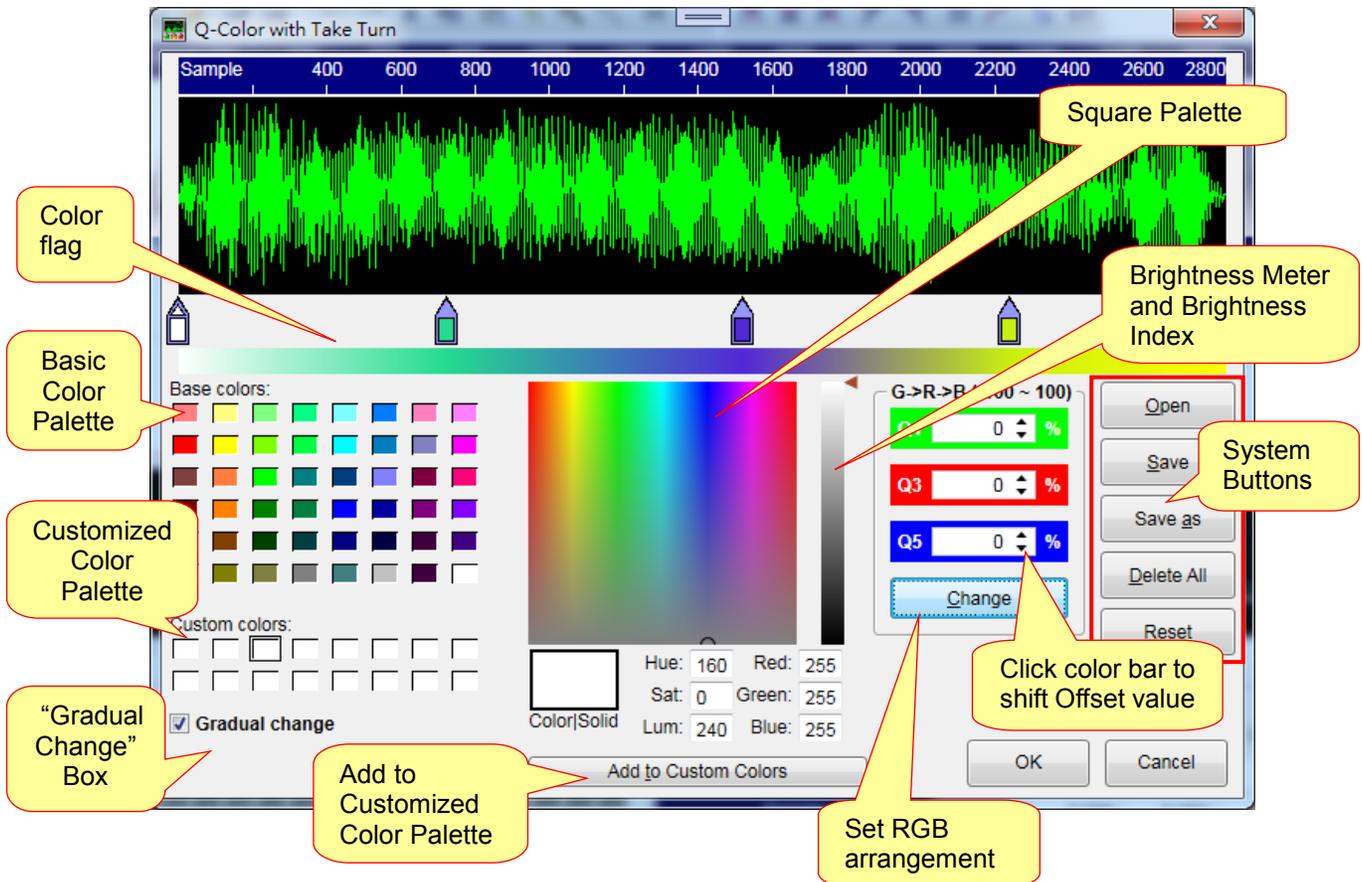
The four operating modes of Q-Color are as below:

- [Take Turn](#)
- [On Route](#)
- [Power Gauge](#)
- [At Random](#)



### 3.2.1 Q-Color [Take Turn]

Q-Color Take Turn allows users to precisely control the color changing over the selected period. An editing window will show as below after execute the function.



#### 3.2.1.1 Manage the Color Flag

To add a color flag, just click in the area below the waveform. After the color flag created, it can be dragged to any point in the area. To delete a color flag, right click on the unwanted flag and select "Delete".

#### 3.2.1.2 Set the Color

At first, select the color flag. Then colors can be set either by selecting the 48-Colors Basic Color Palette on the left, or by clicking anywhere on the square palette in the middle. The selected color is displayed in the color-viewing box under the square palette.

On the right of the square palette is a brightness meter, and users can drag the brightness index (a small black triangle) to modify the brightness of color.

After a color is set, it can be added to the Customized Color Palette. To add a customized color, just select the desired color from the color palettes, or select the color from one of the color flags, and then click "Add to Customized Color Palette" button under the square palette.

### 3.2.1.3 Gradual Change

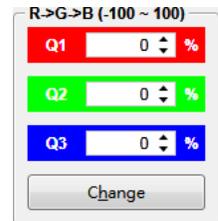
**Gradual Change Box** is around the bottom left, and it is default as unchecked. Color changes from the present color flag to the next immediately when Gradual Change Box unchecked, whereas color changes from the present color flag to the next gradually and smoothly when Gradual Change Box checked.

### 3.2.1.4 Setting

**Setting** arranges the three QIO channels to RED, GREEN, and BLUE respectively, and there are always 6 arrangements available. To change the current setting, just click the “Change” button below the setting.

### 3.2.1.5 Offset

**Offset** command adds an integer value as QIO data output, and the default value is 0. The Offset dialog box will be shown by clicking Offset color bar to shift value. The value can be positive or negative. Parameter allows any integer between -100 and 100: a positive offset shifts UP all highlighted QIO data whereas a negative offset shifts DOWN all highlighted QIO data. When the value is shifted to over 100% or under 0%, it will stay at the limit (100% or 0%).

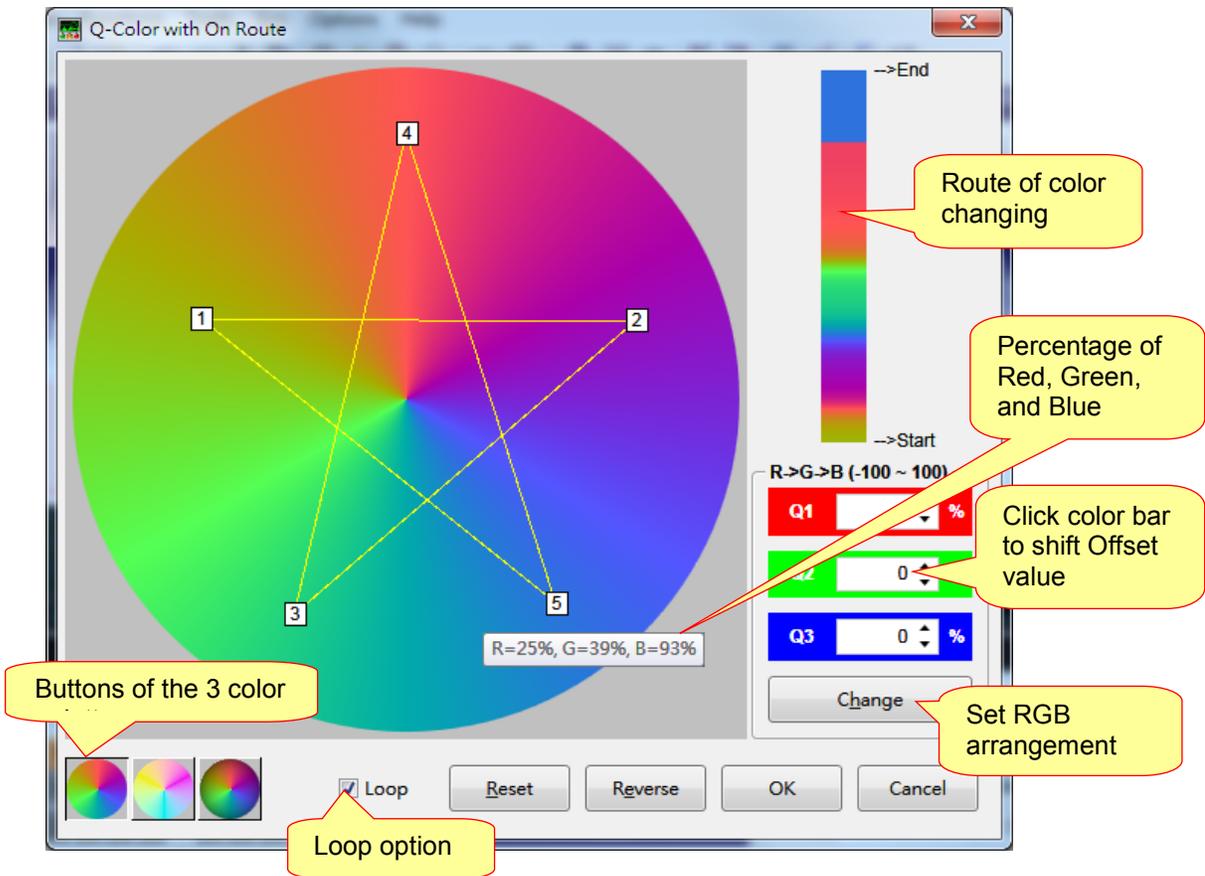


### 3.2.1.6 System Buttons

Button	Function
<b>Open</b>	Retrieve a saved <b>.qcsig</b> files.
<b>Save</b>	Save all color flags in a <b>.qcsig</b> file.
<b>Save as</b>	Save the current editing color flag as a new filename or in a new <b>.qcsig</b> file.
<b>Delete All</b>	Delete all color flags and re-start from beginning.
<b>Reset</b>	Clean all color flags between start and end, and resume the default colors.
<b>OK</b>	Confirm the changes.
<b>Cancel</b>	Discard all changes.

## 3.2.2 Q-Color [On Route]

**Q-Color [On Route]** offers an easy way to make gradual color change by setting its route. After executing **Q-Color [On Route]**, a color palette will show. There are 3 kinds of color palettes available for options, and it can be switched by pressing the buttons around the bottom left corner.



### 3.2.2.1 Manage the Color Point

To add a color point, just click in the color palette. After the color point created, it can be dragged to anywhere in the area. To delete a color flag, just right click on the unwanted point.

### 3.2.2.2 Change the Color Palette

There are 3 color palettes available, and the main difference between them is “brightness”. To change the color palette, just click on the color palette button around the bottom left corner.

### 3.2.2.3 Loop Option

**Loop Option** connects the end point to the start point, which makes the color route start and end at the same color. If Loop option is unchecked, it will end as the color that the last point stays.

### 3.2.2.4 Setting

**Setting** arranges the three QIO channels to RED, GREEN, and BLUE respectively, and there are always 6 arrangements available. To change the current setting, just click the “Change” button below the setting.

### 3.2.2.5 Reset

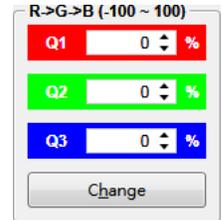
**Reset** clears all color points except the start one.

3.2.2.6 Reverse

**Reverse** button reverses the sequence of all color points.

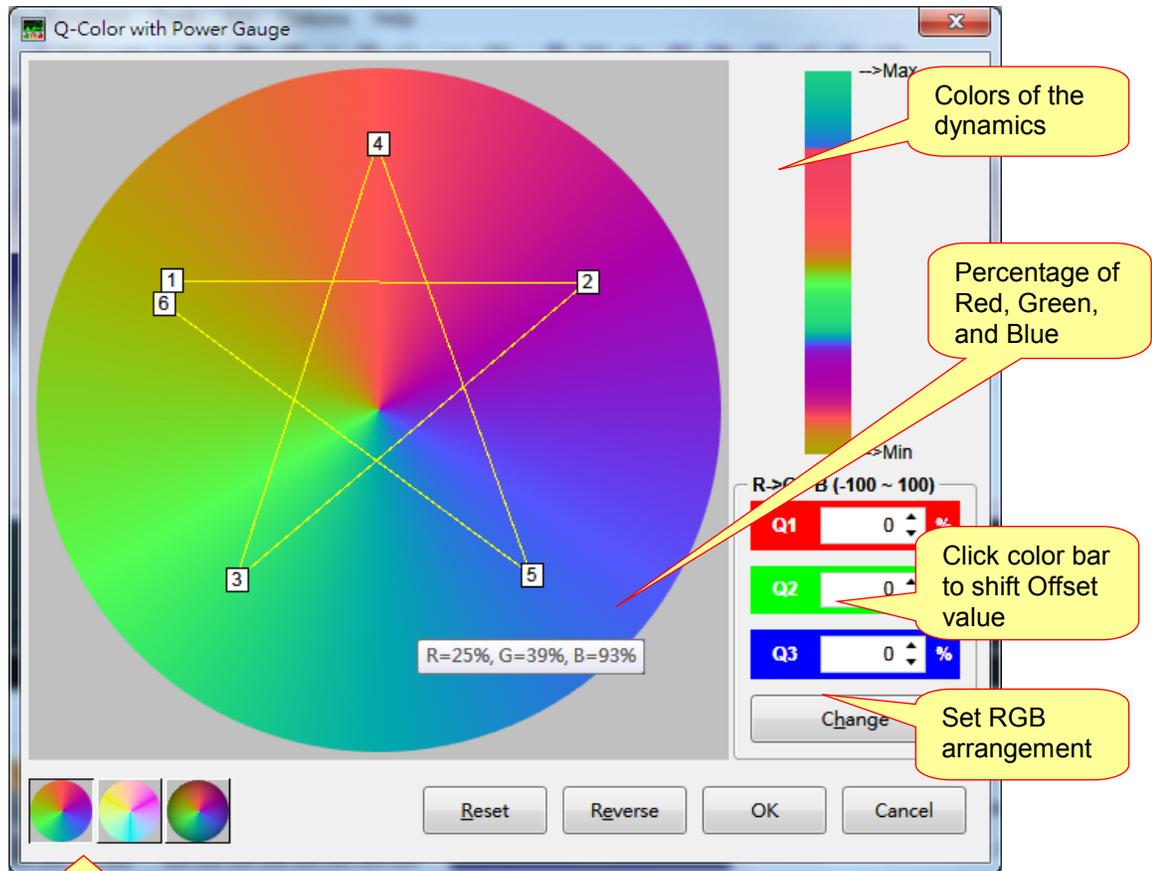
3.2.2.7 Offset

**Offset** command adds an integer value as QIO data output, and the default value is 0. The Offset dialog box will be shown by clicking Offset color bar to shift value. The value can be positive or negative. Parameter allows any integer between -100 and 100: a positive offset shifts UP all highlighted QIO data whereas a negative offset shifts DOWN all highlighted QIO data. When the value is shifted to over 100% or under 0%, it will stay at the limit (100% or 0%).



3.2.3 Q-Color [Power Gauge]

**Q-Color [Power Gauge]** offers an easy way to make color change with dynamics of the waveform. By setting its route, users can easily decide colors of the dynamics. After executing **Q-Color [Power Gauge]**, a color palette will show. There are 3 kinds of color palettes available for options, and it can be switched by pressing the buttons around the bottom left corner.



Buttons of the 3 color palettes

### 3.2.3.1 Manage the Color Point

To add a color point, just click in the color palette. After the color point created, it can be dragged to anywhere in the area. To delete a color flag, just right click on the unwanted point.

### 3.2.3.2 Change the Color Palette

There are 3 color palettes available, and the main difference between them is “brightness”. To change the color palette, just click on the color palette button around the bottom left corner.

### 3.2.3.3 Setting

**Setting** arranges the three QIO channels to RED, GREEN, and BLUE respectively, and there are always 6 arrangements available. To change the current setting, just click the “Change” button below the setting.

### 3.2.3.4 Reset

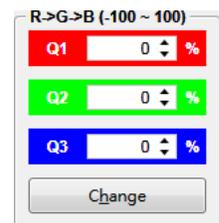
**Reset** clears all color points except the start one.

### 3.2.3.5 Reverse

**Reverse** button reverses the sequence of all color points.

### 3.2.3.6 Offset

**Offset** command adds an integer value as QIO data output, and the default value is 0. The Offset dialog box will be shown by clicking Offset color bar to shift value. The value can be positive or negative. Parameter allows any integer between -100 and 100: a positive offset shifts UP all highlighted QIO data whereas a negative offset shifts DOWN all highlighted QIO data. When the value is shifted to over 100% or under 0%, it will stay at the limit (100% or 0%).



## 3.2.4 Q-Color [At Random]

**Q-Color [At Random]** provides the quickest way to generate random change of colors. Diagonal lines will be generated for each of the 3 QIO channels in a random manner.

## 3.3 Power-Meter

Power-Meter can control up to 32 LEDs to indicate the momentary voice power intensity. It works like the Equalizer of stereo equipment. The principle of Power-Meter is based on setting different thresholds in ascending order for the QIO signals. A QIO signal will be switched to 100% turning on its LED when the

voice power intensity is above its threshold. As the thresholds for the QIO signals are different, different combinations of LEDs will be turned on in different times giving excellent result. Normally, the higher the voice power intensity, the more LEDs will be turned on. You can get even better result by setting appropriate Release Time and Mechanical Delay.

The screenshot displays the 'Power-Meter' configuration window and a waveform analysis tool. The configuration window includes level settings for 32 channels (Q1-Q32) and options for Release Time and Mechanical Delay. The waveform analysis tool shows a green waveform, Edit QIO, and View QIO tracks, along with a waveform index and selection info table.

**Level Settings (0 ~ 100)**

Q1 : 12	Q2 : 23	Q3 : 34	Q4 : 45
Q5 : 56	Q6 : 67	Q7 : 78	Q8 : 89
Q9 :	Q10 :	Q11 :	Q12 :
Q13 :	Q14 :	Q15 :	Q16 :
Q17 :	Q18 :	Q19 :	Q20 :
Q21 :	Q22 :	Q23 :	Q24 :
Q25 :	Q26 :	Q27 :	Q28 :
Q29 :	Q30 :	Q31 :	Q32 :

**Option**

Release Time : 0 ms (0 ~ 1000)      Mechanical Delay : 0 ms (0 ~ 1000)

Buttons: Default, OK, Cancel

**Waveform Analysis**

Sample: 3000, 6000, 9000, 12000, 15000, 18000, 21000, 24000, 27000, 30000, 33000, 36000

Y-axis: 100%, 75%, 50%, 25%, 0%, -25%, -50%

Tracks: Waveform, Edit QIO, View QIO, Ctrl

**Waveform Selection Info**

	Start	End	Length
Sample	20305		0
Time(s)	1.692		0.000

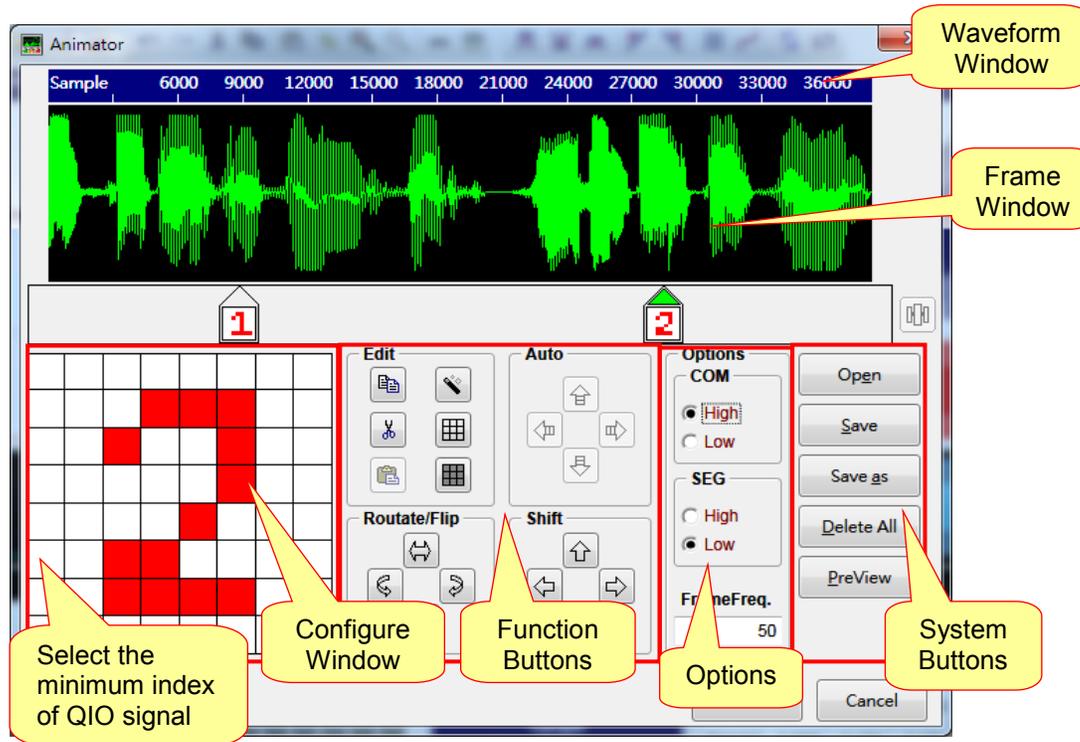
**Waveform Index**

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32

QIO Signal Type: Power-Meter, 0      Source Voice Info -- Sample Count: 38,048 in 16-bit, Duration: 3,171 ms, Sampling Rate: 12,000 Hz

### 3.4 Animator

Animator is specially designed to help the user to create 2D patterns and animations that are synchronized with the voice playing in the LED matrix. Basically, users have to create the patterns frame by frame manually. But by using the quick buttons, users can create the needed patterns or animation much easier and quicker. The figure below shows the interface of the Animator:



#### 3.4.1 LED Configurations

First, users have to define the LED configuration according to the physical circuit connection to the LED matrix. Configure window for defining the dimension of the LED matrix. Pressing + or – buttons in both SEG and COM axis can increase or decrease the number Column and Row respectively. A set of QIO signal for this set up will be automatically allocated. The arrows in the left bottom corner are used to adjust the lowest numbered QIO signal. After adjustment, all QIO signals will be re-numbered. Clicking mouse right button at number area can freely reselect a matching QIO channel in the pop-up menu.

#### 3.4.2 LED Matrix Option

According to the polarity of driving circuit of the LED matrix, the driving signal must be set correspondingly. For driving type circuit (e.g. NPN transistors), please select HIGH. For sinking type circuit (e.g. PNP transistors), please select LOW. FrameFreq box is to define the number of frame displayed per second.

#### 3.4.3 Add a New Frame

By pointing the mouse cursor the space of the frame window and left click, a new frame of pattern will

be created. In the very first time, the Configure window will be immediately changed to the pattern window. This pattern window is used for the user to draw the pattern by clicking the pixel by the mouse. The selected pixels will be 'Red' in color whereas the un-selected pixels will be 'White'. To create another new frame, just click the space of the frame window again.

#### 3.4.4 Move a Frame

To move the position of an existing frame, user can point to, and then press and hold left key to drag and drop the frame to the desired position.

#### 3.4.5 Edit a Frame

Pointing and clicking on an existing frame on the frame window can select that frame for further editing. The pattern of that frame will be immediately shown at the pattern window. Modifications in the pattern window will be immediately reflected in the corresponding icon in the frame window.

#### 3.4.6 Quick Editing Function

There are several quick buttons to help the user to create a sequence of patterns. They are located in Edit, Rotate/Flip and Shift boxes. The followings are the descriptions of the function of these buttons.

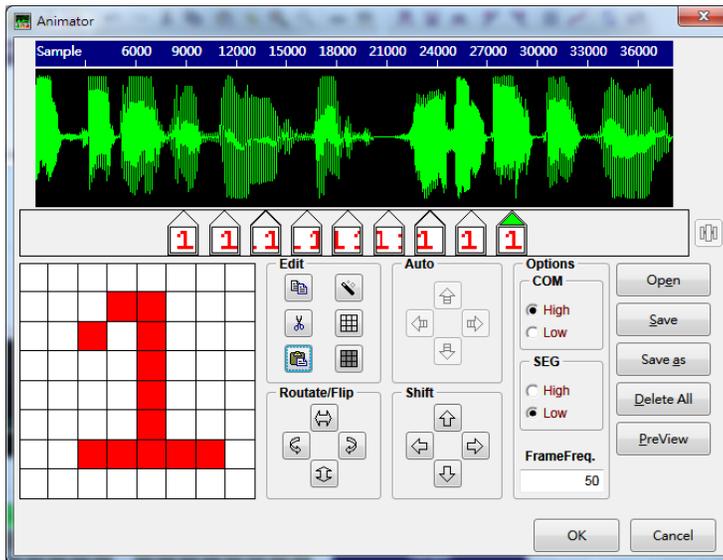
Button	Function
<b>Edit</b>	
	Copy the whole current selected frame pattern to the clipboard.
	Cut the whole current selected frame pattern to the clipboard.
	Paste the pattern from clipboard to the current pattern.
	Reverse all pixels in the current pattern.
	Turn off all pixels in the current pattern.
	Turn on all pixels in the current pattern.
Button	Function
<b>Rotate/ Flip</b>	
	Horizontally flip the pattern.
	Vertically flip the pattern.
	Rotate the pattern clock-wisely.
	Rotate the pattern anti-clock-wisely.
<b>Shift</b>	
	Shift up the pattern by 1 row.
	Shift down the pattern by 1 row.
	Shift left the pattern by 1 column.
	Shift right the pattern by 1 column.

**3.4.7 Quick Animator**

Animator supports a very useful function for the user to quickly create a simple animation. User can use the AUTO function to deduce the transition frames between two selected frames (or even more) instead of drawing all of them manually. To use the AUTO function, user must select at least 2 frames by holding CTRL key and left click the mouse on the desired frames. Pressing one of four directional AUTO buttons yields the transition frames between two terminal frames in accordance with the selected direction. The number of transition frames for vertical direction AUTO function is the number of row (COM) while for horizontal direction is the number of column (SEG).

Button	Function	Button	Function
	AUTO Up function.		AUTO Left function.
	AUTO Down function.		AUTO Right function.

The following screen shows a demonstration of using AUTO Right function.



**3.4.8 Align Frames**

After pressing the alignment button  , all frames in-between the first frame and the last frame will be re-located with equal spacing. It can make the animation run smoother.

**3.4.9 System Buttons**

Button	Function
<b>Open</b>	Retrieve a saved <b>.pic</b> file.
<b>Save</b>	Save all frame patterns in a <b>.pic</b> file.
<b>Save as</b>	Save the current editing frame pattern as a new filename or in a new <b>.pic</b> file.
<b>Delete All</b>	Delete all frames and re-start from beginning.
<b>Preview</b>	Run the simulation.
<b>OK</b>	Confirm the changes.
<b>Cancel</b>	Discard all changes.

## 4 Revision History

<b>Version</b>	<b>Date</b>	<b>Description</b>	<b>Pages Modified</b>
1.0	2007/12/17	Original simple description.	-
2.0	2008/09/18	Make full functions description.	-
2.1	2010/08/23	<ol style="list-style-type: none"> <li>1. Windows 7 complied.</li> <li>2. Add function of Power-Meter and function of Animator.</li> </ol>	<p>5</p> <p>33, 34</p>
2.2	2010/12/01	1. Add Cut, Copy and Paste commands for editing multiple QIO signals.	10
		2. Add command of Repeatedly Pasting copied signal to fill a select range.	10
		3. Add command of offsetting RGB signal.	21, 23, 25
		4. Add Quick-IO and Q-Tone cooperation.	30
		5. Add QIO setting and NY4/NY5 Series I/O ports arrangement.	32
		6. Modify PWM Rate setting.	14, 32
2.3	2012/01/02	1. Add Insert Mark command.	15
		2. Add Delete All Marks command.	15, 23
		3. Modify Offset command.	16, 30, 32, 33
		4. Modify Shift command.	16
		5. Modify Non-Linear contents.	19
		6. Add Table 4.5 Hot Key List. (Level Control, Power-Meter, Insert Mark and Delete All Marks)	22
2.4	2012/05/23	Add .nyw as the supported file format.	11
2.5	2012/06/13	Modify QIO settings and NY5 series I/O ports arrangement.	49
2.6	2012/07/10	Modify the description of File menu.	11
2.7	2012/11/23	Add new function to Ctrl Menu.	29
2.8	2013/02/27	1. Add Frequency Analysis function to View Menu.	20
		2. Add FFT Flitter function.	31
2.9	2017/02/06	Update the main interface and function descriptions.	-
3.0	2017/08/09	Update the main interface.	-

<b>Version</b>	<b>Date</b>	<b>Description</b>	<b>Pages Modified</b>
3.1	2018/05/17	<ol style="list-style-type: none"> <li>1. Update the description of "Export VIO File".</li> <li>2. Add the description of "Language" to [Help] menu.</li> </ol>	<p>13</p> <p>28</p>
3.2	2019/05/14	<ol style="list-style-type: none"> <li>1. Update the main interface of <i>Quick-IO</i>.</li> <li>2. Add the Convert Cue to Mark command.</li> <li>3. Update the menu and description of View.</li> <li>4. Update the menu and description of Options.</li> </ol>	<p>-</p> <p>14</p> <p>16</p> <p>21</p>
3.3	2019/11/07	Update the function illustrations and descriptions.	12
3.4	2021/01/19	Add the illustration and description of Convert Cue to Sync.	14
3.5	2021/11/22	Add the illustration and description of Resample function.	20
3.6	2022/01/25	<ol style="list-style-type: none"> <li>1. Remove the QIO description of NY3M/NY3W.</li> <li>2. Add NY5+ series.</li> </ol>	<p>-</p> <p>17, 18, 41, 42</p>
3.7	2022/05/27	<ol style="list-style-type: none"> <li>1. Add the illustration and description of Batch Convert.</li> <li>2. Add the description of Delete Mark.</li> <li>3. Update the description of Ctrl Menu.</li> <li>4. Add the QIO Q1~Q32 setting and NX1 Series I/O ports arrangement.</li> </ol>	<p>13</p> <p>15</p> <p>25</p> <p>43</p>
3.8	2022/08/06	<ol style="list-style-type: none"> <li>1. Add the illustration and description of Import Vixen Signal.</li> <li>2. Add the illustration and description of Sort SYNC.</li> <li>3. Add the illustration and description of Group and Import.</li> <li>4. Add the illustration and description of System Buttons for Q-Color Take Turn.</li> <li>5. Update the System Buttons description of Animator.</li> </ol>	<p>12</p> <p>17</p> <p>24</p> <p>34</p> <p>-</p> <p>49</p>
3.9	2022/11/28	<ol style="list-style-type: none"> <li>1. Update the illustration and description of Import QIO Signal.</li> <li>2. Update the illustration of Import Vixen Signal.</li> <li>3. Update the illustration of Export QIO Signal.</li> <li>4. Update the illustration of Export VIO File.</li> <li>5. Add the illustration and description of Replace Audio.</li> <li>6. Update the illustration and description of Convert Cue to QIO.</li> <li>7. Update the illustration and description of Reorder QIO.</li> <li>8. Update the illustration of Settings.</li> <li>9. Update the description of Q-Action with Level.</li> </ol>	<p>12</p> <p>12</p> <p>12</p> <p>13</p> <p>15</p> <p>17</p> <p>19</p> <p>26</p> <p>32</p>

<b>Version</b>	<b>Date</b>	<b>Description</b>	<b>Pages Modified</b>
4.0	2023/02/07	Add the illustration and description of Q-Action with Beat Detection.	31
4.1	2023/08/15	Add the icon and descriptions of Import Logic Analyzer Signals.	12
4.2	2024/08/26	Update the descriptions of QIO Q1~Q7 Setting and NY3 Series I/O Ports Arrangement.	48

## 5 Appendix

Although *Quick-IO* offers user-friendly interface, it handles many complicated task, and sometimes we may be confused if we do not know how it works. The following appendices contain some useful information for using *Quick-IO*, so that users can get rid of confusion.

### Contents:

- [5.1 Quick-IO and Q-Tone Cooperation](#)
- [5.2 Quick-IO and Q-Speech Cooperation](#)
- [5.3 Quick-IO and Q-Code Cooperation](#)
- [5.4 PWM Resolution](#)
- [5.5 Hot Keys](#)

### 5.1 Quick-IO and Q-Tone cooperation

Using *Quick-IO* with *Q-Tone* makes I/O control more easy and flexible. The following will describe how *Quick-IO* cooperates with *Q-Tone*.

#### 5.1.1 What You Draw is What You See

The Level High in *Quick-IO* means that output status is on when *Q-Tone*'s Output status is set as Busy-Low, namely Sink Connection implemented (connect output pin and VDD) Instead. The Level High in *Quick-IO* also means that output status is on when *Q-Tone*'s Output status is set as Busy-High, namely Drive Connection implemented (connect output pin and GND). Vice versa. The Level Low in *Quick-IO*, cooperating with the proper *Q-Tone*'s Output status settings, means that output status is off. This is the conception of "What you draw is what you see".

#### 5.1.2 QIO Q1~Q2 setting and NY2 Series I/O ports arrangement

	Q1	Q2
NY2A	IO1	-
NY2B	IO1	IO2
NY2C	IO1	IO2
NY2D	-	-

### 5.2 Quick-IO and Q-Speech cooperation

Using *Quick-IO* with *Q-Speech* makes I/O controlling more easy and flexible. The following will describe how *Quick-IO* cooperates with *Q-Speech*.

## 5.2.1 What You Draw is What You See

The Level High in *Quick-IO* means that output status is on when *Q-Speech's* Output status is set as Busy-Low, namely Sink Connection implemented (connect output pin and VDD) Instead. The Level High in *Quick-IO* also means that output status is on when *Q-Speech's* Output status is set as Busy-High, namely Drive Connection implemented (connect output pin and GND), vice versa. The Level Low in *Quick-IO*, cooperating with the proper *Q-Speech's* Output status settings, means that output status is off. This is the conception of “*What you draw is what you see*”.

## 5.2.2 QIO Q1~Q7 Setting and NY3 Series I/O Ports Arrangement

	Q1	Q2	Q3	Q4	Q5	Q6	Q7
NY3A	-	-	-	-	-	-	-
NY3B	IO1	-	-	-	-	-	-
NY3C	IO1	IO2	-	-	-	-	-
NY3D	IO1	IO2	IO3	-	-	-	O4
	-	-	-	IO1	IO2	IO3	O4
NY3P(D)	-	IO2	-	-	-	-	-
	-	-	-	-	IO2	-	O4
NY3L	O1	O2	IO3	O1	O2	-	-

\*It allows 2 sets of I/O setting coexist in NY3D and NY3P(D), so one voice section could have 2 kinds of output in different steps.

## 5.3 Quick-IO and Q-Code cooperation

Using *Quick-IO* with *Q-Code* makes I/O controlling work more easy and efficient. The following will describe how *Quick-IO* cooperates with *Q-Code*.

### 5.3.1 One System, One Statement

I/Os are fixed as mask options and cannot be changed by commands in NY3 series, thus it can be easily defined which signal is active and which is not. Unlike NY3 series, I/Os in NY4/NY5/NY5+ series can be controlled by commands and I/O status can be changed at anytime, so it's hard to tell which signal means active and which doesn't. To make it simple for sophisticated NY4/NY5 series, *Quick-IO* signals would be in accord with *Q-Code* language. Namely, 0% in *Quick-IO* is equal to 0 in *Q-Code* (output Low) while 100% in *Quick-IO* is equal to 1 in *Q-Code* (output High). This is the conception of “*One System, One Statement*”.

But *Q-Code* provides another Busy-Low (BL) and Busy-High (BH) setting, that's similar with *Q-Speech* setting. For details, Please see *Q-Code* user manual.

### 5.3.2 QIO Q1~Q8 setting and NY4 Series I/O ports arrangement

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
NY4A	PA0	PA1	PA2	PA3	-	-	-	-
NY4B	PA0	PA1	PA2	PA3	PB0	PB1	PB2	PB3

### 5.3.3 QIO Q1~Q32 setting and NY5/NY5+ Series I/O ports arrangement

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
PA0	PA1	PA2	PA3	PB0	PB1	PB2	PB3
Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
PC0	PC1	PC2	PC3	PD0	PD1	PD2	PD3
Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24
PE0	PE1	PE2	PE3	PF0	PF1	PF2	PF3
Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32
PG0	PG1	PG2	PG3	PH0	PH1	PH2	PH3

### 5.3.4 QIO Q1~Q32 setting and NX1 Series I/O ports arrangement

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
PA0	PA1	PA2	PA3	PA4	PA5	PA6	PA7
Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
PA8	PA9	PA10	PA11	PA12	PA13	PA14	PA15
Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24
PB6	PB7	PB8	PB9	PB10	PB11	PB12	PB13
Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32
PB14	PB15	PC0	PC1	PC2	PC3	PC4	PC5

### 5.3.5 PWM Resolution

In *Quick-IO*, the max degree of illumination is 200, namely there are 200 kinds of brightness. On occasions, there are a fewer degrees available, and it depends on which IC is used? What's the sampling rate? And how's the frame rate, which can be set in [Option].

Regarding to NY3C & NY3D series, there is the following formula for effective brightness degrees:

$$D = SR / FR$$

D = Effective Degrees of Brightness ( $D \leq 200$ )

SR = Sample Rate

FR = Frame Rate

Ex:

When SR = 8KHz and FR= 80Hz,

$$D = 8000 / 80 = 100$$

Thus, the efficient degrees of brightness are 100.

But when SR = 8KHz and FR = 100Hz,

$$D = 8000 / 100 = 80$$

Actually the efficient degrees of brightness are merely 80.

***Note: For different IC series, the formula of effective brightness degrees is different. Thus, please contact Nyquest for more information.***

## 5.4 Hot Keys

Quick-IO offers hot keys to keep users from doing everything with the mouse. User can drag and select the region with one hand, and execute the intended function with the other hand. Please refer to the Hot Key List.

**Table 5.5 Hot Key List**

Menu	Function	Hot Key
<b>Edit</b>	Undo	Ctrl + Z
	Redo	Shift + Ctrl + Z
	Insert Mark	Ctrl + M
	Delete Mark	Ctrl + Del
	Delete All Mark	Ctrl + D
	Cut	Ctrl + X
	Copy	Ctrl + C
	Paste	Ctrl + V
	Invert	I
	Reverse	R
	Offset	O
	Shift	S
	QIO Select	Q
	Select All	Ctrl + A
<b>View</b>	Frequency Analysis	Alt + Z
<b>Function</b>	Level High	H
	Level Low	L
	Level Control	C
	Ascend	A
	Descend	D
	Flashing	F
	Non-Linear	N
<b>Tool</b>	Power-Meter	M
<b>Option</b>	Settings	F4