九齊科技股份有限公司

Nyquest Technology Co., Ltd.

User Manual

# Q-Tone for NY2 Series

## Easy Tone Synthesizer Programmer

**Version 2.8**

**Nov. 8, 2024**

# Table of Contents

# 1 Introduction

*Q-Tone* is Nyquest's brand new integrated development tool for music IC. The intuitive interface, well-regulated pages, and real-time rehearse bring more convenience to programmers. Cooperate with its powerful peripherals, *Q-MIDI, Quick-IO* and *Q-Writer*, it would make work much more simple and efficient.

**Contents:**



## 1.1 What is *Q-Tone*

*Q-Tone* is an integrated development environment used to program Nyquest's Voice IC Series. It not only provides a user-friendly graphical interface, but also brings more accuracy, efficiency and simplicity.

## 1.2 Getting Started

Please contact Nyquest Technology to acquire the updated *Q-Tone* program. To install *Q-Tone*, 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 the installation.

### 1.2.1 System Requirements

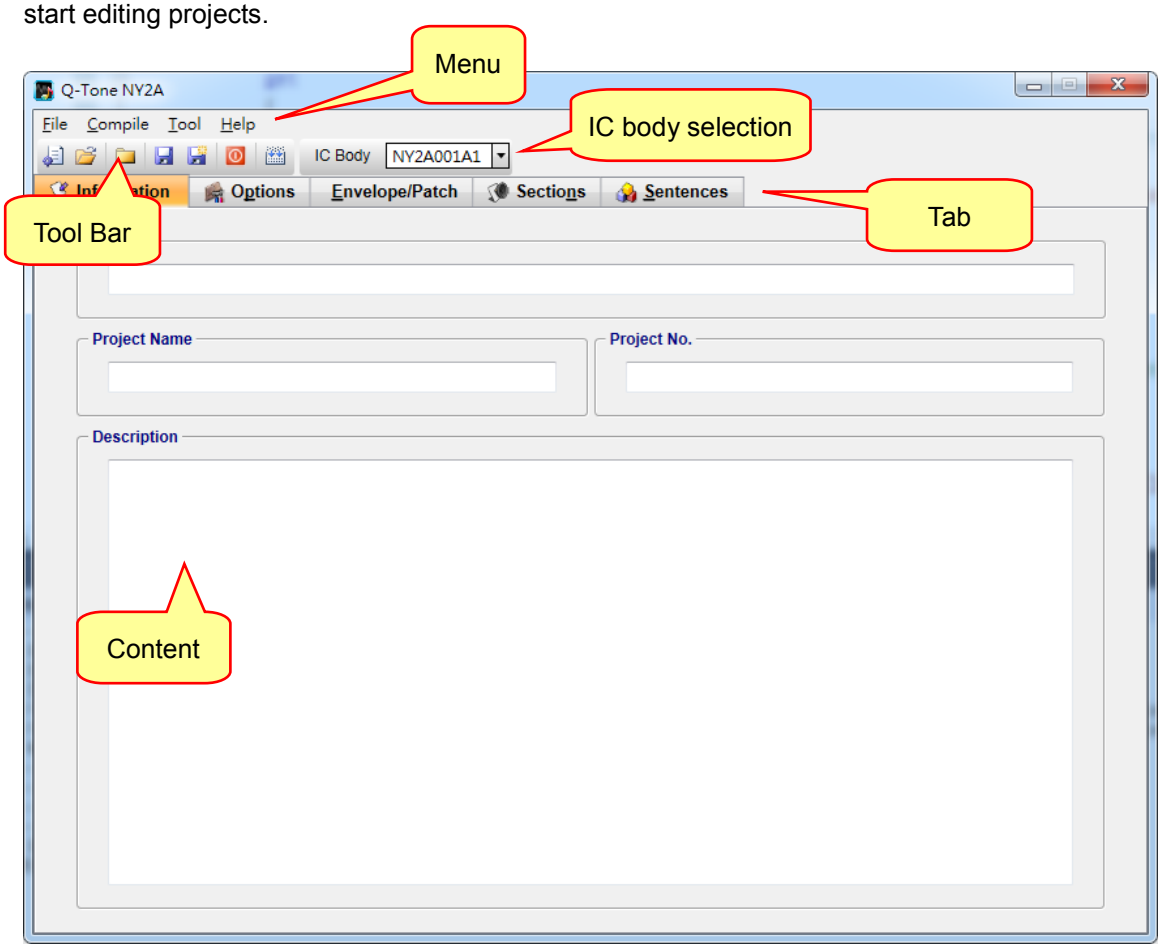
a) Pentium 1.3GHz or above CPU with Windows 7, 8, 10 or 11 operating system
b) At least 1GMB RAM
c) At least 2G free space on your hard disk
d) 1366x768 VGA or above display card and monitor

## 1.3 The Main Interface of *Q-Tone*

When executing *Q-Tone,* the initial window with IC Body series will show up. Then select the desired IC Body and press [OK], user could get start.


| IC series | Abbr. |
|---|---|
| NY2AxxxA | NY2A |
| NY2BxxxA | NY2B |
| NY2CxxxA | NY2C |
| NY2DxxxA | NY2D |

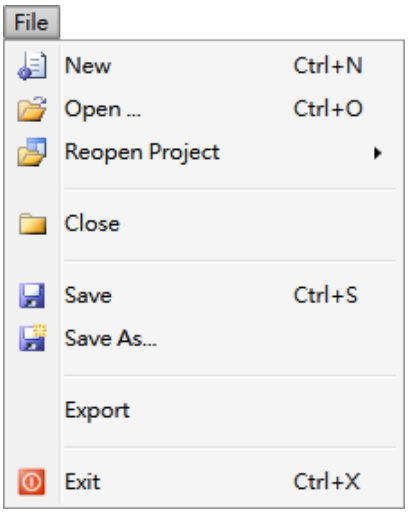
After selecting IC body, please select [File/New] or [File/Open], or just click on the [New] / [Open] button to start editing projects.



## 1.4 Using the Menus

### 1.4.1 File Menu

Click on the header [File] on the Menu bar and the menu is shown below.

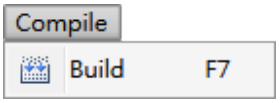



Functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| New | Create a new *Q-Tone* project |
| Open | Open an existing *Q-Tone* project |
| Reopen Project | List the recently opened *Q-Tone* projects, from which one can be chosen. |
| Close | Close the currently open *Q-Tone* project |
| Save | Save the *Q-Tone* project |
| Save As | Save the *Q-Tone* project with a different name and/or to a new location |
| Export | Export the *Q-Tone* project and the files used in project to another directory. |
| Exit | Quit *Q-Tone* |

***Note: All files saved by Q-Tone will have the .prj extension.***

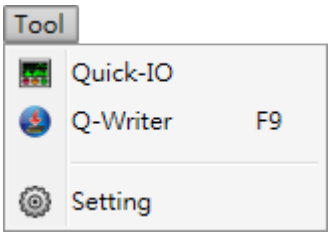
### 1.4.2 Compile Menu



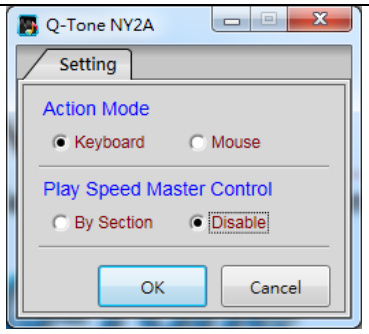

Function of the menu item is described below:

| Menu Item | Function |
|---|---|
| Build | User can convert a *Q-Tone* project file (**.prj**) into a target binary file (**.bin**). To start the compiling process, just click on the header [Compile] and then select [Build]. A target binary file (**.bin**) and a checking list file (**.htm**) will be generated after compiling. |

### 1.4.3 Tool Menu



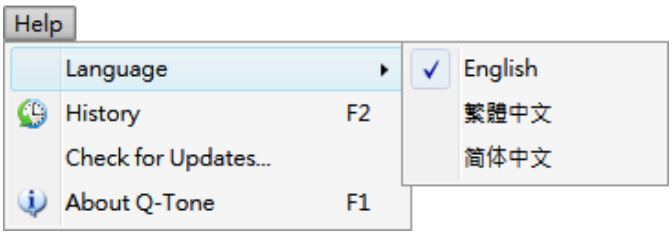

Functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| *Quick-IO* | *Quick-IO* is the software to edit synchronized output signals for voices. To use *Quick-IO*, simply click on [*Quick-IO*] on the [Tool] menu. |
| *Q-Writer* | *Q-Writer* is the hardware tool to download the **.bin** file to the demo board. To use *Q-Writer*, simply click on [Q-Writer] on the [Tool] menu. |
| Setting | The [*Setting*] window is for setting the environment variables of *Q-Tone*. User can select keyboard or Mouse to edit program via the Action Mode and Play Speed Master Control.<br>  <br>User can select Keyboard mode or Mouse mode to enhance editing effectively via Action Mode. The default is Keyboard mode.<br>User can select By Section or Disable the Play Speed Master Control according user's operating habits. When the play speed of Section is adjusted, the play speed of Step will be synchronized (By Section) or not synchronized (Disable) based on the setting. The default is By Section. |



***Note: Q-MIDI, Q-Writer and Quick-IO must be installed, or they can't be functional.***

### 1.4.4 Help Menu



Functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| Language | Support different language interfaces. |
| History | Revised records. Display the revised history of *Q-Tone*. |
| Check for Updates… | Check for the latest version of *Q-Tone*. This function will connect to the Internet. |
| About Q-Tone | Display the information of *Q-Tone* including its version. |

## 1.5 Using the Buttons

There are 8 buttons available on toolbar for quick access to the frequently used commands. To execute such a command, just click the corresponding button.


New -- Create a new *Q-Tone* project.


Open -- Open an existing *Q-Tone* project.


Reopen -- List the recently opened *Q-Tone* projects, from which one can be chosen.


Close -- Close the currently opened *Q-Tone* project.


Save -- Save the *Q-Tone* project.


Save As -- Save the *Q-Tone* project with a different name and/or to a new location.


Exit -- Quit present project and exit *Q-Tone.*

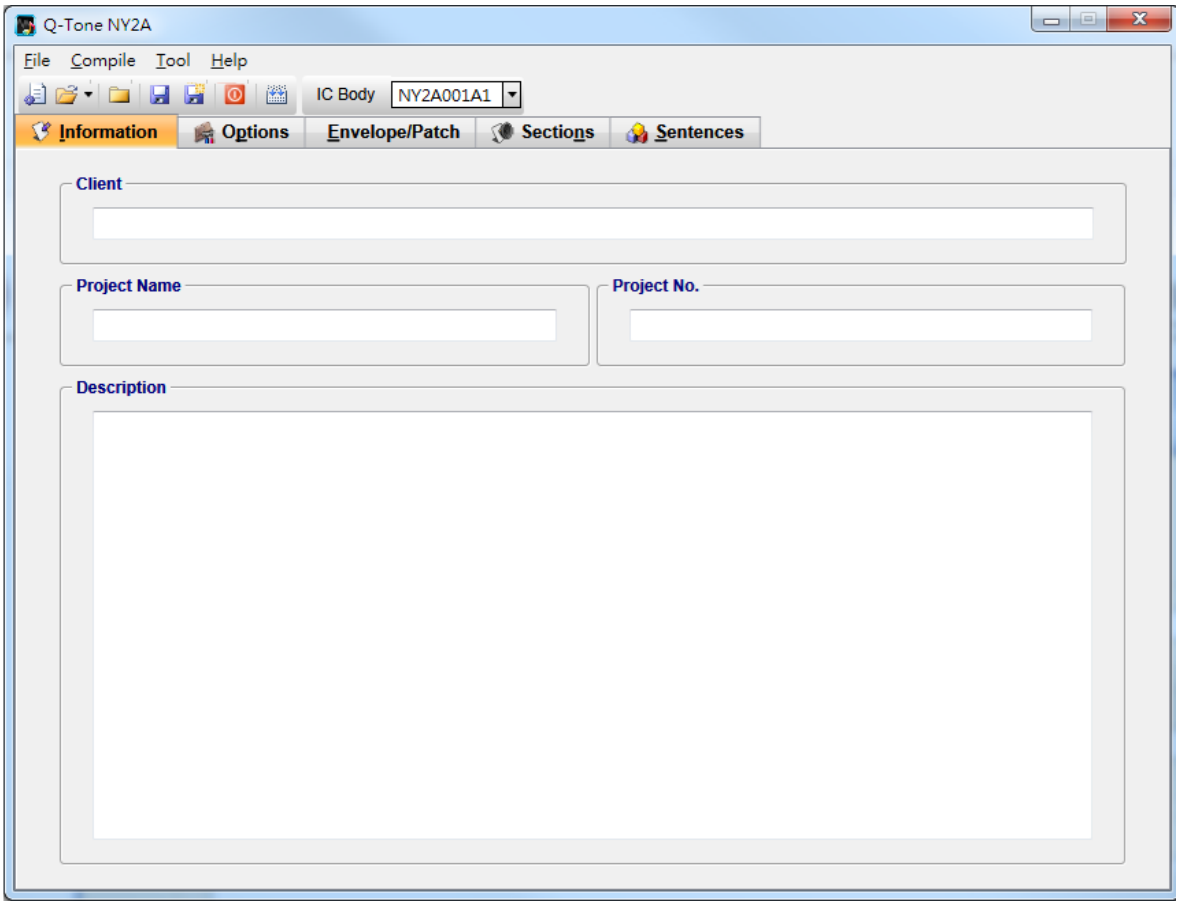

Build – Build *Q-Tone* Project (**.prj**) as a binary file (**.bin**).

## 1.6 Controlling the Pages

Page contents vary for different IC series. There are 6 pages available in the window: Information, Options, Envelope/Patch, Sections, Sentences and Alone/Matrix. But the Alone/Matrix page is only use for NY2C. To view a page, simply click on the corresponding page tab.

### 1.6.1 Information Page

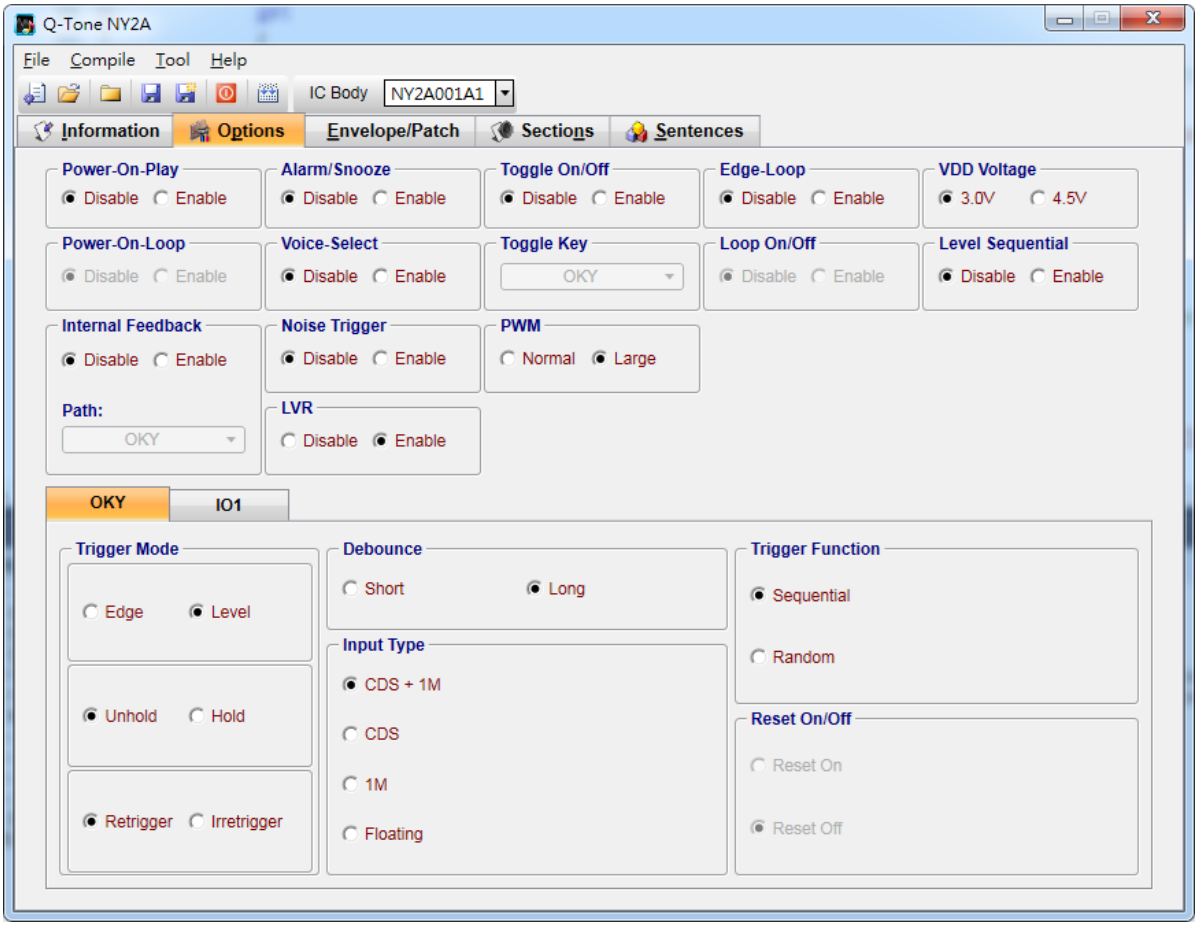
The Information Page is designed for recording the client name, project name, etc. The information on this page is for your reference and will be saved ONLY in the **.prj** file. It will not be checked, compiled and included in the **.bin** file except the client name.




***Note: The client name on this page will be included in the Checking List and Confirm Table after compiling. This is to protect the copyright of the programmer. The client name is the only "required" on this page, a warning message will display when compiling if this column is blank.***

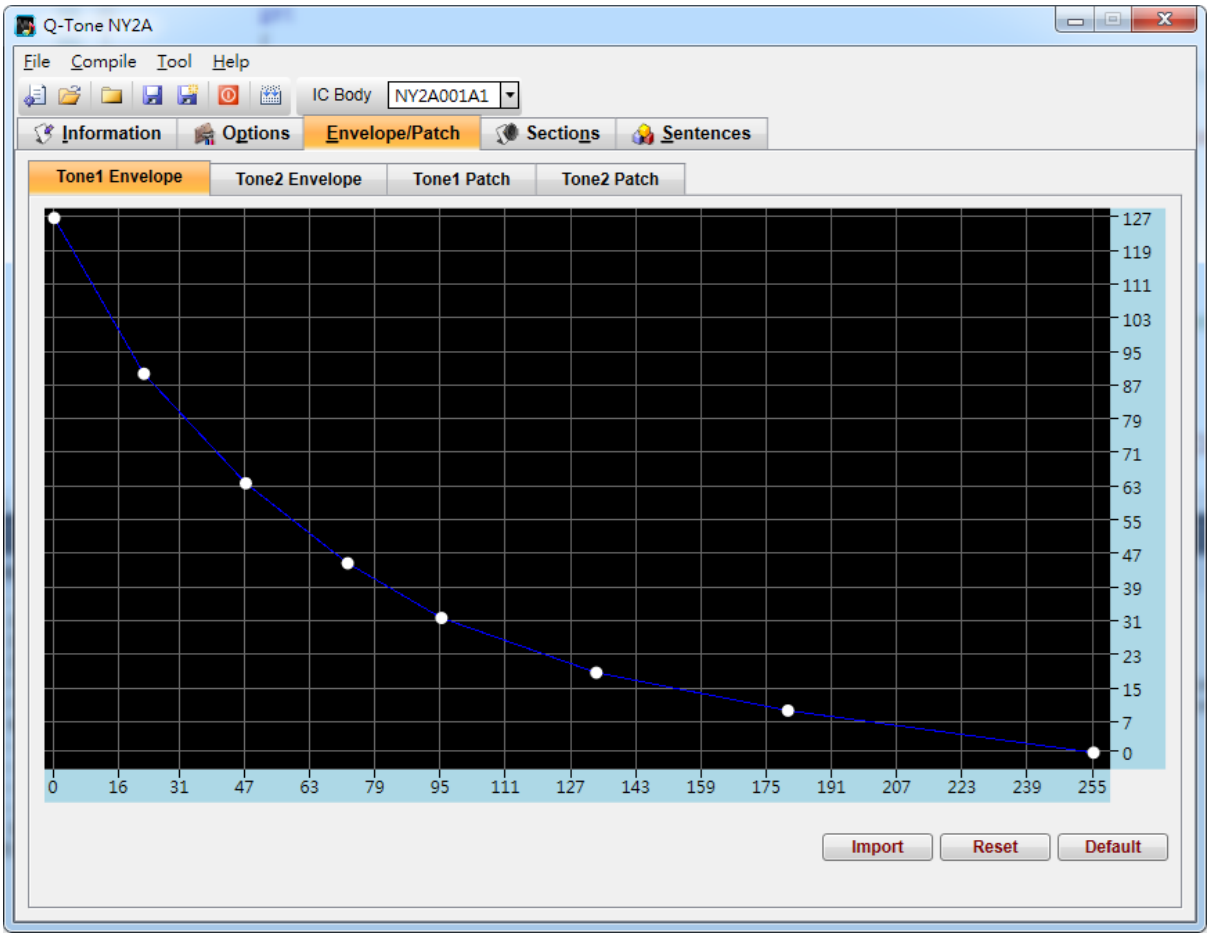
### 1.6.2 Options Page

The Options Page is designed for setting mask options to control IC functions. Functions of different IC series are not the same, so the appearance of the Options page will be different for different IC series.



### 1.6.3 Envelope/Patch Page

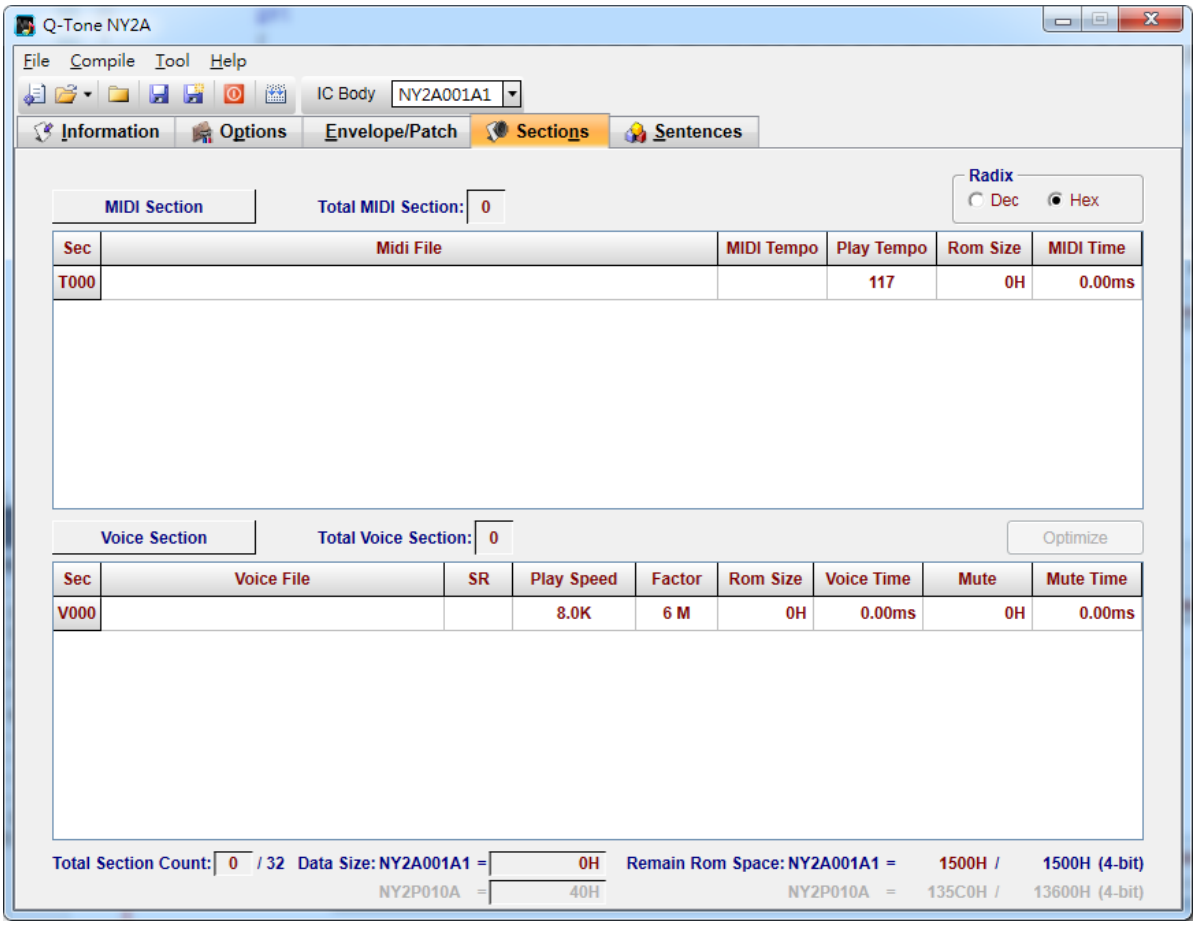
The Envelope/Patch Page is designed for drawing envelope profile and making patch wave. User could take full advantage of this marvelous tool to make wonderful sound that different to the traditional square-wave tone.




***Note: X-axis ranges from 0 to 255, and Y-axis ranges from 0 to 127.***

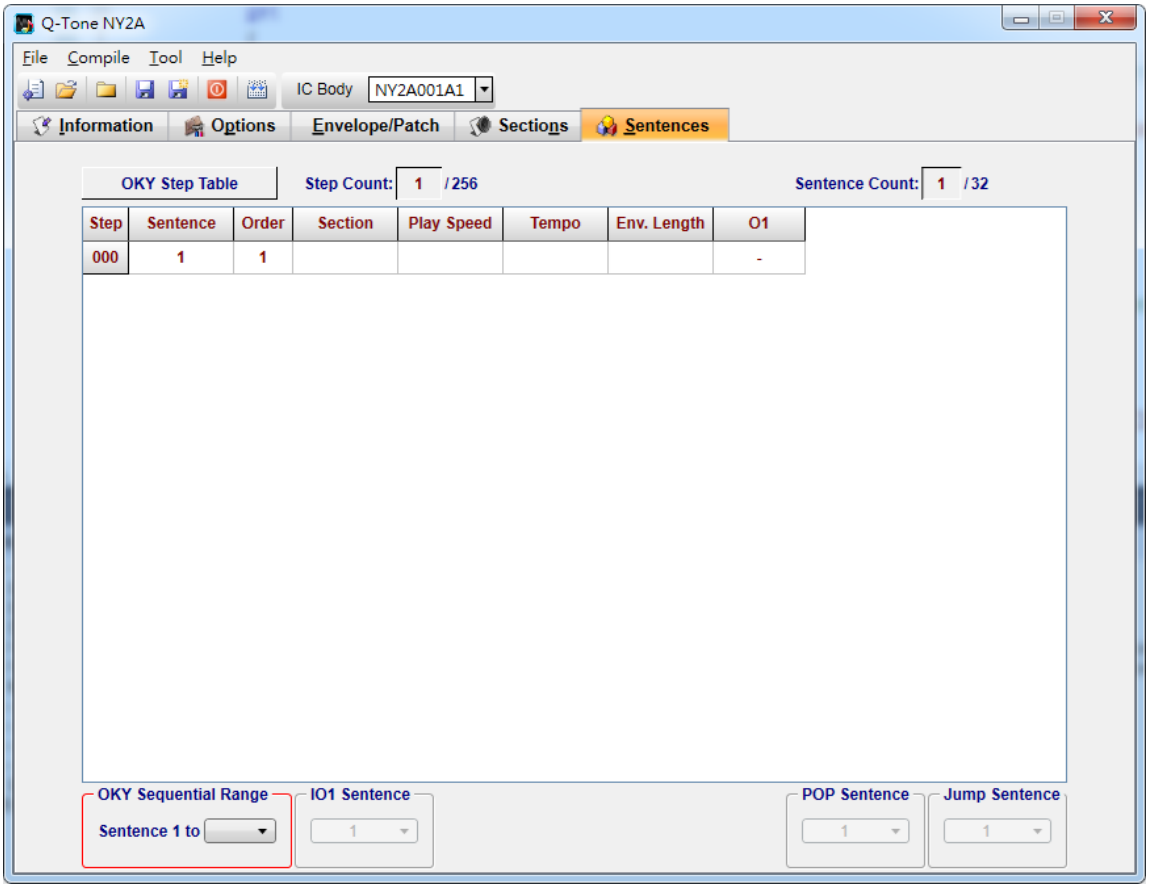
### 1.6.4 Sections Page

The Sections Page is designed for including and managing the music and voice sections. After sections appropriately included here, they could be arranged on the Sentences page later.



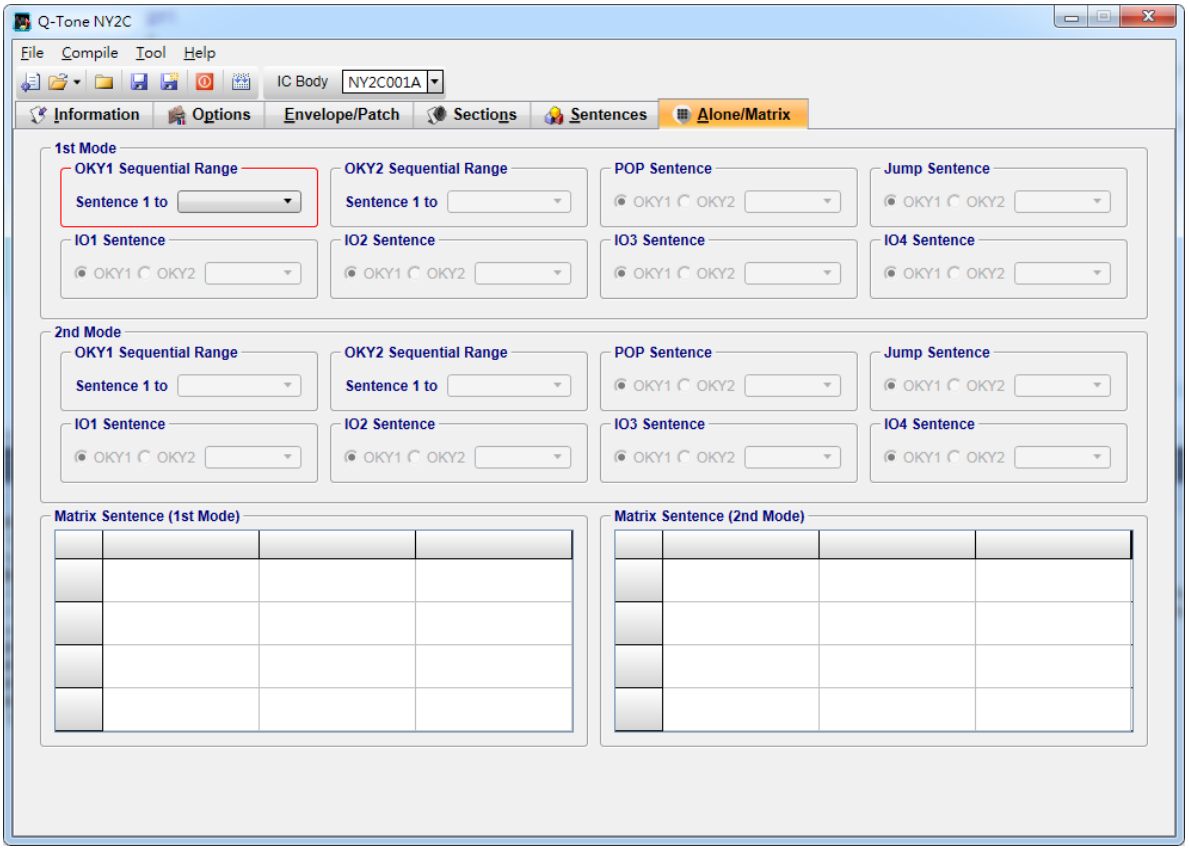
### 1.6.5 Sentences Page

The Sentences Page is designed for arranging sentences. By altering steps of a sentence, different combinations of voice and music sections could be created for triggers. Functions of different IC series are not the same, so the appearance of the Sentences page will be different for different IC series.



### 1.6.6 Alone/Matrix Page

The Alone/Matrix Page is designed for arranging alone or matrix keys of sentence. User can have various effects by arranging different combinations of voice and music sections. Functions of different IC series are not the same, so the appearance of the Alone/Matrix page will be different for different IC series.




***Note: The Alone/Matrix page is not applied for all IC series.***

# 2 Using *Q-Tone* for NY2A Series

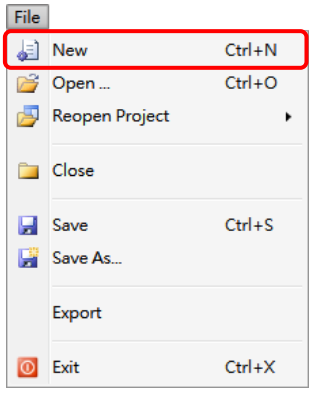
In this chapter, the details of using *Q-Tone* for NY2A will be presented step by step.

**Contents:**

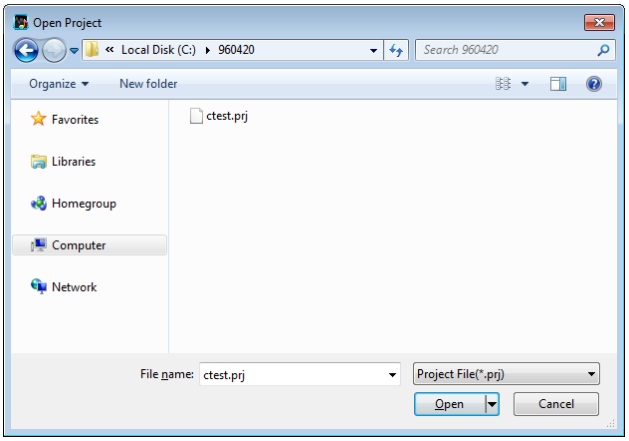


## 2.1 Creating a *Q-Tone* Project

After selecting [File/New] or [File/Open] on *Q-Tone*, or clicking the [New] button on the toolbar directly to start editing.

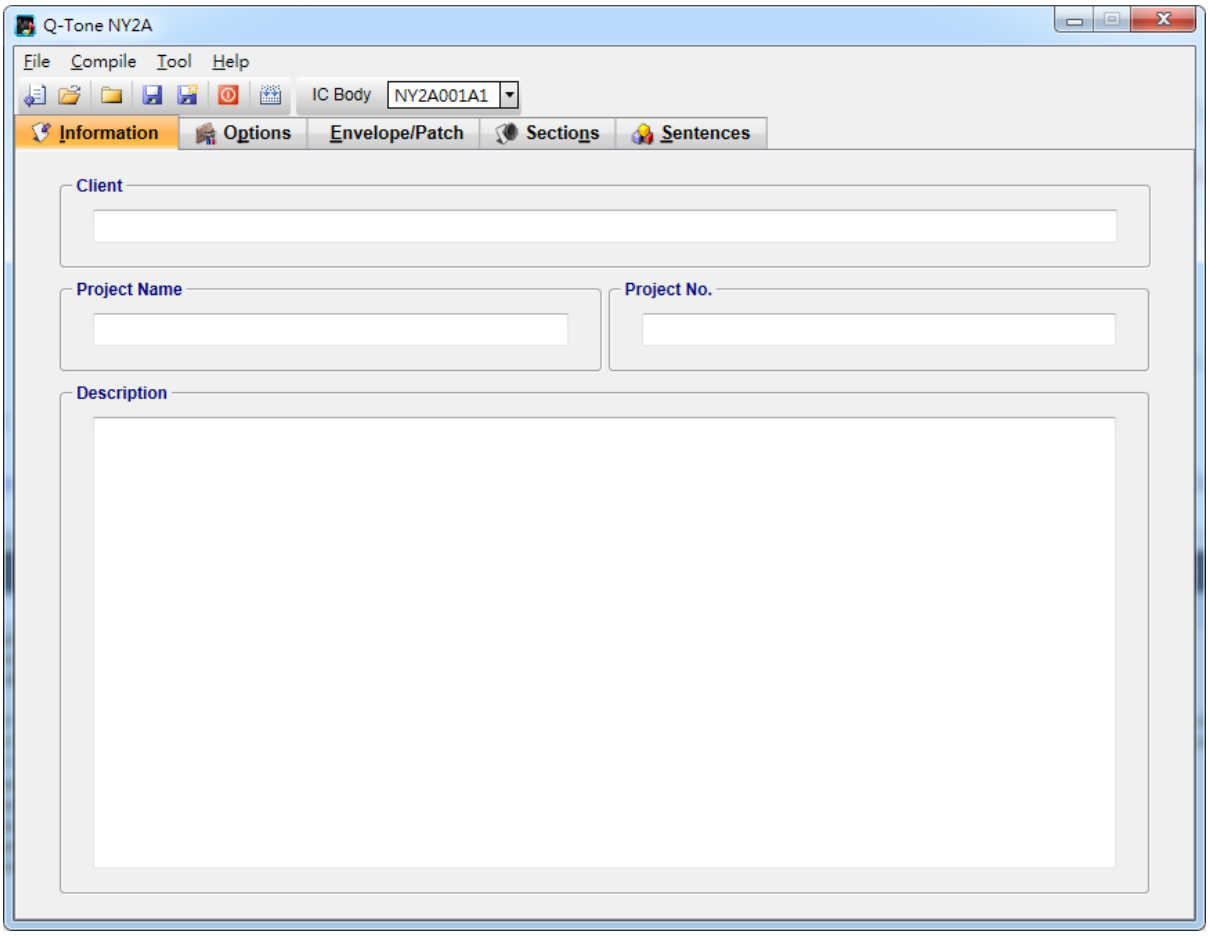



To modify an existing file, select [Open] from the [File] menu, and a dialog box for opening file will display shortly. After selecting a desired file within the [Open Project] dialog box, press [Open] button, or double-click it directly, and the existing file will be opened. If the file to be opened has been edited recently, it might be found on the list of [Reopen] option and could be opened directly.



## 2.2 Filling in the Information

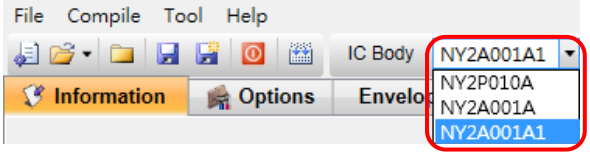
The Information page will be shown immediately after the file is opened. Any words can be typed in the blanks of this page, and the information on this page will be saved completely in the *Q-Tone* file. Since the information on this page, except [Client] blank, is just for user to annotate or record, no error checking will be performed by *Q-Tone.* All information will not be included in the .bin file except the client name.




***Note: The client name on this page will be included in the Checking List and Confirm Table after compiling. This is to protect the copyright of the programmer. The client name is the only "required" on this page, a warning message will display when compiling if this column is blank.***

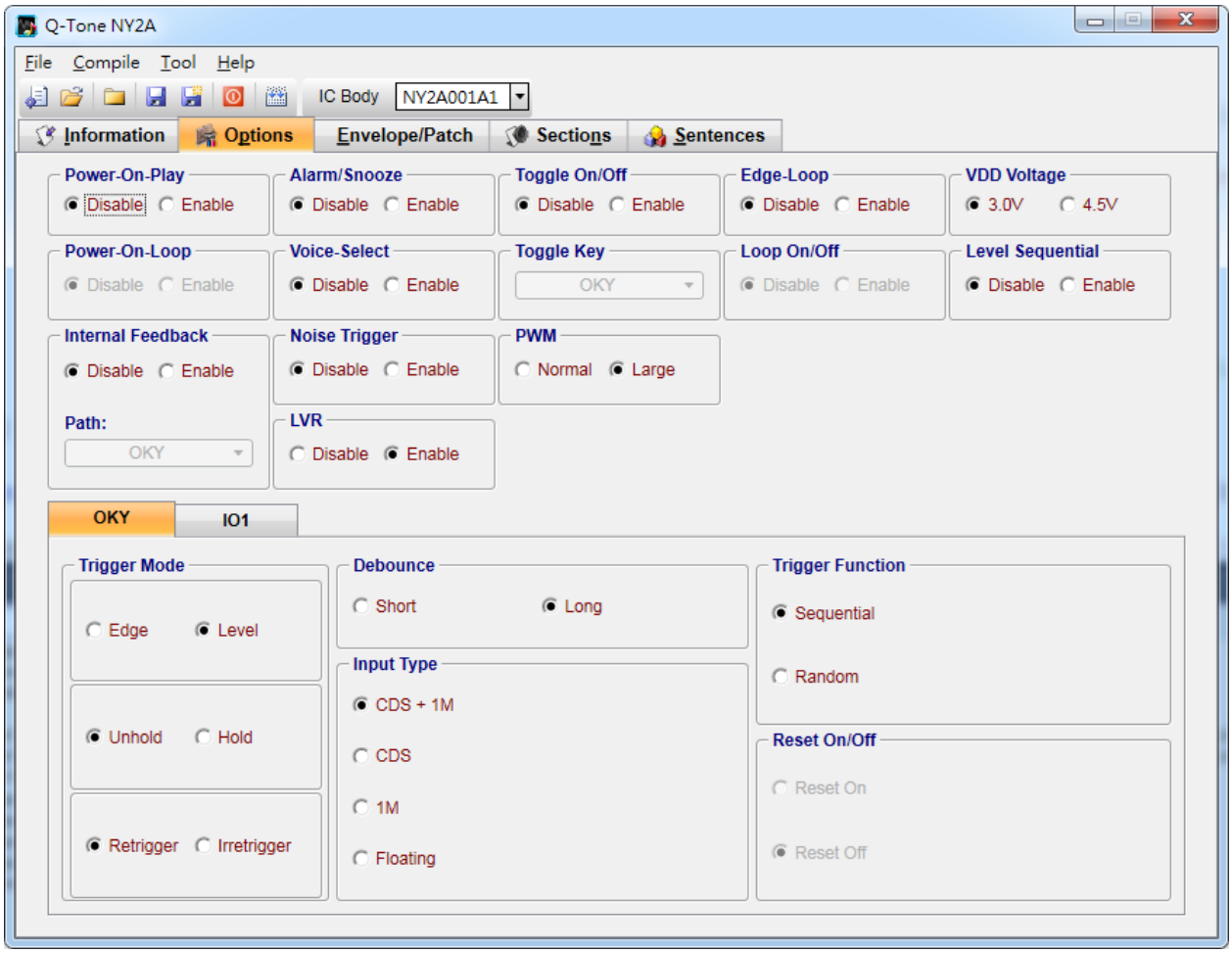
## 2.3 Selecting the IC Body

The [IC Body] drop-down list is at the top of the window. By clicking the Down button of it, all available IC bodies will be listed for selection. IC body could be changed during editing a project, but an error message in red word may display if the total ROM size of current sections exceeds the capacity of selected IC body.



## 2.4 Selecting the Mask Options

By selecting different mask options on the Options page, the complicated functions could be accomplished quickly. Although different series ICs have different functions, there are usually similar items in Options page. Such as Debounce Time, Trigger Mode, etc, could be set easily on the Options page.




### 2.4.1 Power-On-Play (POP)

When Power-On-Play option is enabled, IC will play the POP Sentence one time when power is on. When another key is triggered, it stops playing the POP Sentence and immediately plays the assigned sentence of triggered key.

### 2.4.2 Power-On-Loop

When Power-On-Loop option is enabled, IC will play the POP Sentence in loop when power is on. The trigger mode is fixed as Edge / Unhold / Retrigger.

***Note: This option can be set only at Power-On-Play status is enabled.***

### 2.4.3 Alarm/Snooze

When Alarm/Snooze option is enabled, IO1 is set as alarm clock switch, and OKY is set as the snooze button.

When IO1 alarm switch is held, it plays the IO1 sentence one time, and then plays the “Loop Sentence” in loop until alarm period is over. Once IO1 switch is turned off while alarm playing, alarm stops and then plays the “Jump Sentence” one time. Once pressing the snooze button while alarm playing, alarm stops playing and then waits for a period of snooze time. After snooze time is over, the “Loop Sentence” will be played in loop.

Cooperating with Voice-Select function, it plays the OKY sentence one time and then plays the Loop Sentence in loop when IO1 alarm switch is held. Once IO1 switch is turned off while alarm playing, alarm stops and then plays the “Jump Sentence” one time.

***Note:***

1. ***When Alarm/Snooze and Voice-Select are both enabled, there will be no snooze function.***
2. ***Loop Sentence and POP Sentence share the same sentence.***

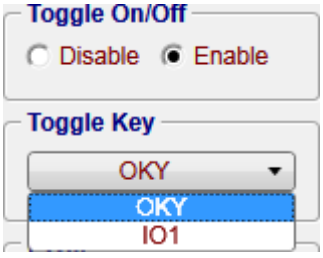
### 2.4.4 Voice-Select

When Voice-Select option is enabled, OKY is set as a select key to pick the desired sentence, and IO1 is set as a play key to play the selected sentence. When a desired sentence is selected by OKY sequential playing, then triggering IO1 will have this sentence played.

***Note: It's popular in doorbell application.***

### 2.4.5 Toggle On/Off

The Toggle On/Off function allows users to immediately stop playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To enable this function, switch it to “Enable”, and specify the key in “Toggle Key” column (and the specific trigger will be fixed as Unhold and Retrigger). Please note there is only one key available for Toggle On/Off function, although all 2 keys could be set as input trigger in NY2A.




### 2.4.6 VDD Voltage

The IC oscillation frequency will be shifted at different operating voltage. For accuracy of internal-resistor oscillation, VDD voltage must be selected for OSC fine tuning during IC production.

### 2.4.7 Level-Sequential

Level-Sequential is a special application of OKY. When OKY is triggered and held, it plays assigned sentences sequentially in loop (S1, S2, S3, S1, S2, S3, …). When key is released, it stops playing

immediately (under Hold mode), or stops playing at end of current sentence (under Unhold mode). Triggering again, it will start from the next sentence, playing sequentially in loop as key is held.

Cooperating with Edge-Loop function, it plays assigned sentences sequentially in loop when OKY is triggered (but not held). Triggering again when playing, it will play next sentences sequentially in loop.

Cooperating with both Edge-Loop and Loop On/Off function, it plays the assigned sentences sequentially in loop when OKY is triggered (but not held), and stops playing when triggered again. If the key is triggered again after being toggled off, it will play the next sentences sequentially in loop.

### 2.4.8 Edge-Loop

When Edge-Loop option is enabled, user can assign an input key to implement this function through Toggle Key selection. When the specific key is triggered, it will play the assigned sentence in loop. Cooperating with OKY (OKY2) Sequential function, the first trigger plays first sentence in loop, the second trigger plays second sentence in loop, the third trigger plays third sentence in loop, and so on.

Cooperating with Loop On/Off function, the first trigger plays first sentence in loop, and the second trigger stops playing. Once the key is triggered again, it plays the next sentence (with OKY Sequential) in loop, and stops playing if triggered again during playing, and so on.

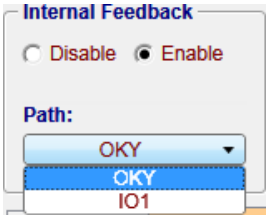
### 2.4.9 Loop On/Off

When the key function is Edge-Loop, enabling the Loop On/Off option can achieve Toggle On/Off function. That is, the first trigger plays first sentence in loop, and the second trigger stops playing. Once the key is triggered again, it plays the next sentence (with OKY Sequential) in loop, and stops playing if triggered again during playing, and so on.

***Note: Loop On/Off and Toggle On/Off cannot coexist.***

### 2.4.10 Internal-Feedback

The Internal-Feedback option is a special application of IO1. When the sentence is stopped or played over, it continues to play the assigned sentence of OKY or IO1 (Internal Feedback Path) through internal Stop – High Pulse signal.




### 2.4.11 Noise-Trigger

Noise-Trigger is a special application setting OKY as Low Trigger. Long Debounce is recommended. If the Noise-Trigger option is enabled and OKY is set as Edge/Unhold and Pull-Low Active, IC will play OKY sentence once at power on. When lager noise happens outside or by antenna effect, an input signal will be induced to trigger OKY key.

***Note: It's popular in cigarette lighter or mobile antenna application.***

### 2.4.12 Low-Voltage-Reset (LVR)

When VDD voltage is lower than 1.8V, IC will automatically reset. The default setting of LVR function is “Enable”. Choose “Disable” can turn off this function.

***Note: If Power-On-Play option is “Enable”, the POP Sentence will be played after LVR acts. If user presses OKY and LVR is operating, IC would replay the first Sentence.***

### 2.4.13 Selecting PWM Output

The PWN Current function provides 2 options: Normal volume and Large volume. User could decide the PWM output based on practical applications.

### 2.4.14 Selecting Trigger Mode

The mode of a trigger must be specified to completely define the input functions. Specify the trigger mode by choosing from the following three types of options:

- ◆ The Edge and Level options specify whether the trigger should respond to the rising edge or the high level of the input signal.
- ◆ The Hold and Unhold options specify whether you need to keep on pressing the trigger button to execute the whole voice sentence.
- ◆ The Retrigger and Irretrigger options specify whether the trigger can be functional when a voice sentence is playing.

### 2.4.15 Debounce

Debounce time is a playback-speed-dependent function, which determines the debouncing period for TG. There are always two kinds of debounce time to be selected. The long debounce time is used for debouncing the push button trigger input while the short debounce time is used for debouncing the electrical transition such as CDS input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

### 2.4.16 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY2A series there are 4 input type options corresponding to different applications.

| Option | Input Type Description |
|---|---|
| CDS + 1M | Normal selection for button trigger.<br>1MΩ pull-low resistance when button is pressed, and 1MΩ+300KΩ (parallel) pull-low resistance when button is released. |
| CDS | Internal 300KΩ pull-low resistance, usually for photo-resistor trigger.<br>Floating when button is pressed, and 300KΩ pull-low resistance when button is released. |
| 1M | Internal 1MΩ pull-low resistance, reserved for some special applications. |
| Floating | No internal resistor connection, and is usually connected to other output pin or connected to GND by an external resistor. |

### 2.4.17 Selecting OKY Trigger Function

The OKY Trigger Function allows users to set the IC to play sentences in a sequential or random manner for two consecutive triggers applied to OKY pin. When sequential trigger function is selected, the IC will play the “next” sentence whereas a random sentence will be played when random trigger function is selected.

### 2.4.18 Selecting OKY Reset On/Off

This function is available only when the OKY trigger function is sequential. When Reset is ON, the IC will reset the sentence sequential pointer once the other input pin (IO1) is pressed. It means after IO1 is pressed, pressing OKY will lead to the playing of sentence 1. When Reset is OFF, the playing sequence of OKY will keep unaffected.

### 2.4.19 Selecting Output Types

When IO1 is set as output, user could specify a status signal as the output signal. The following are the available output type options:

| Option | Output types Description |
|---|---|
| Stop – Low Pulse | Low active stop-pulse output whenever device stop playing |
| Stop – High Pulse | High active stop-pulse output whenever device stop playing |
| Busy – High Active | High active signal output during playing (Drive output) |
| Busy – Low Active | Low active signal output during playing (Sink output) |
| LED 2Hz Flash | 2Hz Sink or Drive signal output to drive LED during playing |
| LED 4Hz Flash | 4Hz Sink or Drive signal output to drive LED during playing |
| LED 8Hz Flash | 8Hz Sink or Drive signal output to drive LED during playing |
| LED 16Hz Flash | 16Hz Sink or Drive signal output to drive LED during playing |
| LED 1/2 Dynamic | 1/2 (sound level) dynamic Sink or Drive signal output to drive LED |
| LED 3/4 Dynamic | 3/4 (sound level) dynamic Sink or Drive signal output to drive LED |

The actual flashing rates for LED 2Hz, LED 4Hz, LED 8Hz and LED 16Hz options are positive relative

to the play speed of voice or tempo of melody. Only when the play speed of voice is 8kHz or tempo of melody is 117, are their flashing rates equal to settings on Options page (2Hz, 4Hz, 8Hz and 16Hz).

***Note: The flash of LED 2Hz, LED 4Hz, LED 8Hz and LED 16Hz of Voice Section resets by different Step, bit the flash of LED 2Hz, LED 4Hz, LED 8Hz and LED 16Hz of MIDI Section resets by different Note.***

### 2.4.20 Connect Type

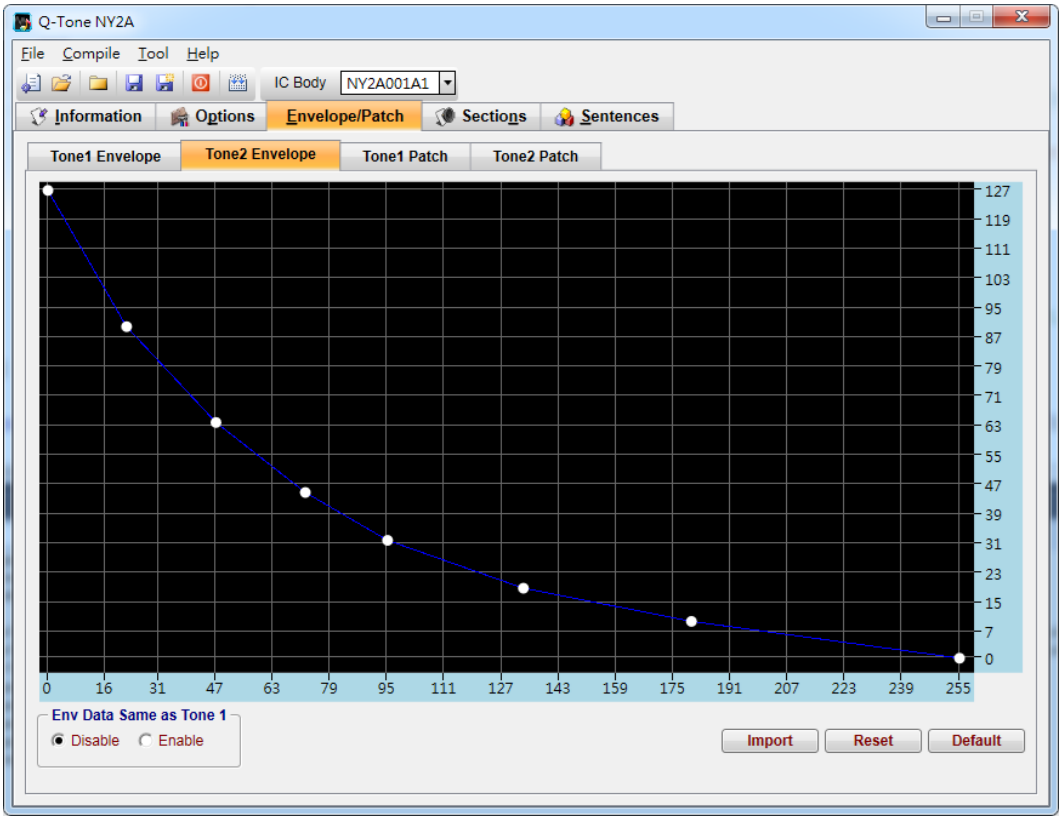
When the IO1 is set as output, user could specify a status signal as the output signal. There are 2 connected type options corresponding to different applications as below.

| Option | Connected Type Description |
|---|---|
| Sink | High active signal output during playing |
| Drive | Low active signal output during playing |

## 2.5 Editing Envelope/Patch

User could draw envelopes (max 256 points) and the user defined patch waves with the graphical interface on Envelope/Patch page.

### 2.5.1 Envelope



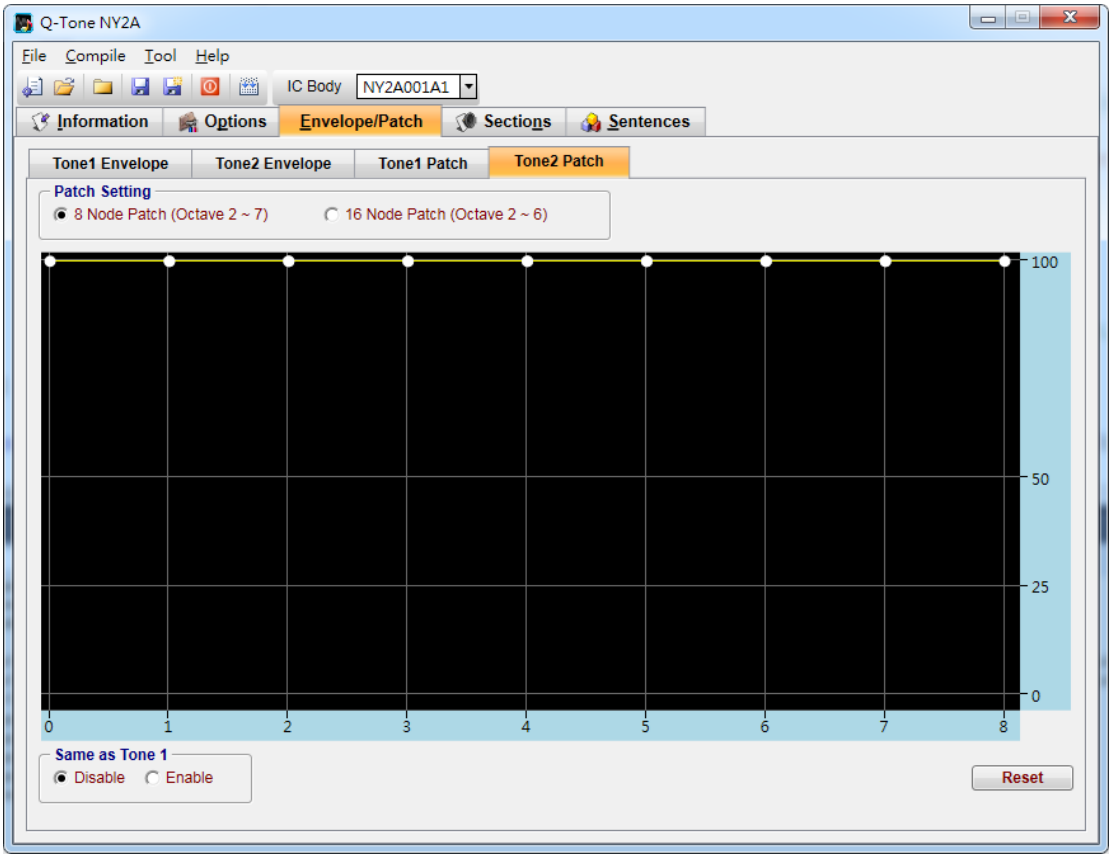

**Env Data Same as Tone1** – When “Env Data Same as Tone1” set as Enable, the envelope of Tone2 is set as the same as Tone1.

**Import** – Import the existing envelope (**.env**) drawn by Envelope Synthesizer.

**Reset** – Reset envelope as a straight line.

**Default** – Set the envelope as *Q-Tone's* default.

### 2.5.2 Patch




**8 Node Patch (Octave 2 ~ 7)** – At "8 Node Patch" mode, there are 8 frames for X-axis, and 4 levels (100%, 50%, 25%, and 0%) for Y-axis. User could define a patch for each tone channel.

***Note: At "8 Node Patch" mode, the pitch range is from C2 to B7.***

**16 Node Patch (Octave 2 ~ 6)** – At "16 Node Patch" mode, there are 16 frames for X-axis, and 4 levels (100%, 50%, 25%, and 0%) for Y-axis. User could define a patch for each tone channel.

***Note: At "16 Node Patch" mode, the pitch range is from C2 to B6.***

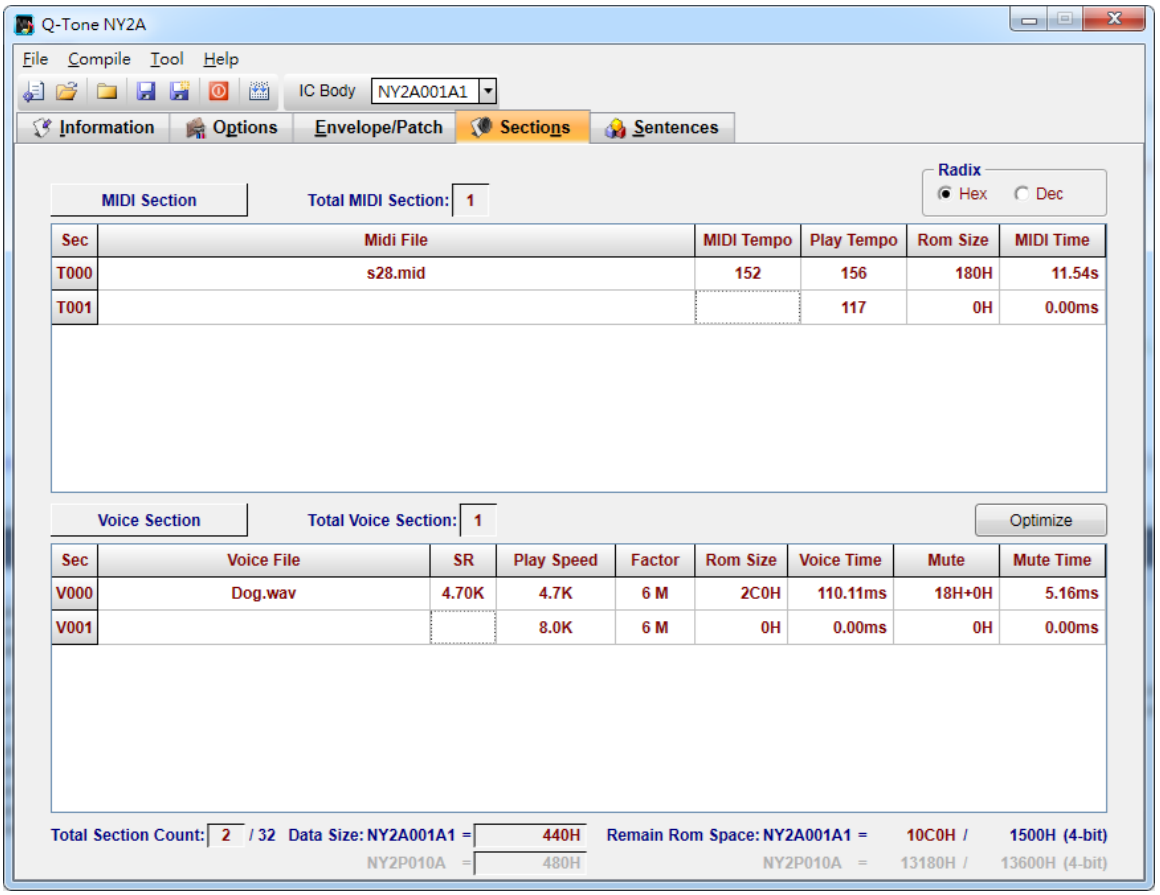
**Same as Tone1** – When "Same as Tone1" set as Enable, the patch of Tone2 is set as the same as Tone1.

**Reset** – Reset the patch as square wave.

## 2.6 Managing the Sections

Sections page is always in a table form, and it allows 32 sections max in NY2A series. User can use the Sections page to include and manage the MIDI / Voice sections for a project. This page is divided as 2 parts,

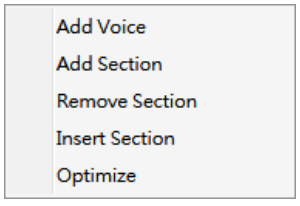
the upper part is for editing MIDI section, the lower part is for voice section.




### 2.6.1 Sec Column

Sec column shows the sequence numbers of MIDI/Voice Sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections to be played. The sequence numbers of MIDI sections are from T000 to T031, and the voice sections are from V000 to V031 for NY2A. (32 sections max for sum of MIDI and voice sections)

### 2.6.2 File Name Column




File Name shows MIDI and voice data files. *Q-Tone* MIDI File column supports GM MIDI Format1 (**.mid)** and *Q-MIDI* files (**.t2x**). The Voice File Column supports 8 / 16 / 32-bit **mono** wave files (**.wav**), *Quick-IO* files (**.nyq**) or *Q-Sound* files (**.nyw**). To include a voice file, double-click on a field in this column. A dialog box for file opening will be shown for selecting a file. To change the existing files, right-click the mouse and select Add / Remove / Insert / Optimize section form the pop-up menu. If user wants to adjust the sequence of sentences, please press the left mouse key on the desire column, then drag the selected sentence to the target column and release the left key.

***Note: Two voice files with the same file name or a single voice file cannot be included in two MIDI/Voice sections.***

### 2.6.3 Tempo Column

Tempo shows the original tempo of the MIDI file.

### 2.6.4 Ref. Tempo Column

Ref. Tempo determines the real playback tempo of the MIDI, and user could choose one of the 25 fix tempos from the drop-down menu. The 25 kinds of tempo supported by NY2A series.

| *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|---|---|---|---|
| 59 | 60 | 63 | 65 | 67 | 69 | 72 | 75 | 78 |
| *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* |
| 82 | 85 | 89 | 94 | 99 | 104 | 110 | 117 | 125 |
| *19* | *20* | *21* | *22* | *23* | *24* | *25* | | |
| 134 | 144 | 156 | 170 | 188 | 208 | 234 | | |

### 2.6.5 ROM Size Column

ROM Size column shows the size of ROM that used by the MIDI/Voice data after compression. The voice section ROM size after compression will be affected by the quality factor. For NY2A, the ROM size for every section must be the multiple of 40H. In most cases, no matter how long the wave file is, the voice encoder will automatically adjust the compressed voice data to fit the multiple of 40H. But sometimes, for an extremely short wave file, the voice encoder will fail to do the adjustment. Mute signal will then be used to fill in the gap between the actual voice file ending and the next 40H multiple. Such mute signal will be shown in the Mute column and will be played following the voice file.

Please note that every NY2A Series IC actually imposes a maximum limit on each type of section including pure MIDI/Voice section, voice+mute section and pure mute section. The maximum limits imposed on all the NY2A Series ICs are tabulated below.

**Table 2.6.5 - The maximum limits imposed by NY2A Series ICs**

| Body | MaxT/V | Max(V+M) | MaxM | Max Total |
|---|---|---|---|---|
| NY2P010A | 7FE0H | 7FE0H | 7FE0H | 13600H |
| NY2A001A | 1500H | 7FE0H | 7FE0H | 1500H |
| NY2A001A1 | 1500H | 7FE0H | 7FE0H | 1500H |

- **MaxT/V** column shows the maximum ROM Size that can be taken up by the voice file when the voice section is a pure voice section (voice section with a voice file only).
- **Max(V+M)** column shows the maximum sum of the ROM Size taken up by the voice file and the mute data when the voice section is a voice+mute section.
- **MaxM** column shows the maximum value of the mute data when the voice section is a pure mute section (without any voice file).
- **Max Total** column shows the maximum total ROM Size that can be taken up by all the voice files in a project.

Let's take NY2A001A1 as an example. For this body the ROM size taken up by the voice file of each voice section must not exceed 7FE0H. If the ROM size taken up by that voice file is 5FE0H, then this file can be followed by a maximum of 2000H mute data (7FE0H – 5FE0H = 2000H). If this voice

section does not contain a voice file, then it can have a maximum of 7FE0H mute data. The Max Total of NY2P010A ROM size cannot exceed 13600H. If the Rom size taken up by that voice file is 7FE0H, it has to be separated into sections and every size is less than 7FE0H.

### 2.6.6 MIDI Time Column

MIDI Time shows the real playing time estimated according to the MIDI and the Ref. Tempo set at this page. Changing Ref. Tempo will lead to changing of MIDI time, since playing time is relevant to tempo.

### 2.6.7 SR Column

SR stands for the sample rate of the voice file.

### 2.6.8 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a voice section here. There are 16 kinds of playback speed available, and each voice section can be given a unique playback speed. The 16 kinds of speed are listed in the following table:

| ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***6*** | ***7*** | ***8*** |
|---|---|---|---|---|---|---|---|
| 12.0kHz | 10.8kHz | 9.7kHz | 8.9kHz | 8.0kHz | 7.5kHz | 7.0kHz | 6.5kHz |
| ***9*** | ***10*** | ***11*** | ***12*** | ***13*** | ***14*** | ***15*** | ***16*** |
| 6.1kHz | 5.8kHz | 5.4kHz | 5.2kHz | 4.9kHz | 4.7kHz | 4.5kHz | 4.3kHz |

### 2.6.9 Factor Column

The Factor column shows the quality factor of compression. Altering this factor may cause changes in compression quality and ROM size simultaneously. The ROM size after compression will be directly shown in ROM size column. There are 12 factors, which from ‘1’ to ‘12’. Normally, a bigger factor will lead to bigger ROM size but better quality after compression. The default factor is “6”.

| Factor | Comment |
|---|---|
| 12H | The best compressed sound quality. |
| … | …. |
| 6M | Middle sound quality (default). |
| … | …. |
| 1L | Very low sound quality, but smallest ROM size. |

### 2.6.10 Voice Time Column

The Voice Time column shows the voice playing time estimated by *Q-Tone*. Voice time varies depending on playing speed, so changing the Play Speed on this page may lead to changes.

### 2.6.11 Mute Column


Mute column shows the quantified data of mute duration. Mute data for NY2A series must be the multiple of 20H. Mute data can be set by pressing the Up and Down buttons at right of the mute column. Pressing the Up button makes the mute data increase by 20H whereas pressing the Down button makes the mute data decrease by 20H.

### 2.6.12 Mute Time Column

Mute Time column shows the actual mute time, which is estimated by *Q-Tone*. Mute time varies depending on playback speed, thus changing the Play Speed on this page may lead to change of mute time.

### 2.6.13 Radix

The Radix column is on the upper right, it shows the calculated unit of capacity. *Q-Tone* provides two kinds of unit: Hex and Dec.

### 2.6.14 Total MIDI Section, Total Voice Section & Total Section Count

Total MIDI Section, Total Voice Section, and Total Section Count show how many MIDI files, Voice files and total files used respectively.

### 2.6.15 Data Size & Remain ROM Space

Data Size, which is located at the bottom of this page, shows the total ROM used by MIDI and voice sections while Remain Rom Space shows the available ROM that still not used. The total available ROM space is displayed to the right of slash (“/”), and the total ROM used must not exceed it.

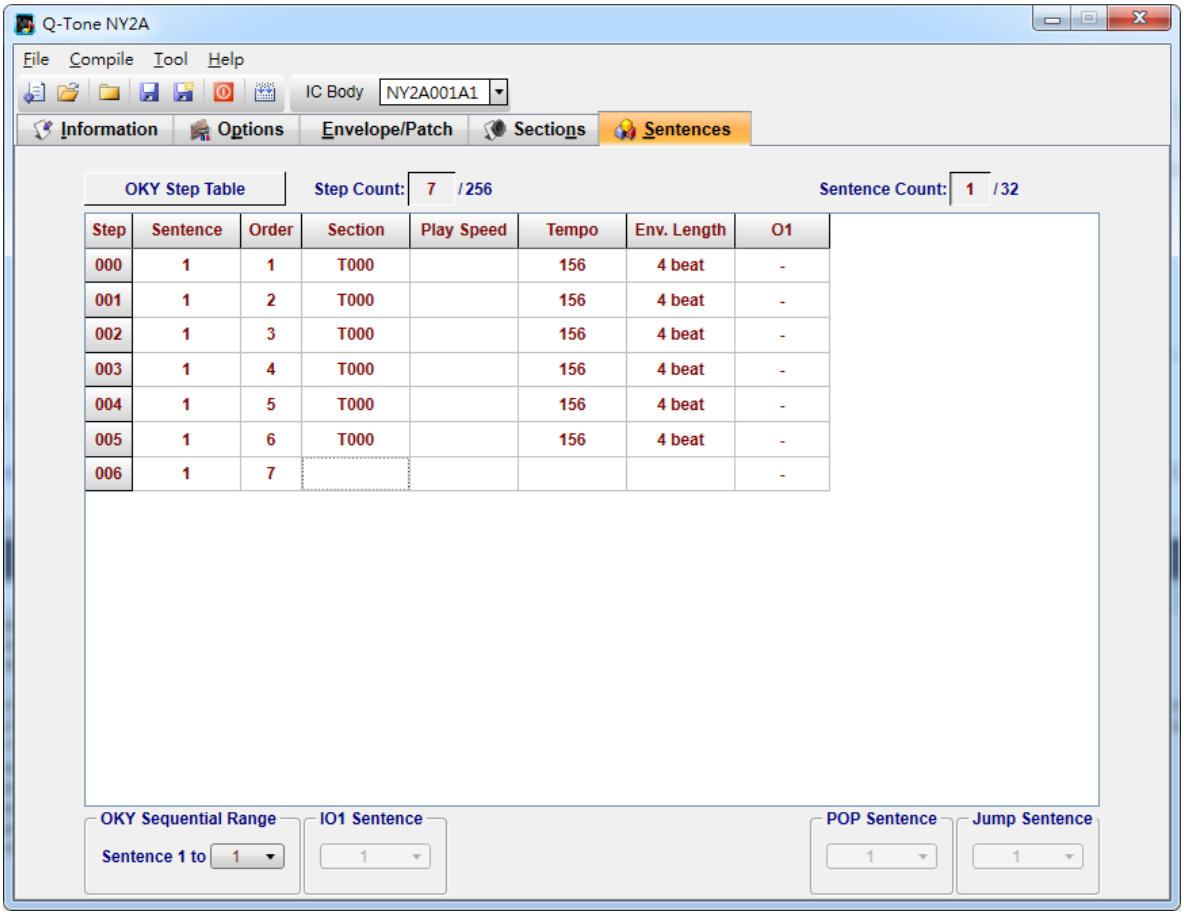
### 2.6.16 Right-click Menu

A right-click menu will show on the right by right clicking on the voice section table or mute section table. The functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| Add Voice/MIDI | Add one or numbers of MIDI/Voice file or section at the end of all section |
| Add Section | Add a section at the end of all section |
| Remove Section | Delete the selected section |
| Insert Section | Insert a MIDI/Voice section before the selected section |
| Optimize | Automatically adjust the compression ratio of sections by using the full ROM capacity. |

## 2.7 Arranging the Sentences

A “sentence” means a combination of MIDI or voice sections to be played when triggered. For NY2A, there are 32 sentences available under the limit of total 256 steps.

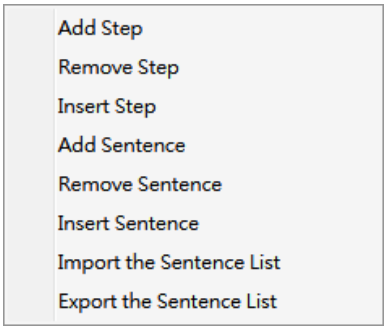



### 2.7.1 Step Column

For NY2A there are total 256 (000 to 255) steps that can be defined for the step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. The total number of defined steps is shown beyond the step table in this window.

### 2.7.2 Sentence Column

The Sentence column shows the sentence numbers the steps belong to. For NY2A, there are total 32 (from 1 to 32) sentences available. Every sentence, which may contain several steps, can specify which voice section to play. To add / remove / insert / import / export a step or sentence, select the target that is desired to be removed / inserted and then right-click the mouse and select the desire option from the pop-up menu.



### 2.7.3 Order Column

The Order column shows the sequence numbers of the steps contained in each sentence. *Q-Tone* will automatically generate the sequence numbers for all the steps in a sentence in ascending order. When this sentence is executed due to an input trigger, step 1 will be played first, followed by step 2 and step 3, and so on.

### 2.7.4 Section Column

Selecting a section here means the corresponding MIDI or voice file defined on Sections page will be arranged in the sentence.

### 2.7.5 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a voice section here. There are 16 kinds of playback speed available, and each voice section can be given a unique playback speed. (Please see Chapter 2.6.8 for details of the 16 kinds of play speed.)

### 2.7.6 Tempo Column

Tempos applied to sentences refer to the settings on Sections Page, and they cannot be edited at this page.

### 2.7.7 Env. Length Column

Env. Length Column determines the envelope length that is drawn on Envelope/Patch page. There are 4 options: 1 beat, 2 beat, 4 beat, and 8 beat; each step could be given a unique envelope length.

### 2.7.8 O1/FB Column

When IO1 is set as output in Options page, the O1 step in OKY Step Table must be specified to make IC's output functional. There are 12 kinds of output options available in NY2A, including 10 kinds of fix output types and user-defined QLED and QIO. (Please see Chapter 2.4.19)

When "Internal-Feedback" on Options Page is enabled, O1 Column in the Sentence Page will become "Int. FB" automatically. Thus, user could indicate which sentences will trigger the intended sentence (Internal Feedback Path) when it stops or ends. (Please see Chapter 2.4.10 for the detail of "Internal-Feedback".)

### 2.7.9 OKY Sequential Range

When the OKY trigger function is sequential, the Sequential Range means it will loop sentences in the range by triggering OKY. For example, if this range is 4, triggering OKY repeatedly will play sentences 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, and so on. When the OKY trigger function is random, the Random Range means the range of random selection for the next executing sentence. In other words, if this range is 4, an OKY trigger will lead to the execution of a random sentence in the range from sentence

1 to sentence 4.

### 2.7.10 IO1/POP Sentence

IO1 Sentence is available only when IO1 is set as input or POP is enabled on Options page. User could specify which sentence will be executed when IO1 or POP is triggered. When the number of defined sentences is below 30, but IO1 / POP Sentence can be specified any voice. When the number of defined sentences exceeds 30, IO1 Sentence must be restricted to play the 31st sentence. If the number of defined sentences exceeds 31, IO1 and POP Sentence must be restricted to play the 31st and 32nd sentence.

### 2.7.11 Loop/Jump Sentence

When Alarm/Snooze is enabled on Options Page, Loop Sentence on the Sentence Page must be defined. When alarm is triggered and held, it will play IO1 sentence once and then play the Loop Sentence repeatedly until it falls into snooze status or the alarm time is over. When alarm is triggered and then press IO1 to exit, it will play Jump Sentence immediately.

Any sentence can be set as Loop / Jump Sentence when the number of defined sentences is below 29; Jump Sentence must be restricted to the 30th sentence if the number of defined sentences exceeds 29. When the number of defined sentences exceeds 31, Jump and Loop Sentence will be restricted to play the 31st and 32nd sentence.

### 2.7.12 Right-click Menu

A right-click menu will show on the right by right-click. The functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| Add Step | Add a step at the end of all sections. |
| Remove Step | Delete the selected step. |
| Insert Step | Insert a step at the selected step. |
| Add Sentence | Add a sentence at the end of all sentences |
| Remove Sentence | Remove the selected sentence. |
| Insert Sentence | Insert a sentence before the selected sentence. |
| Import the Sentence List | Import the edited sentence list (*.csv). |
| Export the Sentence List | Export all sentences as a sentence list (*.csv). |

# 3 Using *Q-Tone* for NY2B Series

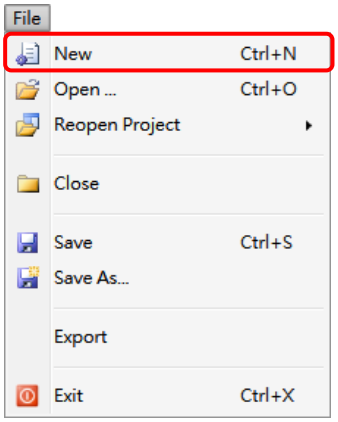
In this chapter, the details of using *Q-Tone* for NY2B will be presented step by step.

**Contents:**

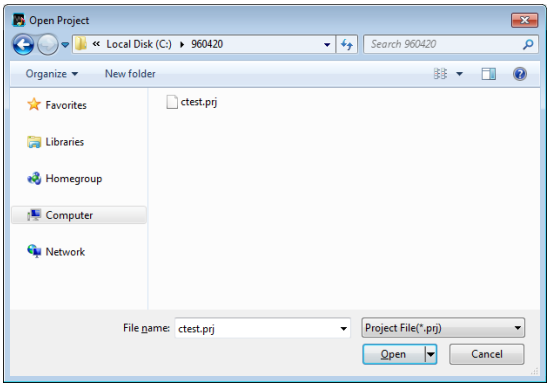


## 3.1 Creating a *Q-Tone* Project

After selecting [File/New] or [File/Open] on *Q-Tone*, or clicking the [New] button on the toolbar directly to start editing.

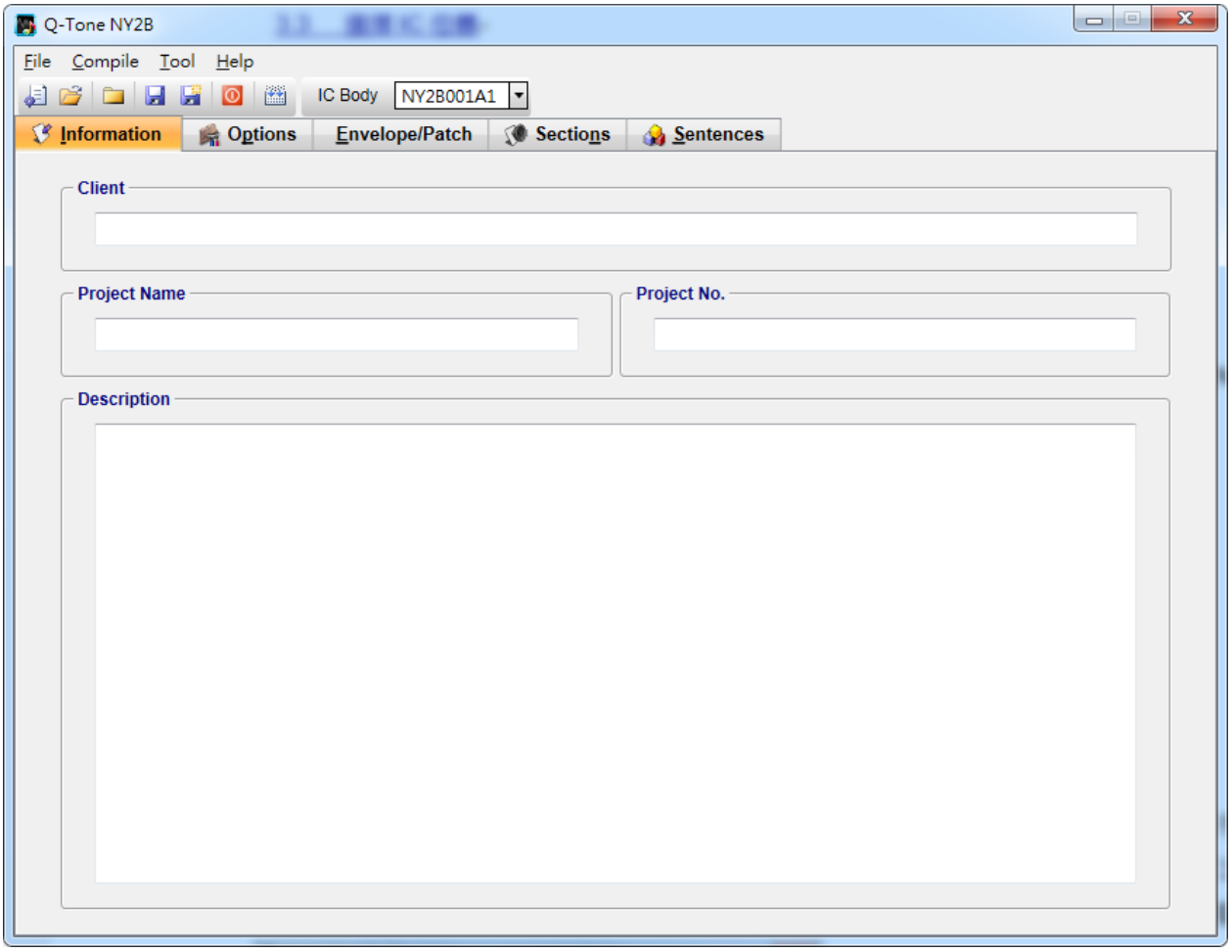



To modify an existing file, select [Open] from the [File] menu, and a dialog box for opening file will display shortly. After selecting a desired file within the [Open Project] dialog box, press [Open] button, or double-click it directly, and the existing file will be opened. If the file to be opened has been edited recently, it might be found on the list of [Reopen] option and could be opened directly.




## 3.2 Filling in the Information

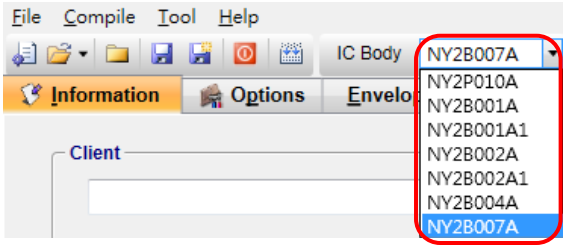
The Information page will be shown immediately after the file is opened. Any words can be typed in the blanks of this page, and the information on this page will be saved completely in the *Q-Tone* file. Since the information on this page, except [Client] blank, is just for user to annotate or record, no error checking will be performed by *Q-Tone.* All information will not be included in the .bin file except the client name.




***Note: The client name on this page will be included in the Checking List and Confirm Table after compiling. This is to protect the copyright of the programmer. The client name is the only "required" on this page, a warning message will display when compiling if this column is blank.***

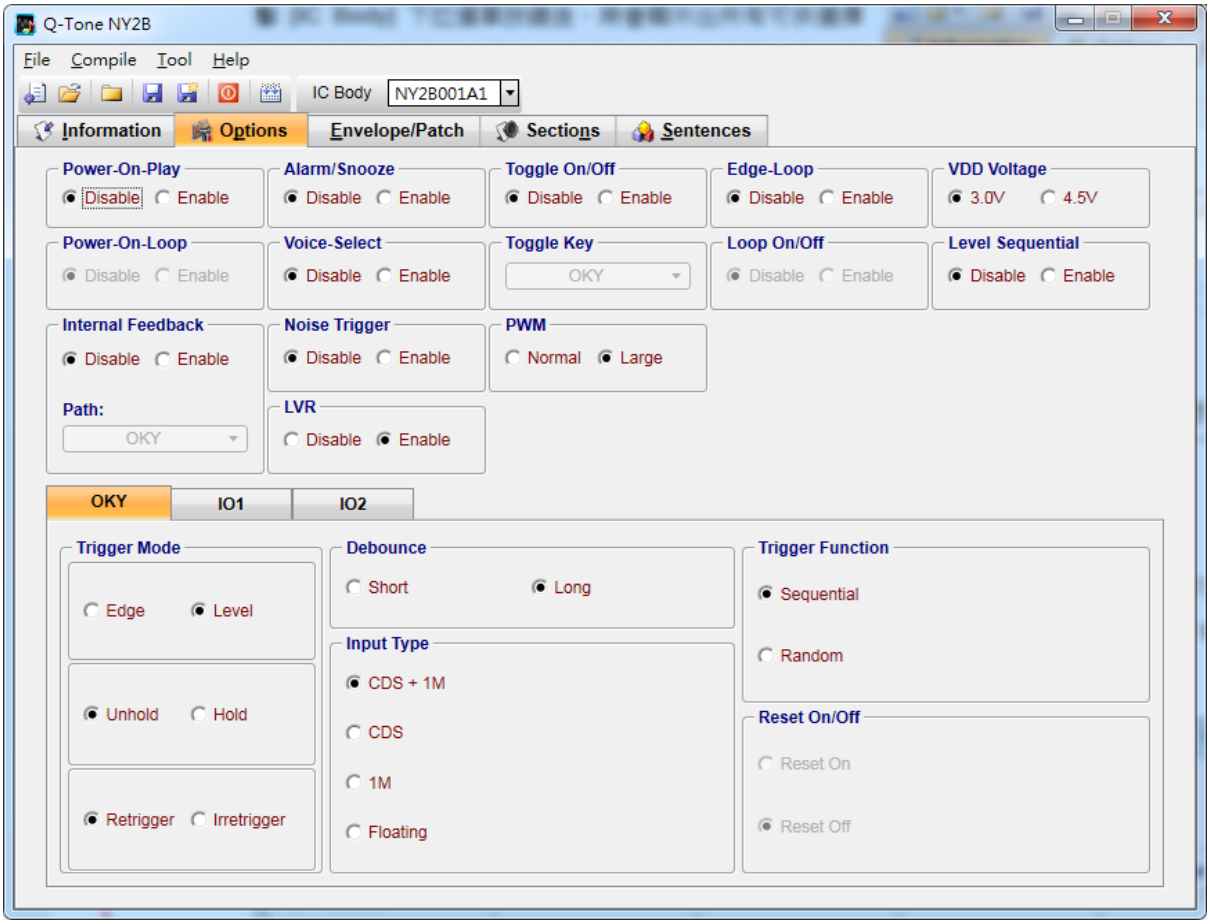
## 3.3 Selecting the IC Body

The [IC Body] drop-down list is at the top of the window. By clicking the Down button of it, all available IC bodies will be listed for selection. IC body could be changed during editing a project, but an error message in red word may display if the total ROM size of current sections exceeds the capacity of selected IC body.




## 3.4 Selecting the Mask Options

By selecting different mask options on the Options page, the complicated functions could be accomplished quickly. Although different series ICs have different functions, there are usually similar items in Options page. Such as Debounce Time, Trigger Mode, etc, could be set easily on the Options page.




### 3.4.1 Power-On-Play (POP)

When Power-On-Play option is enabled, IC will play the POP Sentence one time when power is on. When cooperating with Power-On-Loop function, the POP Sentence will stop playing until other key-trigger happened and then immediately plays the assigned sentence of triggered key.

### 3.4.2 Power-On-Loop

When Power-On-Loop option is enabled, IC will play the POP Sentence in loop when power is on. The trigger mode is fixed as Edge / Unhold / Retrigger.

***Note: This option can be set only at Power-On-Play status is enabled.***

### 3.4.3 Alarm/Snooze

When Alarm/Snooze option is enabled, IO2 is set as alarm clock switch, and OKY or IO1 is set as the snooze button.

***Note: There is only one kind of snooze time when using IO1 as snooze button.***

When IO2 alarm switch is held, it plays the IO2 sentence one time, and then plays the “Loop Sentence” in loop until alarm period is over. Once IO2 switch is turned off while alarm playing, alarm stops and then plays the “Jump Sentence” one time. Once pressing the snooze button while alarm playing, alarm stops playing and then waits for a period of snooze time. After snooze time is over, the “Loop Sentence” will be played in loop.

Cooperating with Voice-Select function, it plays the OKY sentence one time and then plays the Loop Sentence in loop when IO2 alarm switch is held. Once IO2 switch is turned off while alarm playing, alarm stops and then plays the “Jump Sentence” one time.

***Note:***

***1. When Alarm/Snooze and Voice-Select are both enabled, the snooze trigger is set as IO1.***

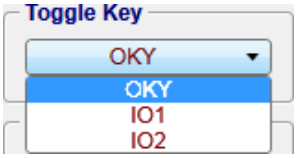
***2. Loop Sentence and POP Sentence share the same sentence.***

### 3.4.4 Voice-Select

When Voice-Select option is enabled, OKY is set as a select key to pick the desired sentence, and IO2 is set as a play key to play the selected sentence. When a desired sentence is selected by OKY sequential playing, then triggering IO2 will have this sentence played.

***Note: It's popular in doorbell application.***

### 3.4.5 Toggle On/Off




The Toggle On/Off function allows users to immediately stop playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To enable this function, switch it to “Enable”, and specify the key in “Toggle Key” column (and the specific trigger will be fixed as Unhold and Retrigger). Please note there is only one key available for Toggle On/Off function, although all 3 keys could be set as input trigger in NY2B.

### 3.4.6 VDD Voltage

The IC oscillation frequency will be shifted at different operating voltage. For accuracy of internal-resistor oscillation, VDD voltage must be selected for OSC fine tuning during IC production.

### 3.4.7 Level-Sequential

Level-Sequential is a special application of OKY. When OKY is triggered and held, it plays assigned sentences sequentially in loop (S1, S2, S3, S1, S2, S3, …). When key is released, it stops playing immediately (under Hold mode), or stops playing at end of current sentence (under Unhold mode). Triggering again, it will start from the next sentence, playing sequentially in loop as key is held. Cooperating with Edge-Loop function, it plays assigned sentences sequentially in loop when OKY is

triggered (but not held). Triggering again when playing, it will play next sentences sequentially in loop. Cooperating with both Edge-Loop and Loop On/Off function, it plays the assigned sentences sequentially in loop when OKY is triggered (but not held), and stops playing when triggered again. If the key is triggered again after being toggled off, it will play the next sentences sequentially in loop.

### 3.4.8 Edge-Loop

When Edge-Loop option is enabled, user can assign an input key to implement this function through Toggle Key selection. When the specific key is triggered, it will play the assigned sentence in loop. Cooperating with OKY (OKY2) Sequential function, the first trigger plays first sentence in loop, the second trigger plays second sentence in loop, the third trigger plays third sentence in loop, and so on. Cooperating with Loop On/Off function, the first trigger plays first sentence in loop, and the second trigger stops playing. Once the key is triggered again, it plays the next sentence (with OKY Sequential) in loop, and stops playing if triggered again during playing, and so on.

### 3.4.9 Loop On/Off

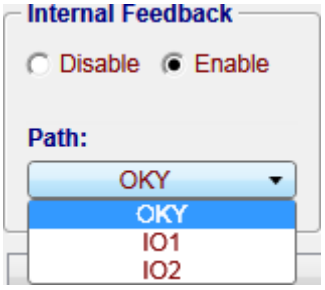
When the key function is Edge-Loop, enabling the Loop On/Off option can achieve Toggle On/Off function. That is, the first trigger plays first sentence in loop, and the second trigger stops playing. Once the key is triggered again, it plays the next sentence (with OKY Sequential) in loop, and stops playing if triggered again during playing, and so on.

***Note: Loop On/Off and Toggle On/Off cannot coexist.***

### 3.4.10 Internal-Feedback

The Internal-Feedback option is a special application of IO2 When the sentence is stopped or played over, it continues to play the assigned sentence of OKY or IO1 or IO2 (Internal Feedback Path) through internal Stop – High Pulse signal.

***Note: When the function is enabled, IO2is fixed as input pin.***




### 3.4.11 Noise-Trigger

Noise-Trigger is a special application setting OKY as Low Trigger. Long Debounce is recommended. If the Noise-Trigger option is enabled and OKY is set as Edge/Unhold and Pull-Low Active, IC will play OKY sentence once at power on. When lager noise happens outside or by antenna effect, an input signal will be induced to trigger OKY key.

***Note: It's popular in cigarette lighter or mobile antenna application.***

### 3.4.12 Low-Voltage-Reset (LVR)

When VDD voltage is lower than 1.8V, IC will automatically reset. The default setting of LVR function is “Enable”. Choose “Disable” can turn off this function.

***Note: If Power-On-Play option is “Enable”, the POP Sentence will be played after LVR acts. If user presses OKY and LVR is operating, IC would replay the first Sentence.***

### 3.4.13 Selecting PWM Output

The PWN Current function provides 2 options: Normal volume and Large volume. User could decide the PWM output based on practical applications.

### 3.4.14 Selecting VDD Voltage

The IC oscillation frequency will be shifted at different operating voltage. For accuracy of internal-R oscillation, VDD voltage must be selected for OSC fine tuning during IC production.

### 3.4.15 Selecting Trigger Mode

The mode of a trigger must be specified to completely define the input functions. Specify the trigger mode by choosing from the following three types of options:

- ◆ The Edge and Level options specify whether the trigger should respond to the rising edge or the high level of the input signal.
- ◆ The Hold and Unhold options specify whether you need to keep on pressing the trigger button to execute the whole voice sentence.
- ◆ The Retrigger and Irretrigger options specify whether the trigger can be functional when a voice sentence is playing.

### 3.4.16 Debounce

Debounce time is a playback-speed-dependent function, which determines the debouncing period for TG. There are always two kinds of debounce time to be selected. The long debounce time is used for debouncing the push button trigger input while the short debounce time is used for debouncing the electrical transition such as CDS input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

### 3.4.17 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY2 series there are 4 input type options corresponding to different applications.

| Option | Input Type Description |
|---|---|
| CDS + 1M | Normal selection for button trigger.<br>1MΩ pull-low resistance when button is pressed, and 1MΩ+300KΩ (parallel) pull-low resistance when button is released. |
| CDS | Internal 300KΩ pull-low resistance, usually for photo-resistor trigger.<br>Floating when button is pressed, and 300KΩ pull-low resistance when button is released. |
| 1M | Internal 1MΩ pull-low resistance, reserved for some special applications. |
| Floating | No internal resistor connection, and is usually connected to other output pin or connected to GND by an external resistor. |

### 3.4.18 Selecting OKY Trigger Function

The OKY Trigger Function allows users to set the IC to play sentences in a sequential or random manner for two consecutive triggers applied to OKY pin. When sequential trigger function is selected, the IC will play the “next” sentence whereas a random sentence will be played when random trigger function is selected.

### 3.4.19 Selecting OKY Reset On/Off

This function is available only when the OKY trigger function is sequential. When Reset is ON, the IC will reset the sentence sequential pointer once the other input pin (IO1 or IO2) is pressed. It means after IO1 (or IO2) is pressed, pressing OKY will lead to the playing of sentence 1. When Reset is OFF, the playing sequence of OKY will keep unaffected.

### 3.4.20 Selecting Output Type

When IO1 or IO2 is set as output, user could specify a status signal as the output signal. The following are the available output type options:

| Option | Output Type Description |
|---|---|
| Stop – Low Pulse | Low active stop-pulse output whenever device stop playing |
| Stop – High Pulse | High active stop-pulse output whenever device stop playing |
| Busy – High Active | High active signal output during playing (Drive output) |
| Busy – Low Active | Low active signal output during playing (Sink output) |
| LED 2Hz Flash | 2Hz Sink or Drive signal output to drive LED during playing |
| LED 4Hz Flash | 4Hz Sink or Drive signal output to drive LED during playing |
| LED 8Hz Flash | 8Hz Sink or Drive signal output to drive LED during playing |

| Option | Output Type Description |
|---|---|
| LED 16Hz Flash | 16Hz Sink or Drive signal output to drive LED during playing |
| LED 1/2 Dynamic | 1/2 (sound level) dynamic Sink or Drive signal output to drive LED |
| LED 3/4 Dynamic | 3/4 (sound level) dynamic Sink or Drive signal output to drive LED |

The actual flashing rates for LED 2Hz, LED 4Hz, LED 8Hz and LED 16Hz options are positive relative to the play speed of voice or tempo of melody. Only when the play speed of voice is 8kHz or tempo of melody is 117, are their flashing rates equal to settings on Options page (2Hz, 4Hz, 8Hz and 16Hz).

***Note: The flash of LED 2Hz, LED 4Hz, LED 8Hz and LED 16Hz of Voice Section resets by different Step, bit the flash of LED 2Hz, LED 4Hz, LED 8Hz and LED 16Hz of MIDI Section resets by different Note.***

### 3.4.21 Connect Type

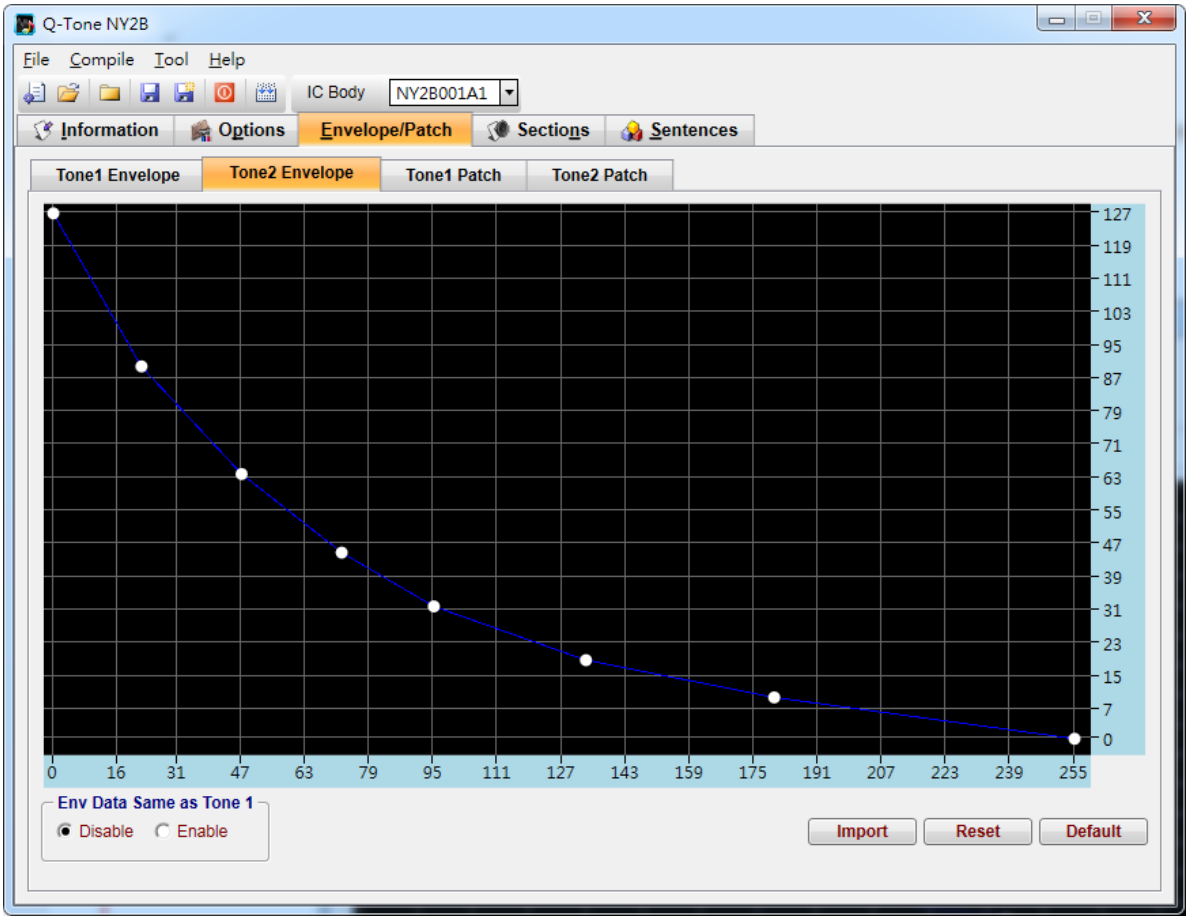
When IO1 or IO2 is set as output, user could specify a status signal as the output signal. There are 2 connect type options as showed below.

| Option | Connect Type Description |
|---|---|
| Sink | Output low level signals while playing. |
| Drive | Output high level signals while playing. |

## 3.5 Editing Envelope/Patch

User could draw envelopes (max 256 points) and the user defined patch waves with the graphical interface on Envelope/Patch page

### 3.5.1 Envelope



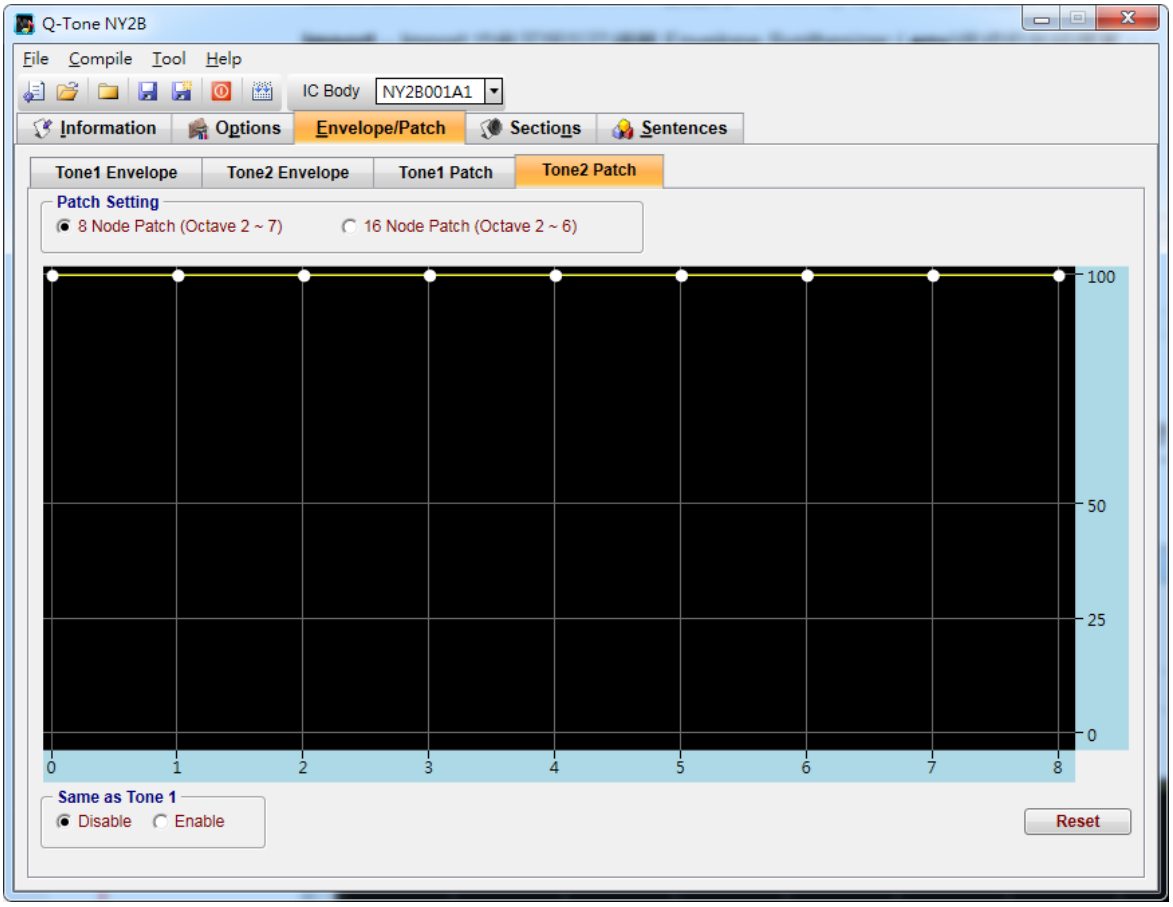

**Env Data Same as Tone1** – When “Env Data Same as Tone1” set as Enable, the envelope of Tone2 is set as the same as Tone1.

**Import** – Import the existing envelope (.env) drawn by Envelope Synthesizer.

**Reset** – Reset envelope as a straight line.

**Default** – Set the envelope as *Q-Tone*’s default.

### 3.5.2 Patch




**8 Node Patch (Octave 2 ~ 7)** – At “8 Node Patch” mode, there are 8 frames for X-axis, and 4 levels (100%, 50%, 25%, and 0%) for Y-axis. User could define a patch for each tone channel.

***Note: At “8 Node Patch” mode, the pitch range is from C2 to B7 at this mode.***

**16 Node Patch (Octave 2 ~ 6)** – At “16 Node Patch” mode, there are 16 frames for X-axis, and 4 levels (100%, 50%, 25%, and 0%) for Y-axis. User could define a patch for each tone channel.

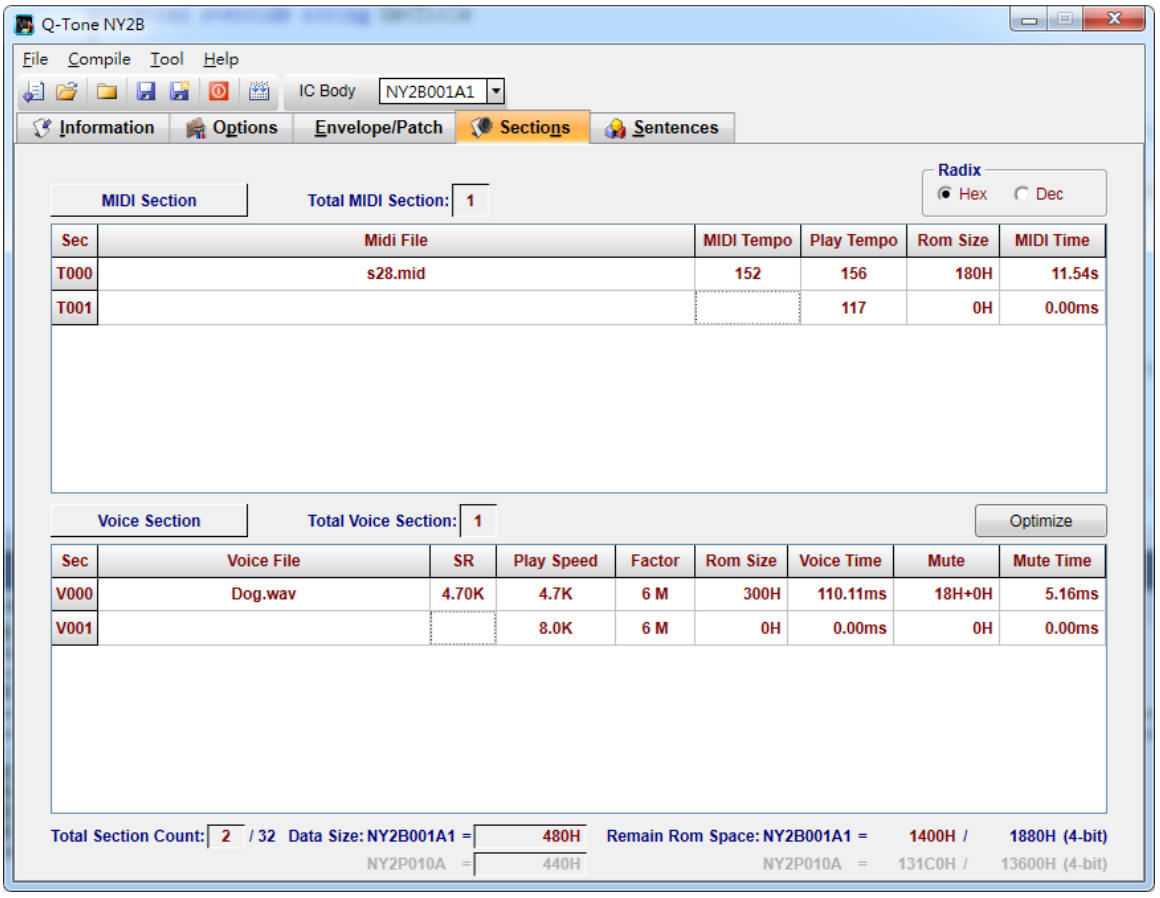
***Note: At “16 Node Patch” mode, the pitch range is from C2 to B6.***

**Same as Tone1** – When “Same as Tone1” set as Enable, the patch of Tone2 is set as the same as Tone1.

**Reset** – Reset the patch as square wave.

## 3.6 Managing the Sections

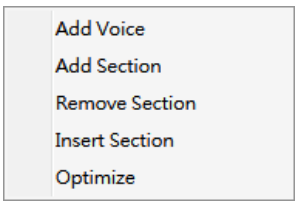
Sections page is always in a table form, and it allows 32 voice-sections max in NY2B series. User can use the Sections page to include and manage the MIDI / Voice sections for a project. This page is divided as 2 parts, the upper part is for editing MIDI section, the lower part is for voice section.




### 3.6.1 Sec Column

Sec column shows the sequence numbers of MIDI/Voice Sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections to be played. The sequence numbers of MIDI sections are from T00 to T31, and the voice sections are from V00 to V31 for NY2B. (32 sections max for sum of MIDI and voice sections)

### 3.6.2 File Name Column




File Name shows MIDI and voice data files. *Q-Tone* MIDI File column supports GM MIDI Format1 (**.mid)** and *Q-MIDI* files (**.t2x**). The Voice File Column supports 8 / 16 / 32-bit **mono** wave files (**.wav**), *Quick-IO* files (**.nyq**) or *Q-Sound* files (**.nyw**). To include a voice file, double-click on a field in this column. A dialog box for file opening will be shown for selecting a file. To change the existing files, right-click the mouse and select Add/ Remove / Insert / Optimize section form the pop-up menu. If user wants to adjust the sequence of sentences, please press the left mouse key on

the desire column, then drag the selected sentence to the target column and release the left key.

***Note: Two voice files with the same file name or a single voice file cannot be included in two MIDI/Voice sections.***

### 3.6.3 Tempo Column

Tempo shows the original tempo of the MIDI file.

### 3.6.4 Ref. Tempo Column

Ref. Tempo determines the real playback tempo of the MIDI, and user could choose one of the 25 fix tempos from the drop-down menu. The 25 kinds of tempo supported by NY2B.

| *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|---|---|---|---|
| 59 | 60 | 63 | 65 | 67 | 69 | 72 | 75 | 78 |
| *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* |
| 82 | 85 | 89 | 94 | 99 | 104 | 110 | 117 | 125 |
| *19* | *20* | *21* | *22* | *23* | *24* | *25* | | |
| 134 | 144 | 156 | 170 | 188 | 208 | 234 | | |

### 3.6.5 ROM Size Column

ROM Size column shows the size of ROM that used by the MIDI/Voice data after compression. The voice section ROM size after compression will be affected by the quality factor. For NY2B001A, NY2B001A1, NY2B002A and NY2B002A1, the ROM size for every section must be the multiple of 80H whereas 200H for the other NY2B bodies. In most cases, no matter how long the wave file is, the voice encoder will automatically adjust the compressed voice data to fit the multiple of 80H (or 200H). But sometimes, for an extremely short wave file, the voice encoder will fail to do the adjustment. Mute signal will then be used to fill in the gap between the actual voice file ending and the next 80H (or 200H) multiple. Such mute signal will be shown in the Mute column and will be played following the voice file.

Please note that every NY2B Series IC actually imposes a maximum limit on each type of section including pure MIDI/Voice section, voice+mute section and pure mute section. The maximum limits imposed on all the NY2B Series ICs are tabulated below.

**Table 3.6.5 - The maximum limits imposed by NY2B Series ICs**

| Body | MaxT/V | Max(V+M) | MaxM | Max Total |
|---|---|---|---|---|
| NY2P010A | FFE0H | FFE0H | FFE0H | 13600H |
| NY2B001A | 1880H | FFE0H | FFE0H | 1880H |
| NY2B001A1 | 1880H | FFE0H | FFE0H | 1880H |
| NY2B002A | 2A00H | FFE0H | FFE0H | 2A00H |
| NY2B002A1 | 2A00H | FFE0H | FFE0H | 2A00H |
| NY2B004A | 6A00H | FFE0H | FFE0H | 6A00H |
| NY2B007A | A800H | FFE0H | FFE0H | A800H |

◆ **MaxT/V** column shows the maximum ROM Size that can be taken up by the voice file when the

voice section is a pure voice section (voice section with a voice file only).

- **Max(V+M)** column shows the maximum sum of the ROM Size taken up by the voice file and the mute data when the voice section is a voice+mute section.
- **MaxM** column shows the maximum value of the mute data when the voice section is a pure mute section (without any voice file).
- **Max Total** column shows the maximum total ROM Size that can be taken up by all the voice files in a project.

Let's take NY2B001A1 as an example. For this body the ROM size taken up by the voice file of each voice section must not exceed FFE0H. If the ROM size taken up by that voice file is 5FE0H, then this file can be followed by a maximum of A000H mute data (FFE0H – 5FE0H = A000H). If this voice section does not contain a voice file, then it can have a maximum of 7FE0H mute data. The Max Total of NY2P010A ROM size cannot exceed 13600H. If the Rom size taken up by that voice file is FFE0H, it has to be separated into sections and every size is less than FFE0H.

### 3.6.6 MIDI Time Column

MIDI Time shows the real playing time estimated according to the MIDI and its Ref. Tempo. Changing Ref. Tempo will lead to changing of MIDI time, since playing time is relevant to tempo.

### 3.6.7 SR Column

SR stands for the sample rate of the voice file.

### 3.6.8 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a voice section here. There are 16 kinds of playback speed available, and each voice section can be given a unique playback speed.
The 16 kinds of speed are listed in the following table:

| ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***6*** | ***7*** | ***8*** |
|---|---|---|---|---|---|---|---|
| 12.0kHz | 10.8kHz | 9.7kHz | 8.9kHz | 8.0kHz | 7.5kHz | 7.0kHz | 6.5kHz |
| ***9*** | ***10*** | ***11*** | ***12*** | ***13*** | ***14*** | ***15*** | ***16*** |
| 6.1kHz | 5.8kHz | 5.4kHz | 5.2kHz | 4.9kHz | 4.7kHz | 4.5kHz | 4.3kHz |

### 3.6.9 Factor Column

The Factor column shows the quality factor of compression. Altering this factor may cause changes in compression quality and ROM size simultaneously. The ROM size after compression will be directly shown in ROM size column. There are 12 factors, which from '1' to '12'. Normally, a bigger factor will lead to bigger ROM size but better quality after compression. The default factor is "6".

| Factor | Comment |
|---|---|
| 12H | The best compressed sound quality. |
| … | … |

| Factor | Comment |
|---|---|
| 6M | Middle sound quality (default). |
| … | … |
| 1L | Very low sound quality, but smallest ROM size. |

### 3.6.10 Voice Time Column

The Voice Time column shows the voice playing time estimated by *Q-Tone*. Voice time varies depending on playing speed, so changing the Play Speed on this page may lead to change of voice time.

### 3.6.11 Mute Column

Mute column shows the quantified data of mute duration. Mute data for NY2B must be the multiple of 20H. Mute data can be set by pressing the Up and Down buttons at right of the mute column. Pressing the Up button makes the mute data increase by 20H whereas pressing the Down button makes the mute data decrease by 20H.


### 3.6.12 Mute Time Column

Mute Time column shows the actual mute time, which is estimated by *Q-Tone*. Mute time varies depending on playback speed, thus changing the Play Speed on this page may lead to change of mute time.

### 3.6.13 Radix

The Radix column is on the upper right, it shows the calculated unit of capacity. *Q-Tone* provides two kinds of unit: Hex and Dec.

### 3.6.14 Total MIDI Section Total Voice Section & Total Section Count

Total MIDI Section, Total Voice Section Count, and Total Section Count show how many MIDI files, Voice files and total files used respectively.

### 3.6.15 Data Size & Remain ROM Space

Data Size, which is located at the bottom of this page, shows the total ROM used by MIDI and voice sections while Remain Rom Space shows the available ROM that still not used. The total available ROM space is displayed to the right of slash (“/”), and the total ROM used must not exceed it.

### 3.6.16 Right-click Menu

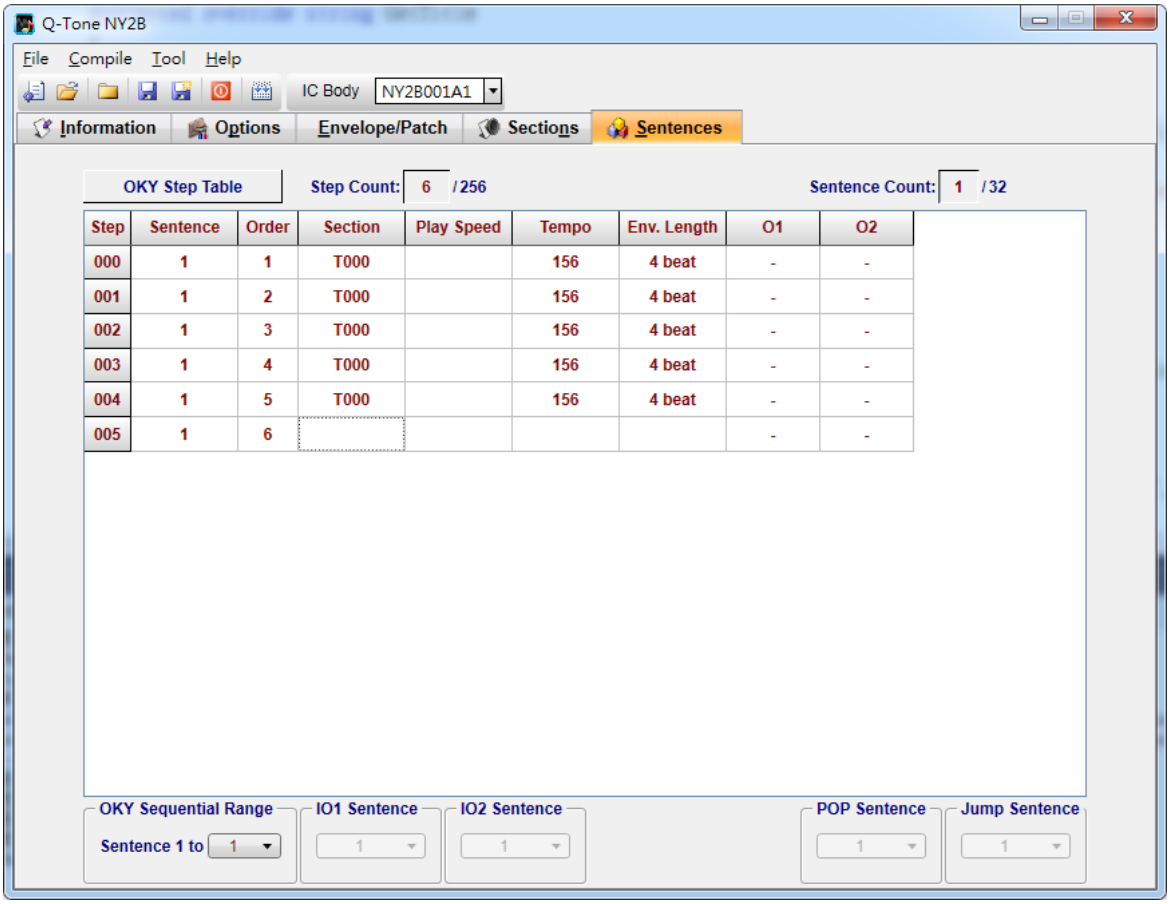
A right-click menu will show on the right by right clicking on the voice section table or mute section

table. The functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| Add Voice/MIDI | Add one or numbers of MIDI/Voice file or section at the end of all section |
| Add Section | Add a section at the end of all section |
| Remove Section | Delete the selected section |
| Insert Section | Insert a MIDI/Voice section before the selected section |
| Optimize | Automatically adjust the compression ratio of sections by using the full ROM capacity. |

## 3.7 Arranging the Sentences

A “sentence” means a combination of MIDI or voice sections to be played when triggered. For NY2B there are 32 sentences available under the limit of total 256 steps.

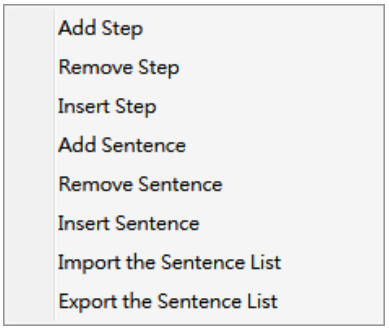


### 3.7.1 Step Column

For NY2B there are total 256 (000 to 255) steps that can be defined for the step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. The total number of defined steps is shown beyond the step table in this window.

### 3.7.2 Sentence Column

The Sentence column shows the sentence numbers the steps belong to. For NY2B, there are total 32 (1 to 32) sentences available. Every sentence, which may contain several steps, can specify which voice section to play. To add / remove / insert / import / export a step or sentence, select the target that is desired to be removed / inserted and then right-click the mouse and select the desire option from the pop-up menu.




### 3.7.3 Order Column

The Order column shows the sequence numbers of the steps contained in each sentence. *Q-Tone* will automatically generate the sequence numbers for all the steps in a sentence in ascending order. When this sentence is executed due to an input trigger, step 1 will be played first, followed by step 2 and step 3, and so on.

### 3.7.4 Section Column

Selecting a section here means the corresponding MIDI or voice file defined on Sections page will be arranged in the sentence.

### 3.7.5 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a voice section here. There are 16 kinds of playback speed available, and each voice section can be given a unique playback speed. (Please see Chapter 3.6.8 for details of the 16 kinds of play speed.)

### 3.7.6 Tempo Column

Tempos applied to sentences refer to the settings on Sections Page, and they cannot be edited at this page.

### 3.7.7 Env. Length Column

Env. Length Column determines the envelope length that is drawn on Envelope/Patch page. There

are 4 options: 1 beat, 2 beat, 4 beat, and 8 beat; each step could be given a unique envelope length.

### 3.7.8 O1/O2/Int. FB Column

When IO1 (or O2) is set as output in Options page, the O1 (or O2) step in OKY Step Table must be specified to make IC's output functional. There are 12 kinds of output options available in NY2B, including 10 kinds of fix output types and user-defined QLED and QIO. (Please see Chapter 3.4.20)
When "Internal-Feedback" on Options Page is enabled, O1 Column in the Sentence Page will become "Int. FB" automatically. Thus, user could indicate which sentences will trigger the intended sentence (Internal Feedback Path) when it stops or ends. (Please see Chapter 3.4.10 for the details of "Internal-Feedback".)

### 3.7.9 OKY Sequential Range

When the OKY trigger function is sequential, the Sequential Range means it will loop sentences in the range by triggering OKY. For example, if this range is 4, triggering OKY repeatedly will play sentences 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, and so on. When the OKY trigger function is random, the Random Range means the range of random selection for the next executing sentence. In other words, if this range is 4, an OKY trigger will lead to the execution of a random sentence in the range from sentence 1 to sentence 4.

### 3.7.10 IO1/IO2/POP Sentence

IO1 / IO2 / POP Sentence is available only when IO1 / IO2 / POP is set as input on Options page. User could specify which sentence will be executed when IO1 / IO2 / POP is triggered. Any sentence can be set as IO1 / IO2 / POP Sentence when the number of defined sentences is below 29, but IO1 Sentence must be restricted to play the 30$^{th}$ if the number of defined sentences exceeds 29, while IO1 Sentence and IO2 Sentence must be restricted to play the 30$^{th}$ and 31$^{st}$ respectively if the number of defined sentences exceeds 30. The IO1, IO2 and POP Sentence must be restricted to play the 30$^{th}$, 31$^{st}$ and 32$^{nd}$ sentence if the number of defined sentences exceeds 31.

### 3.7.11 Loop/Jump Sentence

When Alarm/Snooze is enabled on Options Page, Loop Sentence on the Sentence Page must be defined. When alarm is triggered and held, it will play IO2 sentence once and then play the Loop Sentence repeatedly until it falls into snooze status or the alarm time is over. When alarm is triggered and press IO1 to exit, it will play Jump Sentence immediately.
Any sentence can be set as Jump Sentence when the number of defined sentences is below 28, but Jump Sentence must be restricted to play the 29$^{th}$ if the number of defined sentences exceeds 28. If the number of defined sentences exceeds 31, Jump and Loop Sentence must be restricted to play the 29$^{th}$ and 30$^{th}$ sentence.

### 3.7.12 Right-click Menu

A right-click menu will show on the right by right-click. The functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| Add Step | Add a step at the end of all sections. |
| Remove Step | Delete the selected step. |
| Insert Step | Insert a step at the selected step. |
| Add Sentence | Add a sentence at the end of all sentences. |
| Remove Sentence | Remove the selected sentence. |
| Insert Sentence | Insert a sentence before the selected sentence. |
| Import the Sentence List | Import the edited sentence list (*.csv). |
| Export the Sentence List | Export all sentences as a sentence list (*.csv). |

# 4 Using *Q-Tone* for NY2C Series

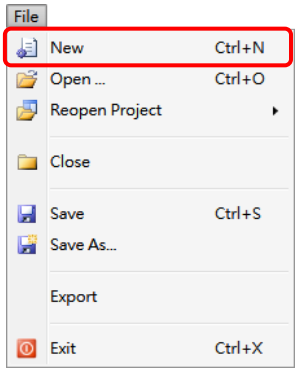
In this chapter, the details of using *Q-Tone* for NY2C will be presented step by step.

**Contents:**

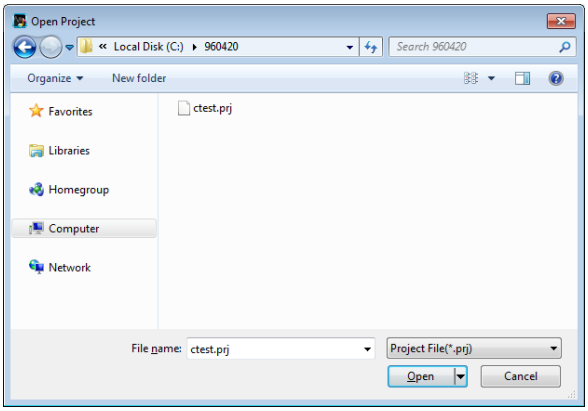


## 4.1 Creating a *Q-Tone* Project

After selecting [File/New] or [File/Open] on *Q-Tone*, or clicking the [New] button on the toolbar directly to start editing.

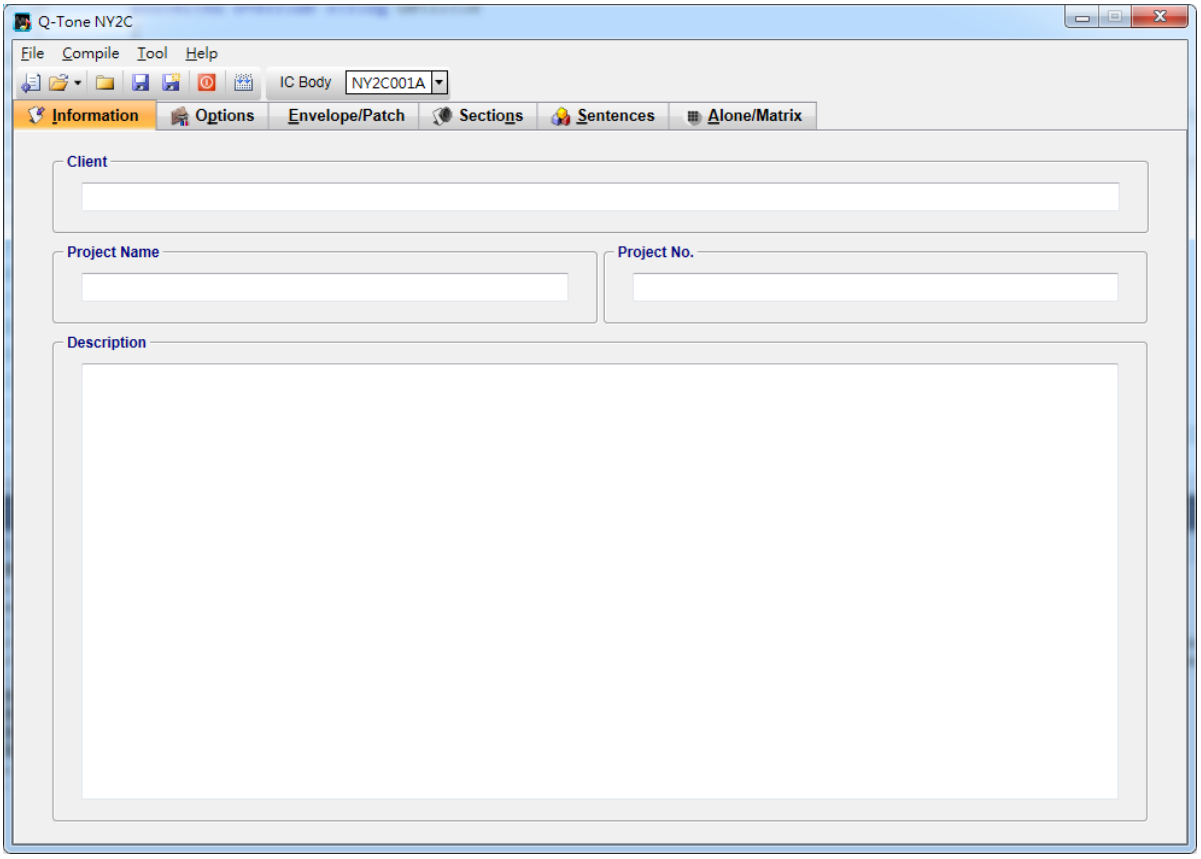



To modify an existing file, select [Open] from the [File] menu, and a dialog box for opening file will display shortly. After selecting a desired file within the [Open Project] dialog box, press [Open] button, or double-click it directly, and the existing file will be opened. If the file to be opened has been edited recently, it might be found on the list of [Reopen] option and could be opened directly.



## 4.2 Filling in the Information

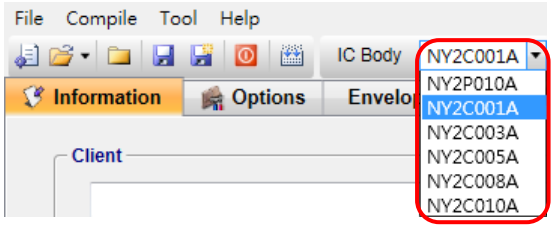
The Information page will be shown immediately after the file is opened. Any words can be typed in the blanks of this page, and the information on this page will be saved completely in the *Q-Tone* file. Since the information on this page, except [Client] blank, is just for user to annotate or record, no error checking will be performed by *Q-Tone.* All information will not be included in the .bin file except the client name.




***Note: The client name on this page will be included in the Checking List and Confirm Table after compiling. This is to protect the copyright of the programmer. The client name is the only "required" on this page, a warning message will display when compiling if this column is blank.***

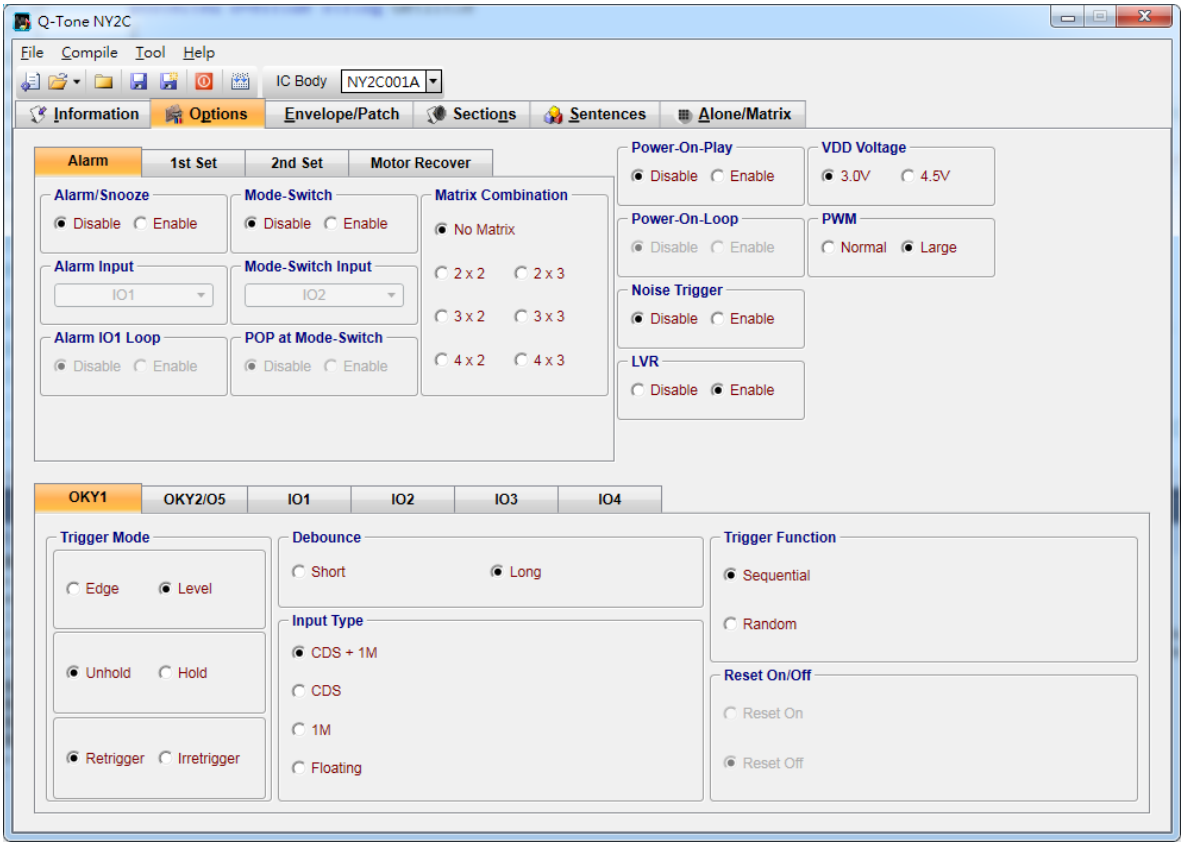
## 4.3 Selecting the IC Body

The [IC Body] drop-down list is at the top of the window. By clicking the Down button of it, all available IC bodies will be listed for selection. IC body could be changed during editing a project, but an error message in red word may display if the total ROM size of current sections exceeds the capacity of selected IC body.



## 4.4 Selecting the Mask Options

By selecting different mask options on the Options page, the complicated functions could be accomplished quickly. Although different series ICs have different functions, there are usually similar items in Options page. Such as Debounce Time, Trigger Mode, etc, could be set easily on the Options page.




### 4.4.1 Power-On-Play (POP)

When Power-On-Play option is enabled, IC will play the POP Sentence one time when power is on. When another key is triggered, it stops playing the POP Sentence and immediately plays the assigned sentence of triggered key.

### 4.4.2 Power-On-Loop

When Power-On-Loop option is enabled, IC will play the POP Sentence in loop when power is on. The trigger mode is fixed as Edge / Unhold / Retrigger.

***Note: This option can be set only at Power-On-Play status is enabled.***

### 4.4.3 Noise-Trigger

Noise-Trigger is a special application setting OKY1 as Low Trigger. Long Debounce is recommended. If the Noise-Trigger option is enabled and OKY1 is set as Edge/Unhold and Pull-Low Active, IC will

play OKY1 sentence once at power on. When lager noise happens outside or by antenna effect, an input signal will be induced to trigger OKY1 key.

***Note: It's popular in cigarette lighter or mobile antenna application.***

### 4.4.4 Low-Voltage-Reset, LVR

When VDD voltage is lower than 1.8V, IC will automatically reset. The default setting of LVR function is “Enable”. Choose “Disable” can turn off this function.

***Note: If Power-On-Play option is “Enable”, the POP Sentence will be played after LVR acts. If user presses OKY and LVR is operating, IC would replay the first Sentence.***

### 4.4.5 Selecting VDD Voltage

The IC oscillation frequency will be shifted at different operating voltage. For accuracy of internal-R oscillation, VDD voltage must be selected for OSC fine tuning during IC production.

### 4.4.6 Selecting PWM Output

The PWN Current function provides 2 options: Normal volume and Large volume. User could decide the PWM output based on practical applications.

### 4.4.7 Alarm/Snooze

When Alarm/Snooze option is enabled, IO1 (or IO2) is set as alarm clock switch, and OKY2 (or OKY1) or other IOs can be set as the snooze button.

When the alarm switch is held, it plays the given sentence one time, and then plays the “Loop Sentence” in loop until alarm period is over. Once the switch is turned off while alarm playing, alarm stops and then plays the “Jump Sentence” one time. Once pressing the snooze button while alarm playing, alarm stops playing and then waits for a specific period of snooze time. After snooze time is over, the “Loop Sentence” will be played in loop.

Cooperating with Voice-Select function, it plays the OKY2 (or OKY1) sentence one time and then plays the Loop Sentence in loop when IO1 (or IO2) alarm switch is held. Once IO1 (or IO2) switch is turned off while alarm playing, alarm stops and then plays the “Jump Sentence” one time.

***Note: Loop Sentence and POP Sentence share the same sentence.***

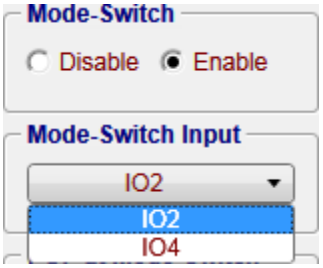
### 4.4.8 Alarm IO1 Loop

Alarm IO1 Loop is a special application of Alarm/Snooze. As this option enabled, it plays IO1 Sentence repeatedly during alarm time, and then it plays Jump Sentence once as alarm time is over.

***Note: Alarm Input must be set as IO1 to have this option available.***

### 4.4.9 Mode-Switch

Mode-Switch enables inputs to have 2 kinds of functions with the same key. When Mode-Switch set as 2-Modes, IO2 or IO4 can be set as Switch Pin, and then IO2 (or IO4) connecting can be switched between VDD (the first Mode) and GND (the second Mode) to realize Mode-Switching. Although input functions can be different between modes, the output functions must be the same between modes.




When Mode-Switch cooperating with Matrix Key, the Switch Pin affects the keys availability:

**IO2 as Switch Pin:**

3X3 Mode:

| | VDD | IO3 | IO4 |
|---|---|---|---|
| OKY1 | MTX0 | MTX3 | MTX6 |
| OKY2 | MTX1 | MTX4 | MTX7 |
| IO1 | MTX2 | MTX5 | MTX8 |

3X2 Mode:

| | VDD | IO3 |
|---|---|---|
| OKY1 | MTX0 | MTX3 |
| OKY2 | MTX1 | MTX4 |
| IO1 | MTX2 | MTX5 |

2X3 Mode:

| | VDD | IO3 | IO4 |
|---|---|---|---|
| OKY1 | MTX0 | MTX2 | MTX4 |
| OKY2 | MTX1 | MTX3 | MTX5 |

2X2 Mode:

| | VDD | IO3 |
|---|---|---|
| OKY1 | MTX0 | MTX2 |
| OKY2 | MTX1 | MTX3 |

**IO4 as Switch Pin:**

4X2 Mode:

| | VDD | IO3 |
|---|---|---|
| OKY1 | MTX0 | MTX4 |
| OKY2 | MTX1 | MTX5 |
| IO1 | MTX2 | MTX6 |
| IO2 | MTX3 | MTX7 |

3X2 Mode:

| | VDD | IO3 |
|---|---|---|
| OKY1 | MTX0 | MTX3 |
| OKY2 | MTX1 | MTX4 |
| IO1 | MTX2 | MTX5 |

2X2 Mode

| | VDD | IO3 |
|---|---|---|
| OKY1 | MTX0 | MTX2 |
| OKY2 | MTX1 | MTX3 |

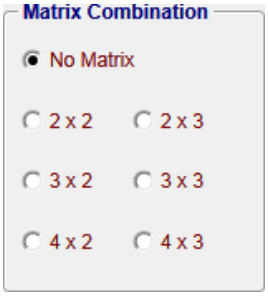
### 4.4.10 POP at Mode-Switch

When POP at Mode-Switch is enabled, it will play the POP Sentence once as Mode-Switched.

***Note: POP on Mode is not available until both Mode-Switch and Power-On-Play enabled.***

### 4.4.11 Matrix Combination

Matrix Combination can be set with 6 different kinds of arrangements: 2X2, 2X3, 3X2, 3X3, 4X2, and 4X3. The default is “No Matrix”, but the input arrangements of matrix keys will be set automatically as Matrix Combination chosen.




***Note: When Mode-Switch enabled, the 4X3 mode of Matrix Key is not***

***available.***

### 4.4.12 Voice-Select

When Voice-Select option is enabled, OKY1 (OKY2) is set as a select key to pick the desired sentence, and IO2 (IO1) is set as a play key to play the selected sentence. When a desired sentence is selected by OKY1 (OKY2) sequential playing, triggering IO2 (IO1) will have this sentence played.

***Note: It's popular in doorbell application.***

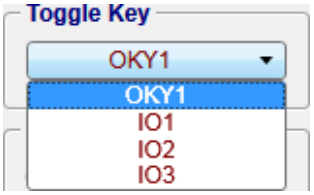
### 4.4.13 Internal-Feedback

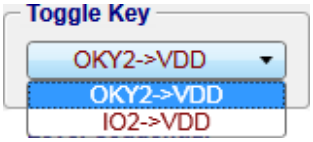
Internal-Feedback is a special application of IO2 and IO4. When a sentence is stop or end, a Stop – High Pulse signal is sent internally to trigger the given Internal Feedback Path. There are two sets of internal feedback paths, and user could choose one from each of the first set (OKY1, IO1, IO2) and the second set (OKY2, IO3, IO4) as the internal feedback path.

***Note: IO2 and IO4 fixed as input when Internal Feedback enabled.***

By using Voice-Select function, IO2 or IO4 can play the OKYx selected sentence once, then play the sentence that assigned by internal trigger.

### 4.4.14 Toggle On/Off




The Toggle On/Off function allows users to immediately stop playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To enable this function, switch it to “Enable”, and specify the key in “Toggle Key” column. There is only one key available for Toggle On/Off function, although all 6 keys could be set as input trigger in NY2C.

If combine the Matrix Key, the first group of 4X3 or 4X2 combination can set up OKY1 (OKY1->VDD) or IO1 (IO1->VDD), the second group can set up OKY2 (OKY2->VDD) or IO2 (IO2->VDD) as Toggle On/Off button. The first group of 3X3 or 3X2 combination can set up OKY1 (OKY1->VDD) or IO1 (IO1->VDD); the second group can be OKY2 (OKY2->VDD) as Toggle On/Off button. The first group of 2X3 or 2X2 combination can set up OKY1 (OKY1->VDD); the second group can be OKY2 (OKY2->VDD) as Toggle On/Off button.

### 4.4.15 Level-Sequential

Level-Sequential is a special application of OKY. When OKY (OKY2) is triggered and held, it plays assigned sentences sequentially in loop (S1, S2, S3, S1, S2, S3, …). When key is released, it stops playing immediately (under Hold mode), or stops playing at end of current sentence (under Unhold mode). Triggering again, it will start from the next sentence, playing sequentially in loop as key is held.

Cooperating with Edge-Loop function, it plays assigned sentences sequentially in loop when OKY is triggered (but not held). Triggering again when playing, it will play next sentences sequentially in loop.
Cooperating with both Edge-Loop and Loop On/Off function, it plays the assigned sentences sequentially in loop when OKY is triggered (but not held), and stops playing when triggered again. If the key is triggered again after being toggled off, it will play the next sentences sequentially in loop.

### 4.4.16 Loop On/Off

When the key function is Edge-Loop, enabling the Loop On/Off option can achieve Toggle On/Off function. That is, the first trigger plays first sentence in loop, and the second trigger stops playing. Once the key is triggered again, it plays the next sentence (with OKY Sequential) in loop, and stops playing if triggered again during playing, and so on.

***Note: Loop On/Off and Toggle On/Off cannot coexist.***

### 4.4.17 Edge-Loop

When Edge-Loop option is enabled, user can assign an input key to implement this function through Toggle Key selection. When the specific key is triggered, it will play the assigned sentence in loop.
Cooperating with OKY (OKY2) Sequential function, the first trigger plays first sentence in loop, the second trigger plays second sentence in loop, the third trigger plays third sentence in loop, and so on.
Cooperating with Loop On/Off function, it stops playing when triggering during playing. Once the key is triggered again, it plays the next sentence (with OKY Sequential) in loop.
Cooperating with Loop-End function, it will stop playing when triggering at the playing of the last OKY sentence. Triggering again after stop, it will start from the first OKY sentence and play it in loop again.

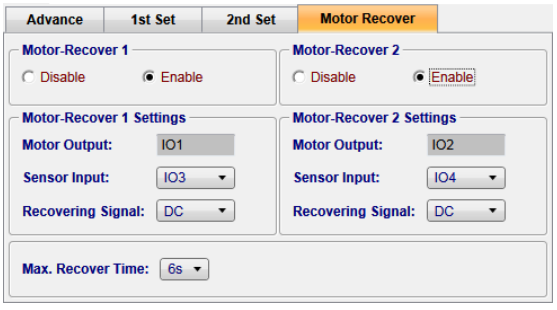
### 4.4.18 Loop-End

Loop-End will stop playing when triggering at the playing of the last OKY Edge-Loop sentence. Triggering again after stop, it will start from the first OKY sentence and play it in loop again.

***Note: Loop On/Off and Loop-End cannot coexist.***

### 4.4.19 Motor-Recover

There are 2 sets of Motor-Recover available. When Motor-Recover is enabled, please use IO1 (or IO2) as motor control, and OKY2 (or IO3) or IO4 for the motor recovering sensor.




- ◆ Sensor Input: The sensor input detects whether the motor is recovered. The sensor input must be OKY2 or IO3 when motor output is IO1; while the sensor input must be IO4 when the motor output is IO2.

- ◆ Recovering Signal: Recovering Signal drives the not-recovered motor to recover. There are 3 kinds of recovering signals available, which are 16Hz, 32Hz, and DC. User could choose one kind for each set respectively.
- ◆ Max Recover Time: The maximum length of recovered motor time. There are 4 options to select: 4s (4 secs)、5s (5 secs)、6s (6 secs)、7s (7 secs).

### 4.4.20 Trigger Mode

The mode of a trigger must be specified to completely define the input functions. Specify the trigger mode by choosing from the following three types of options:

- ◆ The Edge and Level options specify whether the trigger should respond to the rising edge or the high level of the input signal.
- ◆ The Hold and Unhold options specify whether you need to keep on pressing the trigger button to execute the whole voice sentence.
- ◆ The Retrigger and Irretrigger options specify whether the trigger can be functional when a voice sentence is playing.

### 4.4.21 Debounce

Debounce time is a playback-speed-dependent function, which determines the debouncing period for TG. There are always two kinds of debounce time to be selected. The long debounce time is used for debouncing the push button trigger input while the short debounce time is used for debouncing the electrical transition such as CDS input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

### 4.4.22 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY2C series there are 4 input type options corresponding to different applications.

| Option | Input Type Description |
|---|---|
| CDS + | Normal selection for button trigger.<br>1MΩ pull-low resistance when button is pressed, and 1MΩ+300KΩ (parallel) pull-low resistance when button is released. |
| CDS | Internal 300KΩ pull-low resistance, usually for photo-resistor trigger.<br>Floating when button is pressed, and 300KΩ pull-low resistance when button is released. |
| 1M | Internal 1MΩ pull-low resistance, reserved for some special applications. |
| Floating | No internal resistor connection, and is usually connected to other output pin or connected to GND by an external resistor. |

### 4.4.23 Selecting OKY Trigger Function

The OKY Trigger Function allows users to set the IC to play sentences in a sequential or random manner for two consecutive triggers applied to OKY pin. When sequential trigger function is selected,

the IC will play the “next” sentence whereas a random sentence will be played when random trigger function is selected.

### 4.4.24 Selecting OKY Reset On/Off

This function is available only when the OKY trigger function is sequential. When Reset is ON, the IC will reset the sentence sequential pointer once the other input pin (IO1) is pressed. It means after IO1 is pressed, pressing OKY will lead to the playing of sentence 1. When Reset is OFF, the playing sequence of OKY will keep unaffected.

### 4.4.25 Selecting Output Types

When IOs are set as output, user could specify a status signal as the output signal. The following are the available output type options:

| Option | Output types Description |
|---|---|
| Stop – Low Pulse | Low active stop-pulse output whenever device stop playing |
| Stop – High Pulse | High active stop-pulse output whenever device stop playing |
| Busy – High Active | High active signal output during playing (Drive output) |
| Busy – Low Active | Low active signal output during playing (Sink output) |
| LED 2Hz Flash | 2Hz Sink or Drive signal output to drive LED during playing |
| LED 4Hz Flash | 4Hz Sink or Drive signal output to drive LED during playing |
| LED 8Hz Flash | 8Hz Sink or Drive signal output to drive LED during playing |
| LED 16Hz Flash | 16Hz Sink or Drive signal output to drive LED during playing |
| LED 1/2 Dynamic | 1/2 (sound level) dynamic Sink or Drive signal output to drive LED |
| LED 3/4 Dynamic | 3/4 (sound level) dynamic Sink or Drive signal output to drive LED |

The actual flashing rates for LED 2Hz, LED 4Hz, LED 8Hz and LED 16Hz options are positive relative to the play speed of voice or tempo of melody. Only when the play speed of voice is 8kHz or tempo of melody is 117, are their flashing rates equal to settings on Options page (2Hz, 4Hz, 8Hz and 16Hz).

***Note: The flash of LED 2Hz, LED 4Hz, LED 8Hz and LED 16Hz of Voice Section resets by different Step, bit the flash of LED 2Hz, LED 4Hz, LED 8Hz and LED 16Hz of MIDI Section resets by different Note.***

### 4.4.26 Connect Type

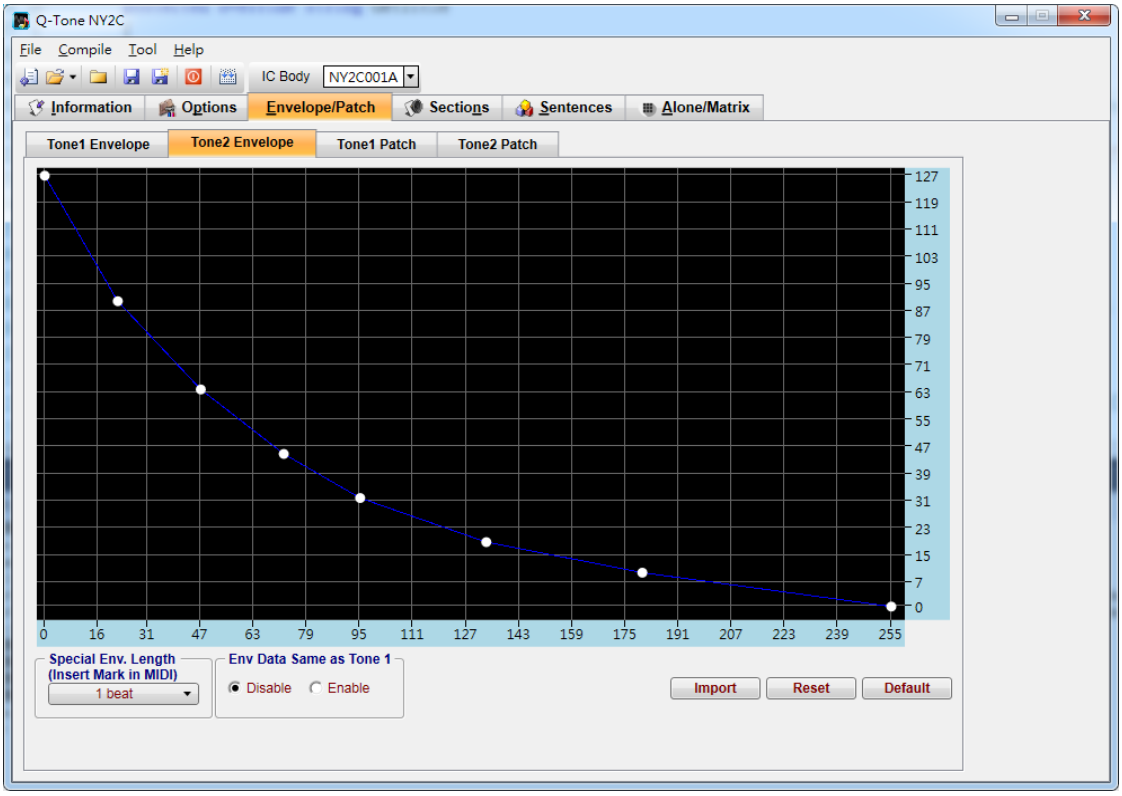
When IOx or O5 is set as output, user could specify a status signal as the output signal. There are 3 connect type options as showed below.

| Option | Connect Type Description |
|---|---|
| Sink | Output low level signals while playing. |
| Constant Sink | Limits output current under 20mA to save power consumption |
| Drive | Output high level signals while playing. |

## 4.5 Envelope/Patch

User could draw envelopes (max 256 points) and the user defined patch waves with the graphical interface on Envelope/Patch page

### 4.5.1 Envelope




**Special Env. Length** – “Special Env. Length” could be set as “1 beat” or “2 beat”. When there is control code ”Ch0=SL” or ”Ch1=SL” in MIDI files (see Appendix for inserting control codes by Cakewalk), the “Special env. Length” here will be applied to replace the original envelope length.

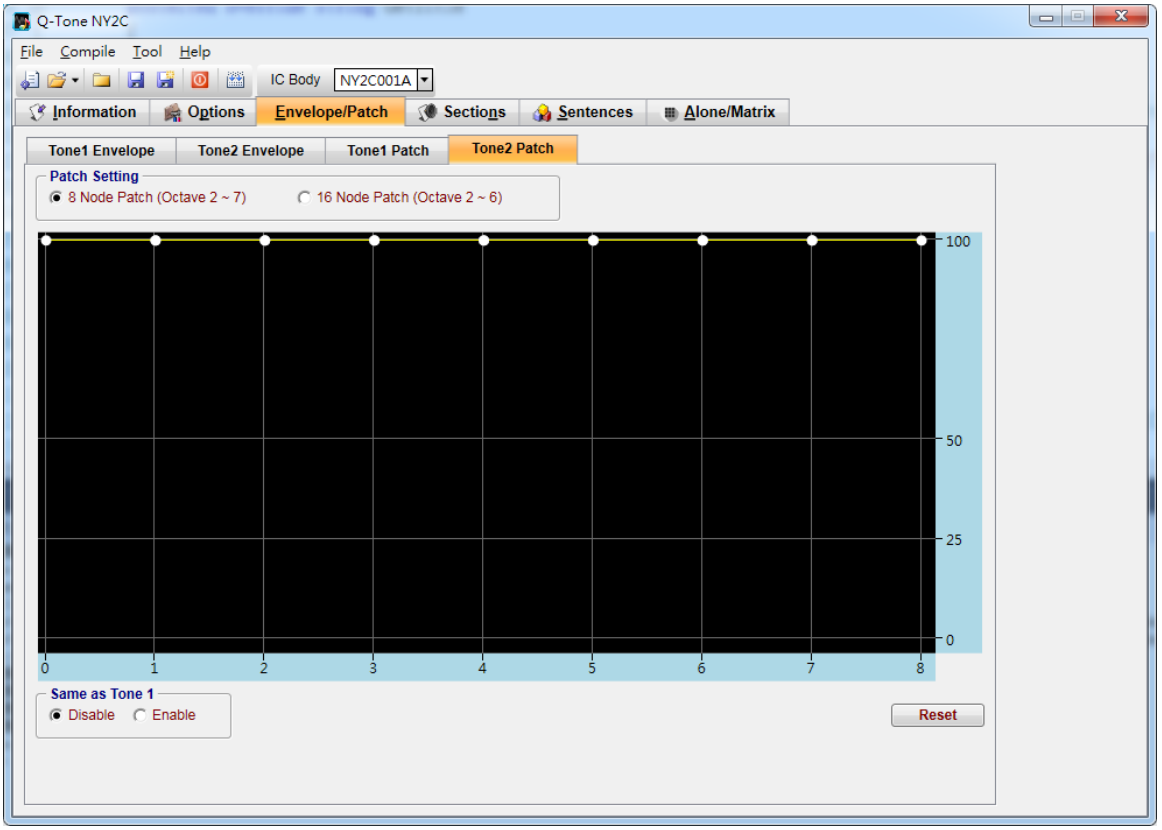
**Env Data Same as Tone1** – When “Env Data Same as Tone1” set as Enable, the envelope of Tone2 is set as the same as Tone1.

**Import** – Import the existing envelope (**.env**) drawn by Envelope Synthesizer.

**Reset** – Reset envelope as a straight line.

**Default** – Set the envelope as *Q-Tone’s* default.

### 4.5.2 Patch




**8 Node Patch (Octave 2 ~ 7)** – At "8 Node Patch" mode, there are 8 frames for X-axis, and 4 levels (100%, 50%, 25%, and 0%) for Y-axis. User could define a patch for each tone channel.

***Note: At "8 Node Patch" mode, the pitch range is from C2 to B7.***

**16 Node Patch (Octave 2 ~ 6)** – At "16 Node Patch" mode, there are 16 frames for X-axis, and 4 levels (100%, 50%, 25%, and 0%) for Y-axis. User could define a patch for each tone channel.

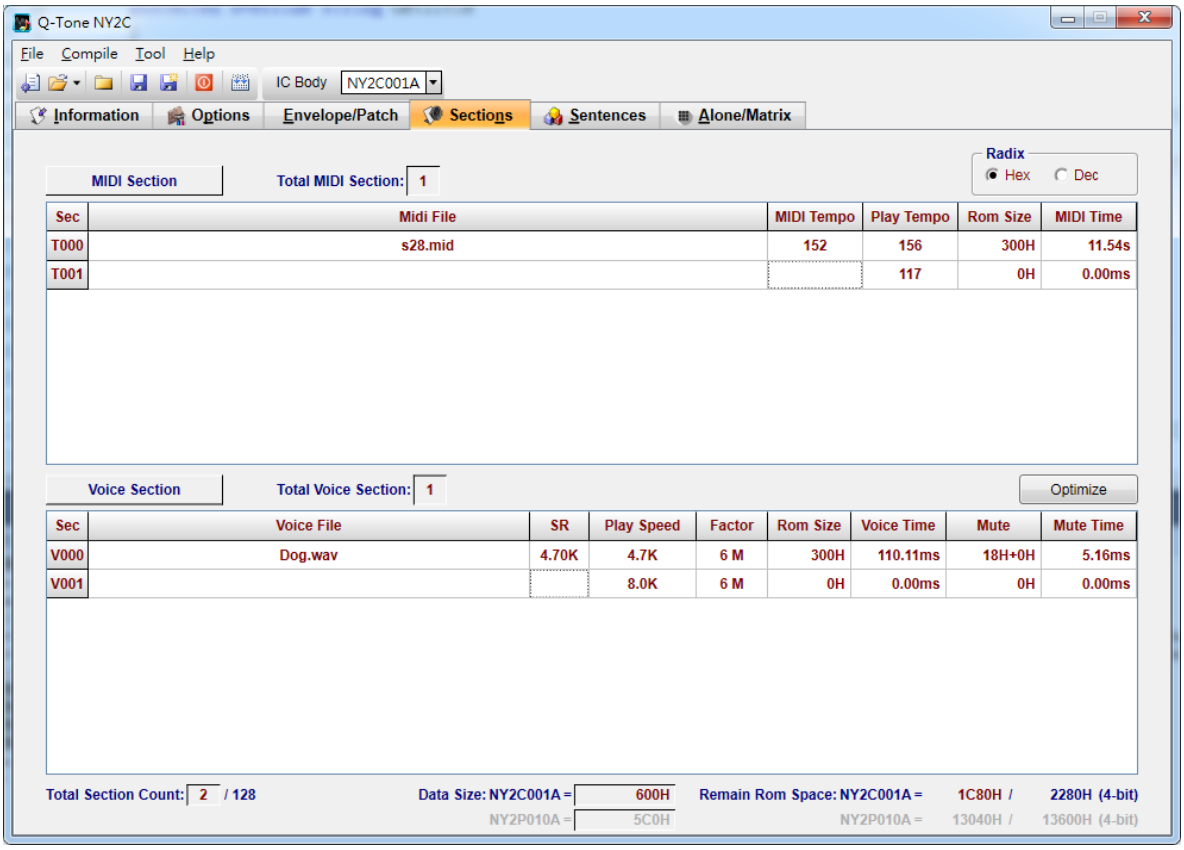
***Note: At "16 Node Patch" mode, the pitch range is from C2 to B6.***

**Same as Tone1** – When "Same as Tone1" set as Enable, the patch of Tone2 is set as the same as Tone1.

**Reset** – Reset the patch as square wave.

## 4.6 Managing the Sections

Sections page is always in a table form, and it allows 128 sections max in NY2C series. User can use the Sections page to include and manage the MIDI / Voice sections for a project. This page is divided as 2 parts, the upper part is for editing MIDI section, the lower part is for voice section.




### 4.6.1 Sec Column

Sec column shows the sequence numbers of MIDI/Voice Sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections to be played. The sequence numbers of MIDI sections are from T000 to T127, and the voice sections are from V000 to V127 for NY2C. (32 sections max for sum of MIDI and voice sections)

### 4.6.2 File Name Column

File Name shows MIDI and voice data files. *Q-Tone* MIDI File column supports GM MIDI Format1 (**.mid)** and *Q-MIDI* files (**.t2x**). The Voice File Column supports 8 / 16 / 32-bit **mono** wave files (**.wav**), *Quick-IO* files (**.nyq**) or *Q-Sound* files (**.nyw**). To include a voice file, double-click on a field in this column. A dialog box for file opening will be shown for selecting a file. To change the existing files, right-click the mouse and select Add / Remove / Insert / Optimize section form the pop-up menu. If user wants to adjust the sequence of sentences, please press the left mouse key on the desire column, then drag the selected sentence to the target column and release the left key.

***Note: Two voice files with the same file name or a single voice file cannot be included in two MIDI/Voice sections.***

### 4.6.3 MIDI Tempo Column

Tempo shows the original tempo of the MIDI file.

### 4.6.4 Play Tempo Column

Play Tempo determines the real playback tempo of the MIDI, and user could choose one of the 25 fix tempos from the drop-down menu.

| *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|---|---|---|---|
| 59 | 60 | 63 | 65 | 67 | 69 | 72 | 75 | 78 |
| *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* |
| 82 | 85 | 89 | 94 | 99 | 104 | 110 | 117 | 125 |
| *19* | *20* | *21* | *22* | *23* | *24* | *25* | | |
| 134 | 144 | 156 | 170 | 188 | 208 | 234 | | |

### 4.6.5 ROM Size Column

ROM Size column shows the size of ROM that used by the MIDI/Voice data after compression. The voice section ROM size after compression will be affected by the quality factor. For NY2C001A and NY2C003A, the ROM size for every section must be the multiple of 80H whereas 200H for the other NY2C bodies. In most cases, no matter how long the wave file is, the voice encoder will automatically adjust the compressed voice data to fit the multiple of 80H (or 200H). But sometimes, for an extremely short wave file, the voice encoder will fail to do the adjustment. Mute signal will then be used to fill in the gap between the actual voice file ending and the next 80H (or 200H) multiple. Such mute signal will be shown in the Mute column and will be played following the voice file.

Please note that every NY2C Series IC actually imposes a maximum limit on each type of section including pure MIDI/Voice section, voice+mute section and pure mute section. The maximum limits imposed on all the NY2C Series ICs are tabulated below.

**Table 4.6.5 - The maximum limits imposed by NY2C Series ICs**

| Body | MaxT/V | Max(V+M) | MaxM | Max Total |
|---|---|---|---|---|
| NY2P010A | FFE0H | FFE0H | FFE0H | 13600H |
| NY2C001A | 2280H | FFE0H | FFE0H | 2280H |
| NY2C003A | 3C80H | FFE0H | FFE0H | 3C80H |
| NY2C005A | 8000H | FFE0H | FFE0H | 8000H |
| NY2C008A | B800H | FFE0H | FFE0H | B800H |
| NY2C010A | F200H | FFE0H | FFE0H | F200H |

- **MaxT/V** column shows the maximum ROM Size that can be taken up by the voice file when the voice section is a pure voice section (voice section with a voice file only).
- **Max(V+M)** column shows the maximum sum of the ROM Size taken up by the voice file and the mute data when the voice section is a voice+mute section.
- **MaxM** column shows the maximum value of the mute data when the voice section is a pure mute section (without any voice file).

- **Max Total** column shows the maximum total ROM Size that can be taken up by all the voice files in a project.

Let's take NY2C001A as an example. For this body the ROM size taken up by the voice file of each voice section must not exceed FFE0H. If the ROM size taken up by that voice file is 5FE0H, then this file can be followed by a maximum of A000H mute data (FFE0H – 5FE0H = A000H). If this voice section does not contain a voice file, then it can have a maximum of 7FE0H mute data. The Max Total of NY2P010A ROM size cannot exceed 13600H. If the Rom size taken up by that voice file is FFE0H, it has to be separated into sections and every size is less than FFE0H.

### 4.6.6 MIDI Time Column

MIDI Time shows the real playing time estimated according to the MIDI and the Ref. Tempo set at this page. Changing Ref. Tempo will lead to changing of MIDI time, since playing time is relevant to tempo.

### 4.6.7 SR Column

SR stands for the sample rate of the voice file.

### 4.6.8 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a voice section here. There are 16 kinds of playback speed available, and each voice section can be given a unique playback speed.
The 16 kinds of speed are listed in the following table:

| ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***6*** | ***7*** | ***8*** |
|---|---|---|---|---|---|---|---|
| 12.0kHz | 10.8kHz | 9.7kHz | 8.9kHz | 8.0kHz | 7.5kHz | 7.0kHz | 6.5kHz |
| ***9*** | ***10*** | ***11*** | ***12*** | ***13*** | ***14*** | ***15*** | ***16*** |
| 6.1kHz | 5.8kHz | 5.4kHz | 5.2kHz | 4.9kHz | 4.7kHz | 4.5kHz | 4.3kHz |

### 4.6.9 Factor Column

The Factor column shows the quality factor of compression. Altering this factor may cause changes in compression quality and ROM size simultaneously. The ROM size after compression will be directly shown in ROM size column. There are 12 factors, which from '1' to '12'. Normally, a bigger factor will lead to bigger ROM size but better quality after compression. The default factor is "6".

| Factor | Comment |
|---|---|
| 12H | The best compressed sound quality. |
| … | … |
| 6M | Middle sound quality (default). |
| … | … |
| 1L | Very low sound quality, but smallest ROM size. |

### 4.6.10 Voice Time Column

The Voice Time column shows the voice playing time estimated by *Q-Tone*. Voice time varies depending on playing speed, so changing the Play Speed on this page may lead to change of voice time.

### 4.6.11 Mute Column

Mute column shows the quantified data of mute duration. Mute data for NY2C must be the multiple of 20H. Mute data can be set by pressing the Up and Down buttons at right of the mute column. Pressing the Up button makes the mute data increase by 20H whereas pressing the Down button makes the mute data decrease by 20H.


### 4.6.12 Mute Time Column

Mute Time column shows the actual mute time, which is estimated by *Q-Tone*. Mute time varies depending on playback speed, thus changing the Play Speed on this page may lead to change of mute time.

### 4.6.13 Radix

The Radix column is on the upper right, it shows the calculated unit of capacity. *Q-Tone* provides two kinds of unit: Hex and Dec.

### 4.6.14 Total MIDI Section Total Voice Section & Total Section Count

Total MIDI Section, Total Voice Section, and Total Section Count show how many MIDI / Voice files, mute files and total section used respectively.

### 4.6.15 Data Size & Remain ROM Space

Data Size, which is located at the bottom of this page, shows the total ROM used by MIDI and voice sections while Remain Rom Space shows the available ROM that still not used. The total available ROM space is displayed to the right of slash (“/”), and the total ROM used must not exceed it.

### 4.6.16 Right-click Menu

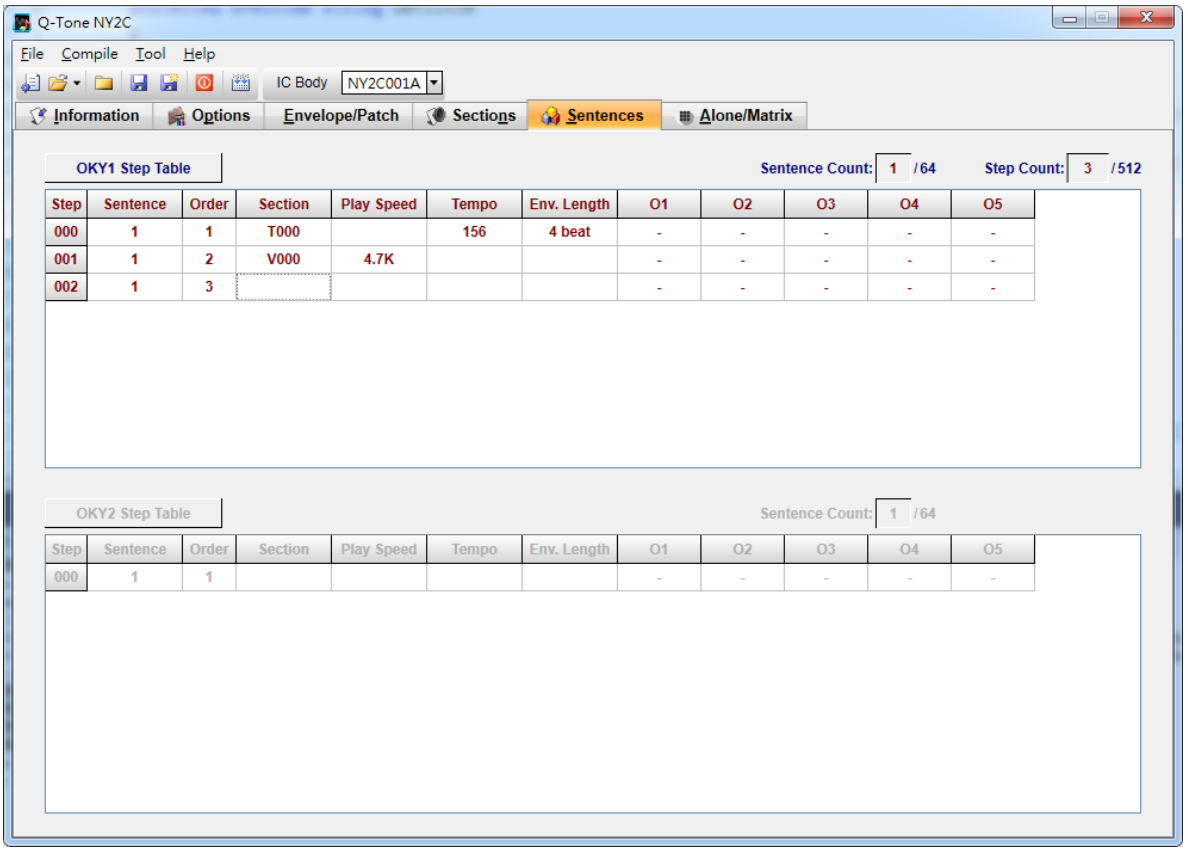
A right-click menu will show on the right by right clicking on the voice section table or mute section

table. The functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| Add Voice/MIDI | Add one or numbers of MIDI/Voice file or section at the end of all section |
| Add Section | Add a section at the end of all section |
| Remove Section | Delete the selected section |
| Insert Section | Insert a MIDI/Voice section before the selected section |
| Optimize | Automatically adjust the compression ratio of sections by using the full ROM capacity. |

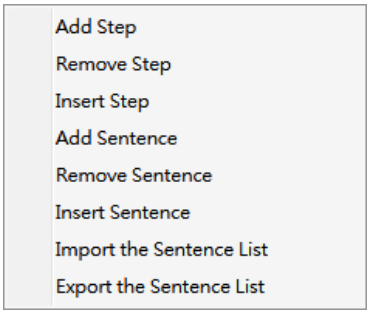
## 4.7 Arranging the Sentences

A “sentence” means a combination of MIDI or voice sections to be played when triggered. For NY2C there are 128 sentences available under the limit of total 512 steps in two pages of OKY1 Step Table and OKY2 Step Table.




### 4.7.1 Step Column

For NY2C there are total 512 (000 to 511) steps that can be defined for the step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. The total number of defined steps is shown beyond the step table in this window.



### 4.7.2 Sentence Column

The Sentence column shows the sentence numbers the steps belong to. For NY2C, there are total 64 (1 to 64) sentences available. Every sentence, which may contain several steps, can specify which voice section to play. To add / remove / insert / import / export a step or sentence, select the target that is desired to be removed / inserted and then right-click the mouse and select the desire option from the pop-up menu.

***Note: OKY1 and OKY2 are each 64 Sentences. In the Matrix Key mode, OKYx is each 32 Sentences.***

### 4.7.3 Order Column

The Order column shows the sequence numbers of the steps contained in each sentence. *Q-Tone* will automatically generate the sequence numbers for all the steps in a sentence in ascending order. When this sentence is executed due to an input trigger, step 1 will be played first, followed by step 2 and step 3, and so on.

### 4.7.4 Section Column

Selecting a section here means the corresponding MIDI or voice file defined on Sections page will be arranged in the sentence.

### 4.7.5 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a voice section here. There are 16 kinds of playback speed available, and each voice section can be given a unique playback speed. (Please seeChapter 4.6.8 for details of the 16 kinds of play speed.)

### 4.7.6 Tempo Column

Tempos applied to sentences refer to the settings on Sections Page, and they cannot be edited at this page.

### 4.7.7 Env. Length Column

Env. Length Column determines the envelope length that is drawn on Envelope/Patch page. There are 4 options: 1 beat, 2 beat, 4 beat and 8 beat; each step could be given a unique envelope length.

### 4.7.8 O1, O2, O3, O4, O5/Int. FB1/Int. FB2 Column

When IOs are set as output in Options page, the corresponding step in OKY1/OKY2 Step Table in Sentences Page must be specified to make IC's output functional. There available are 12 kinds of output options in NY2C, including 10 kinds of fix output types and user-defined QLED and QIO.

(Please see Chapter 4.4.25)

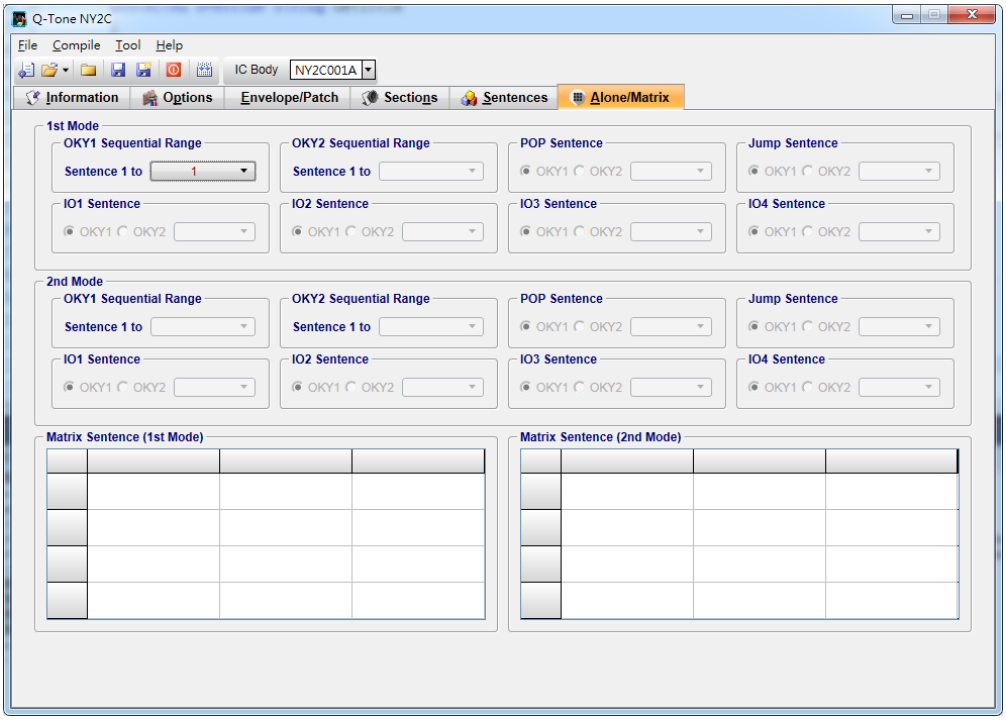
When “Internal Feedback” on Options Page is enabled, O2 Column in the Sentence Page will become “Int. FB” automatically. Thus, user could indicate which sentences will trigger the intended sentence (Internal Feedback Path) when it stops or ends. (Please see Chapter 4.4.11 for the detail of “Internal-Feedback”.)

### 4.7.9 Right-click Menu

| Menu Item | Function |
|---|---|
| Add Step | Add a step at the end of all sections. |
| Remove Step | Delete the selected step. |
| Insert Step | Insert a step at the selected step. |
| Add Sentence | Add a sentence at the end of all sentences. |
| Remove Sentence | Remove the selected sentence. |
| Insert Sentence | Insert a sentence before the selected sentence. |
| Import the Sentence List | Import the edited sentence list (*.csv). |
| Export the Sentence List | Export all sentences as a sentence list (*.csv). |

## 4.8 Alone/Matrix

The sentences played by input functions, such as OKYx / IOx / POP / Loop / Jump Sentence, are defined at Alone/Matrix Page. Matrix Key and Alone Key could coexist, and each key can be defined a unique sentence.




### 4.8.1 OKY1/OKY2 Sequential Range

When the trigger function of OKY1 (or OKY2) is sequential, the Sequential Range means it will loop sentences in the range by triggering OKY1 (or OKY2). For example, if this range is 4, triggering OKYx repeatedly will play sentences 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, and so on. When the trigger function of OKYx is random, the Random Range means the range of random selection for the next executing sentence. In other words, if this range is 4, an OKYx trigger will lead to the execution of a random sentence in the range from sentence 1 to sentence 4.

### 4.8.2 IO1/IO2/IO3/IO4/POP Sentence

When IO1 (IO2 or IO3 or IO4) is set as input, a sentence must be assigned at Alone/Matrix Page for each key, each mode, to have it played while triggered.

When IO/POP Sentence selects OK1 Step Table and the Mode-Switch is disabled, IO1 / IO2 / IO3 / IO4 Sentence can play any sentence if the number of defined sentences is under 59. But IO1 Sentence must be restricted to play the 60$^{th}$ respectively if the number of defined sentences exceeds 59. IO1 / IO2 Sentence must be restricted to play the 60$^{th}$ / 61$^{st}$ sentence respectively if the number of defined sentences exceeds 60. And so forth. So IO1 / IO2 / IO3 / IO4 / POP Sentence must be restricted to play the 60$^{th}$ / 61$^{st}$ / 62$^{nd}$ / 63$^{rd}$ / 64$^{th}$ respectively if the number of defined sentences exceeds 63.

When IO/POP Sentence selects OK2 Step Table and Mode-Switch is disabled, IO1 / IO2 / IO3 / IO4 / POP Sentence can play any sentence when the number of defined sentences is under 64.

When IO/POP Sentence selects OK1 Step Table and Mode-Switch is enabled, IO1 / IO2 / IO3 / IO4 / POP Sentence can play any sentence when the number of defined OKY1 sentences is under 29. But IO1 Sentence must be restricted to play the 30th sentence if the number of defined OKY1 sentence exceeds 29. IO1 / IO2 sentence must be restricted to play the 30th / 31st sentence if the number of defined sentence exceeds 30. And so forth. So IO1 / IO2 / IO3 / IO4 / POP Sentence must be restricted to play the 30th /31st / 32nd / 33rd /34th sentence when the number of defined sentence exceeds 33.

When IO/POP Sentence selects OK2 Step Table and Mode-Switch is enabled, IO1 / IO2 / IO3 / IO4 / POP Sentence can play any sentence when the number of defined sentences is under 32.

### 4.8.3 Loop/Jump Sentence

Loop Sentence is available only when Alarm/Snooze is enabled on Options page, and user could specify it at Alone/Matrix Page. When the alarm is triggered, it will play IO1 Sentence (or IO2 Sentence) once, and then switched to play Loop Sentence repeatedly until the alarm time is over.

When Mode-Switch is disabled, any sentence can be set as Loop Sentence when the number of defined sentences is below 63, but Loop Sentence must be restrict to 64 if the number of defined sentences exceeds 63.

When Mode-Switch is enabled, any sentence can be set as Loop Sentence when the number of OKY1 sentences is below 31, but Loop Sentence must be restrict to 32 if the number of OKY1 sentences exceeds 31.

Jump Sentence is available only when Alarm/Snooze is enabled on Options page. User could specify which sentence will be executed when alarm is over at Alone/Matrix Page. When alarm is triggered, and then trigger (IO1 or IO2) released, it will play the Jump Sentence immediately as trigger released.

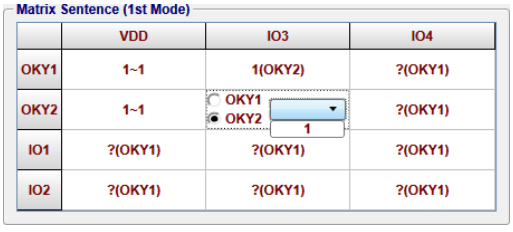
When Mode-Switch is disabled, any sentence can be set as Jump Sentence when the number of defined sentences is below 58, but Jump Sentence must be restrict to 59 if the number of defined sentences exceeds 58.

When Mode-Switch is enabled, any sentence can be set as Jump Sentence when the number of OKY1 sentences is below 26, but POP Sentence must be restrict to 27 if the number of OKY1 sentences exceeds 26.

***Note: Loop Sentence and POP Sentence takes the same index, so that can't coexist.***

### 4.8.4 Matrix Sentence

When user selects Matrix Combination, user must specify the sentence played by each matrix key in the Matrix Sentence area.



# 5 Using *Q-Tone* for NY2D series

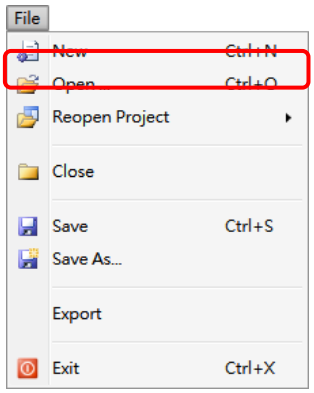
In this chapter, the details of using *Q-Tone* for NY2D will be presented step by step.

**Contents:**

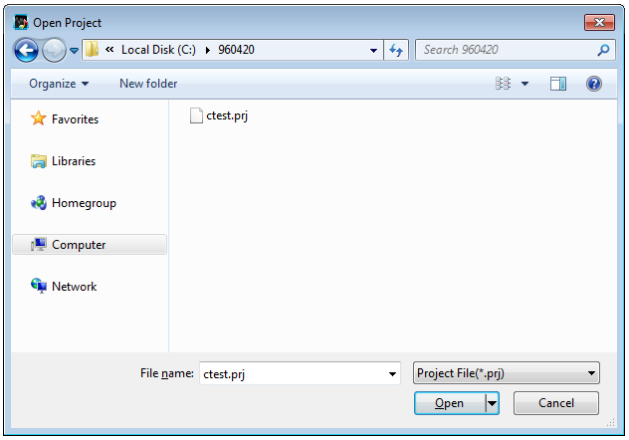


## 5.1 Creating a *Q-Tone* Project

After selecting [File/New] or [File/Open] on *Q-Tone*, or clicking the [New] button on the toolbar directly to start editing.

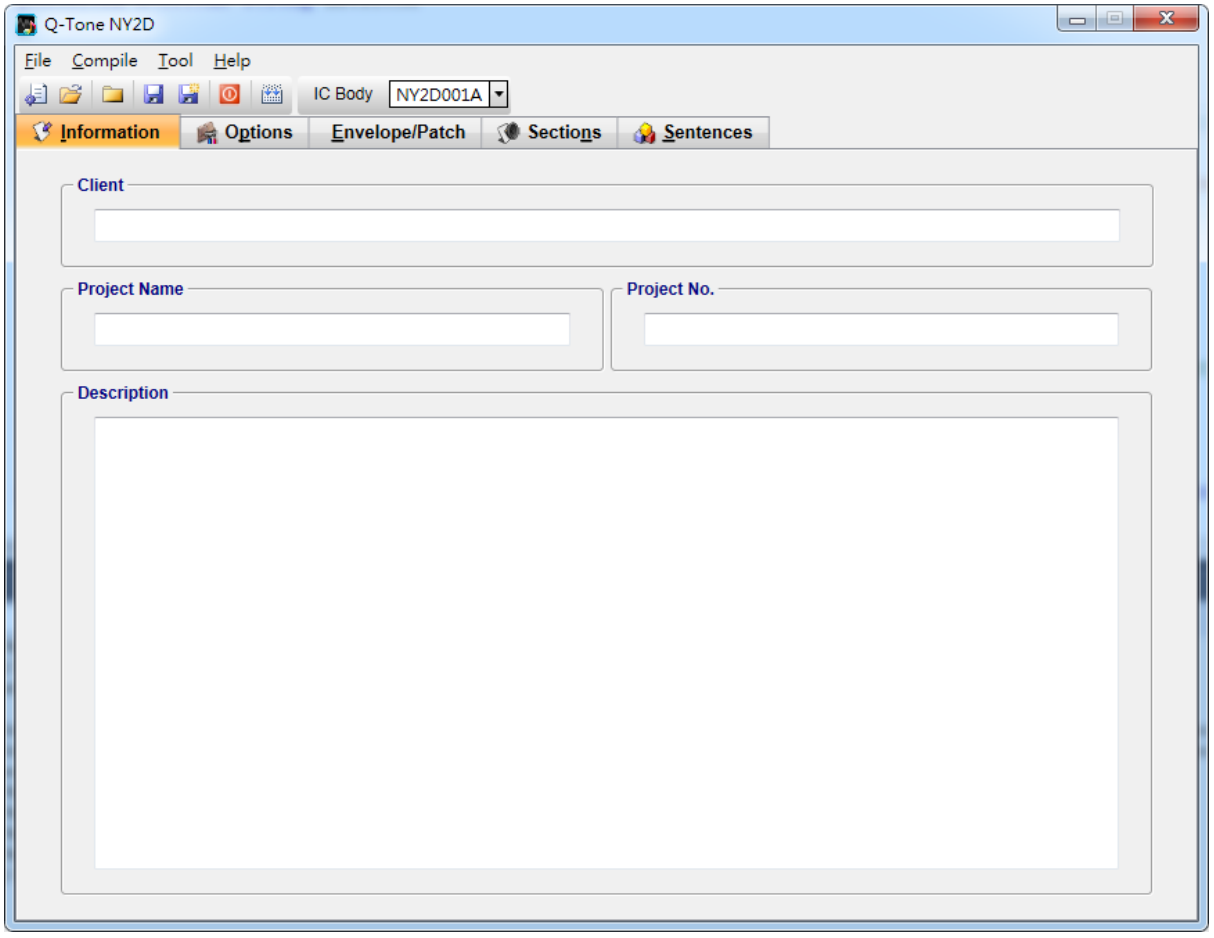



To modify an existing file, select [Open] from the [File] menu, and a dialog box for opening file will display shortly. After selecting a desired file within the [Open Project] dialog box, press [Open] button, or double-click it directly, and the existing file will be opened. If the file to be opened has been edited recently, it might be found on the list of [Reopen] option and could be opened directly.



## 5.2 Filling in the Information

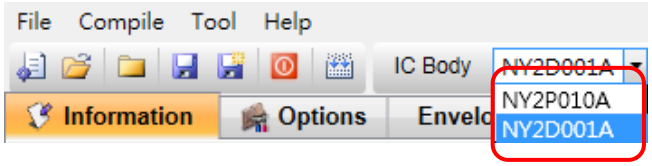
The Information page will be shown immediately after the file is opened. Any words can be typed in the blanks of this page, and the information on this page will be saved completely in the *Q-Tone* file. Since the information on this page, except [Client] blank, is just for user to annotate or record, no error checking will be performed by *Q-Tone.* All information will not be included in the .bin file except the client name.




***Note: The client name on this page will be included in the Checking List and Confirm Table after compiling. This is to protect the copyright of the programmer. The client name is the only "required" on this page, a warning message will display when compiling if this column is blank.***

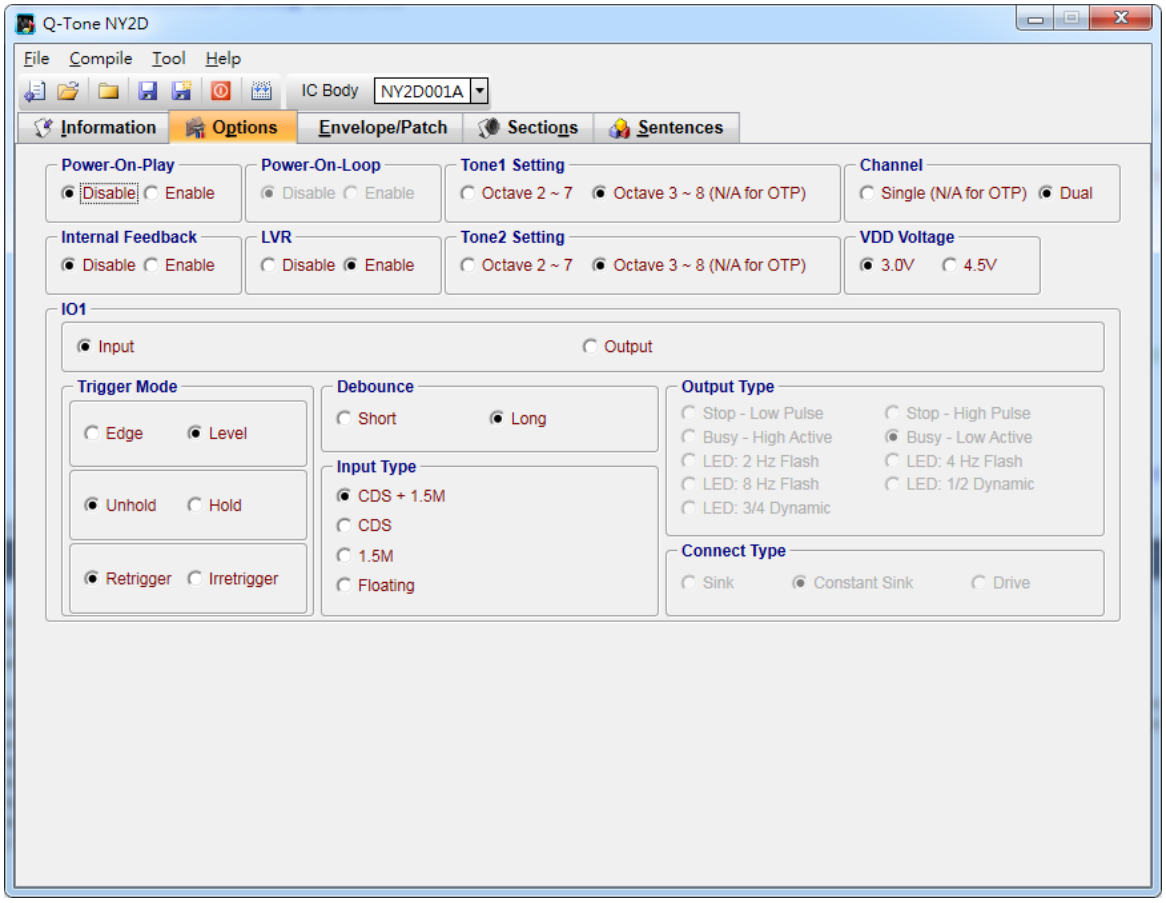
## 5.3 Selecting the IC Body

The [IC Body] drop-down list is at the top of the window. By clicking the Down button of it, all available IC bodies will be listed for selection. IC body could be changed during editing a project, but an error message in red word may display if the total ROM size of current sections exceeds the capacity of selected IC body.



## 5.4 Selecting the Mask Options

By selecting different mask options on the Options page, the complicated functions could be accomplished quickly. Although different series ICs have different functions, there are usually similar items in Options page. Such as Debounce Time, Trigger Mode, etc, could be set easily on the Options page.




### 5.4.1 Power-On-Play (POP)

When Power-On-Play option is enabled, IC will play the POP Sentence one time when power is on. When another key is triggered, it stops playing the POP Sentence and immediately plays the assigned sentence of triggered key.

### 5.4.2 Power-On-Loop

When Power-On-Loop option is enabled, IC will play the POP Sentence in loop when power is on. The trigger mode is fixed as Edge / Unhold / Retrigger.

***Note: This option can be set only at Power-On-Play status is enabled.***

### 5.4.3 Channel

NY2D series supports Single and Dual channels. Users can select the number of channels based on the application to reduce ROM size.

### 5.4.4 Tone Setting

The patch of NY2D series supports Octave 2 ~ 7 and Octave 3 ~ 8. Users can define the patch on their own.

***Note: The pitch range is C2 to B7 in Octave 2 ~ 7 mode, and C3 to B8 in Octave 3 ~ 8 mode.***

### 5.4.5 VDD Voltage

The IC oscillation frequency will be shifted at different operating voltage. For accuracy of internal-resistor oscillation, VDD voltage must be selected for OSC fine tuning during IC production.

### 5.4.6 Internal Feedback

The Internal-Feedback option is a special application of IO1. When the sentence is stopped or played over, it continues to play the assigned sentence of OKY or IO1 (Internal Feedback Path) through internal Stop – High Pulse signal.

### 5.4.7 Low-Voltage-Reset (LVR)

When VDD voltage is lower than 1.3V, IC will automatically reset. The default setting of LVR function is “Enable”. Choose “Disable” can turn off this function.

***Note: If Power-On-Play option is “Enable”, the POP Sentence will be played after LVR acts. If OKY is pressed and LVR is operating, the playing would start over.***

### 5.4.8 Selecting Trigger Mode

The mode of a trigger must be specified to completely define the input functions. Specify the trigger mode by choosing from the following three types of options. (For more details, please refer to NY2D datasheet)

- ◆ The Edge and Level options specify whether the trigger should respond to the rising edge or the high level of the input signal.
- ◆ The Hold and Unhold options specify whether you need to keep on pressing the trigger button to execute the whole MIDI sentence.
- ◆ The Retrigger and Irretrigger options specify whether the trigger can be functional when a MIDI sentence is playing.

### 5.4.9 Debounce

Debounce time is a playback-speed-dependent function, which determines the debouncing period for TG. There are always two kinds of debounce time to be selected. The long debounce time is used for debouncing the push button trigger input while the short debounce time is used for debouncing the electrical transition such as CDS input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

### 5.4.10 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY2D series there are 4 input type options corresponding to different applications.

| Option | Input Type Description |
|---|---|
| CDS + 1.5M | Normal selection for button trigger.<br>1.5MΩ pull-low resistance when button is pressed, and 1.5MΩ+300KΩ (parallel) pull-low resistance when button is released. |
| CDS | Internal 300KΩ pull-low resistance, usually for photo-resistor trigger.<br>Floating when button is pressed, and 300KΩ pull-low resistance when button is released. |
| 1.5M | Internal 1.5MΩ pull-low resistance, reserved for some special applications. |
| Floating | No internal resistor connection, and is usually connected to other output pin or connected to GND by an external resistor. |

### 5.4.11 Selecting Output Type

When IO1 is set as output, user could specify a status signal as the output signal. The following are the available output type options:

**Table 5.4.11 – NY2D Output Type**

| Option | Output types Description |
|---|---|
| Stop – Low Pulse | Low active stop-pulse output whenever device stop playing |
| Stop – High Pulse | High active stop-pulse output whenever device stop playing |
| Busy – High Active | High active signal output during playing (Drive output) |
| Busy – Low Active | Low active signal output during playing (Sink output) |
| LED 2Hz Flash | 2Hz Sink or Drive signal output to drive LED during playing |
| LED 4Hz Flash | 4Hz Sink or Drive signal output to drive LED during playing |
| LED 8Hz Flash | 8Hz Sink or Drive signal output to drive LED during playing |
| LED 1/2 Dynamic | 1/2 (sound level) dynamic Sink or Drive signal output to drive LED |
| LED 3/4 Dynamic | 3/4 (sound level) dynamic Sink or Drive signal output to drive LED |

The actual flashing rates for LED 2Hz, LED 4Hz, and LED 8Hz options are positive relative to the tempo of MIDI. Only when the tempo of MIDI is 117, are their flashing rates equal to settings on Options page (2Hz, 4Hz, and 8Hz).

***Note: The flash of LED 2Hz, LED 4Hz, and LED 8Hz of MIDI Section resets by different Note.***

### 5.4.12 Connect Type

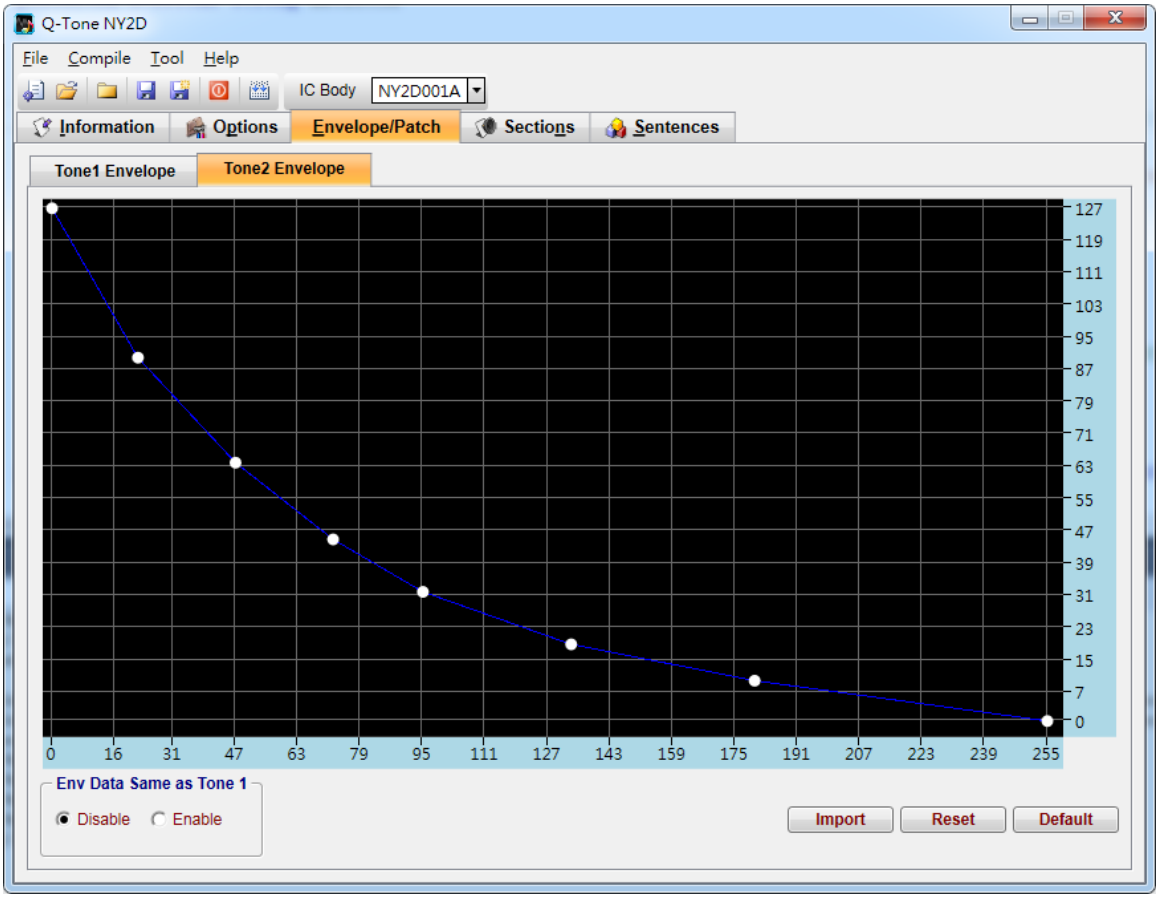
When the IO1 is set as output, user could specify a status signal as the output signal. There are 3 connected type options corresponding to different applications as below.

| Option | Connected Type Description |
|---|---|
| Sink | High active signal output during playing |
| Constant Sink | Limits output current under 20mA to save power consumption |
| Drive | Low active signal output during playing |

## 5.5 Editing Envelope

User could draw envelopes (max 256 points) with the graphical interface on Envelope page.

### 5.5.1 Envelope




**Env Data Same as Tone1** – When “Env Data Same as Tone1” set as Enable, the envelope of Tone2 is set as the same as Tone1.

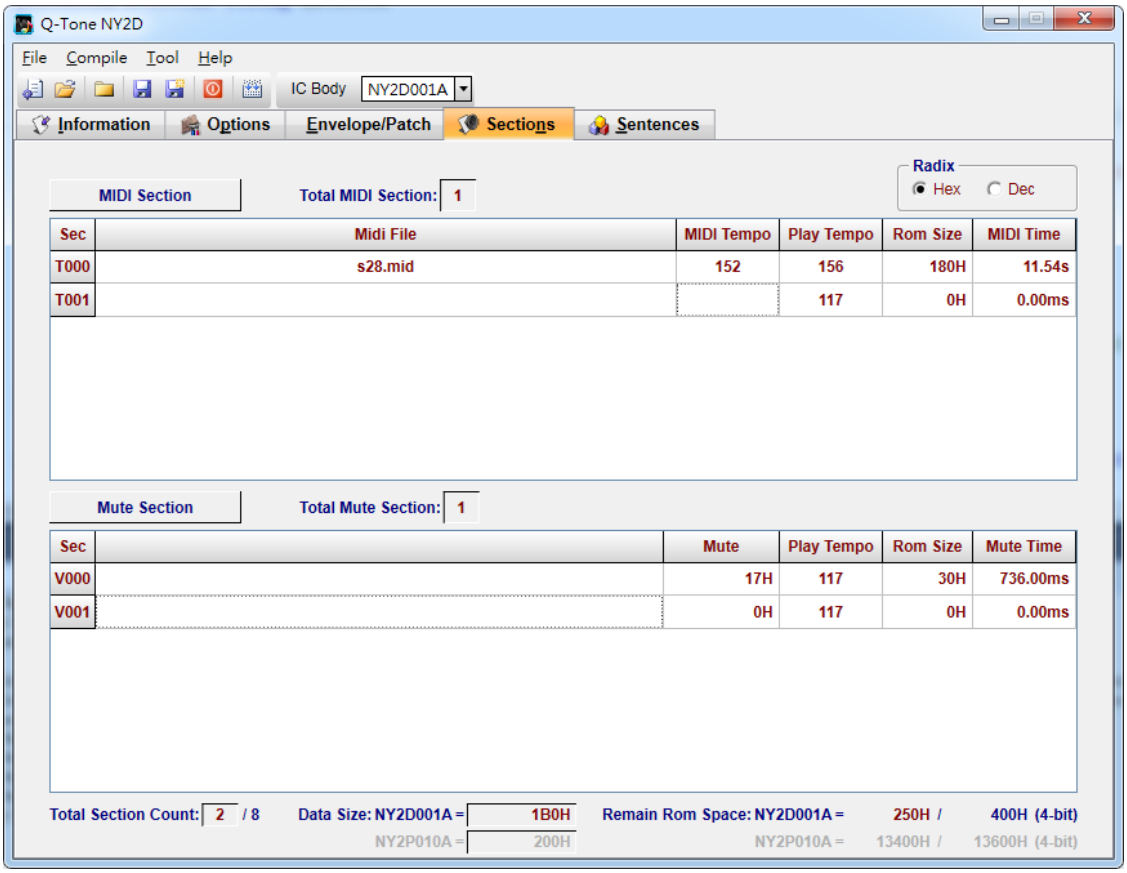
**Import** – Import the existing envelope (**.env**) drawn by Envelope Synthesizer.

**Reset** – Reset envelope as a straight line.

**Default** – Set the envelope as *Q-Tone’s* default.

## 5.6 Managing the Sections

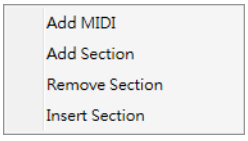
Sections page is always in a table form, and it allows 8 sections max in NY2D series. User can use the Sections page to include and manage the MIDI section for a project. This page is divided as 2 parts, the upper part is for editing MIDI section, and the lower part is for mute section.




### 5.6.1 Sec Column

Sec column shows the sequence numbers of MIDI Sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections to be played. The sequence numbers of MIDI sections are from T000 to T007, and the mute sections are from V000 to V007 for NY2D. (8 sections max for sum of MIDI and mute sections)

### 5.6.2 Fill Name Column




File Name shows MIDI data files. *Q-Tone* MIDI File column supports GM MIDI Format1 (**.mid)** and *Q-MIDI* files (**.t2x**). To include a MIDI file, double-click on a field in this column. A dialog box for file opening will be shown for selecting a file. To change the existing files, right-click the mouse and select Add / Remove / Insert section form the pop-up menu. If user wants to adjust the sequence of sentences, please press the left mouse key on the desire column, then drag the selected sentence to the target column and release the left key.

***Note: Two MIDI files with the same file name or a single MIDI file cannot be included in two***

*MIDI/ sections*.

### 5.6.3 MIDI Tempo Column

Tempo shows the original tempo of the MIDI file.

### 5.6.4 Play Tempo Column

Play Tempo determines the real playback tempo of the MIDI, and user could choose one of the 25 fix tempos from the drop-down menu.

| *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|---|---|---|---|
| 59 | 60 | 63 | 65 | 67 | 69 | 72 | 75 | 78 |
| *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* |
| 82 | 85 | 89 | 94 | 99 | 104 | 110 | 117 | 125 |
| *19* | *20* | *21* | *22* | *23* | *24* | *25* | | |
| 134 | 144 | 156 | 170 | 188 | 208 | 234 | | |

### 5.6.5 ROM Size Column

ROM Size column shows the size of ROM that used by the MIDI data after compression. The ROM size for every section must be the multiple of 10H. In most cases, no matter how long the MIDI file is, the MIDI encoder will automatically adjust the compressed MIDI data to fit the multiple of 10H.

Please note that every NY2D Series IC actually imposes a maximum limit on each type of section including pure MIDI section, MIDI+mute section and pure mute section. The maximum limits imposed on all the NY2D Series ICs are tabulated below.

**Table 5.6.5 - The maximum limits imposed by NY2D Series IC**

| Body | MaxT | MaxM | Max Total |
|---|---|---|---|
| NY2P010A | 400H | 3FC0H | 13600H |
| NY2D001A | 400H | 3FC0H | 400H |

- **MaxT** column shows the maximum ROM Size that can be taken up by the MIDI file when the MIDI section is a pure MIDI section.
- **MaxM** column shows the maximum value of the mute data when the MIDI section is a pure mute section (without any MIDI file).
- **Max Total** column shows the maximum total ROM Size that can be taken up by all the MIDI files in a project.

### 5.6.6 MIDI Time Column

MIDI Time shows the real playing time estimated according to the MIDI and its Ref. Tempo. Changing Ref. Tempo will lead to changing of MIDI time, since playing time is relevant to tempo.

### 5.6.7 Mute Column

Mute column shows the quantified data of mute duration. Mute data can be set by pressing the Up

and Down buttons at right of the mute column. Pressing the Up button makes the mute data increase by 1H whereas pressing the Down button makes the mute data decrease by 1H.


### 5.6.8 Mute Time Column

Mute Time column shows the actual mute time, which is estimated by *Q-Tone*. Mute time varies depending on playback tempo, thus changing the Play Tempo on this page may lead to change of mute time.

### 5.6.9 Radix

The Radix column is on the upper right, it shows the calculated unit of capacity. *Q-Tone* provides two kinds of unit: Hex and Dec.

### 5.6.10 Total MIDI Section, Total Mute Section & Total Section Count

Total MIDI Section, Total MIDI Section Count, and Total Section Count show how many MIDI files, MIDI files and total files used respectively.

### 5.6.11 Data Size & Remain ROM Space

Data Size, which is located at the bottom of this page, shows the total ROM used by MIDI and mute sections while Remain Rom Space shows the available ROM that still not used. The total available ROM space is displayed to the right of slash (“/”), and the total ROM used must not exceed it.

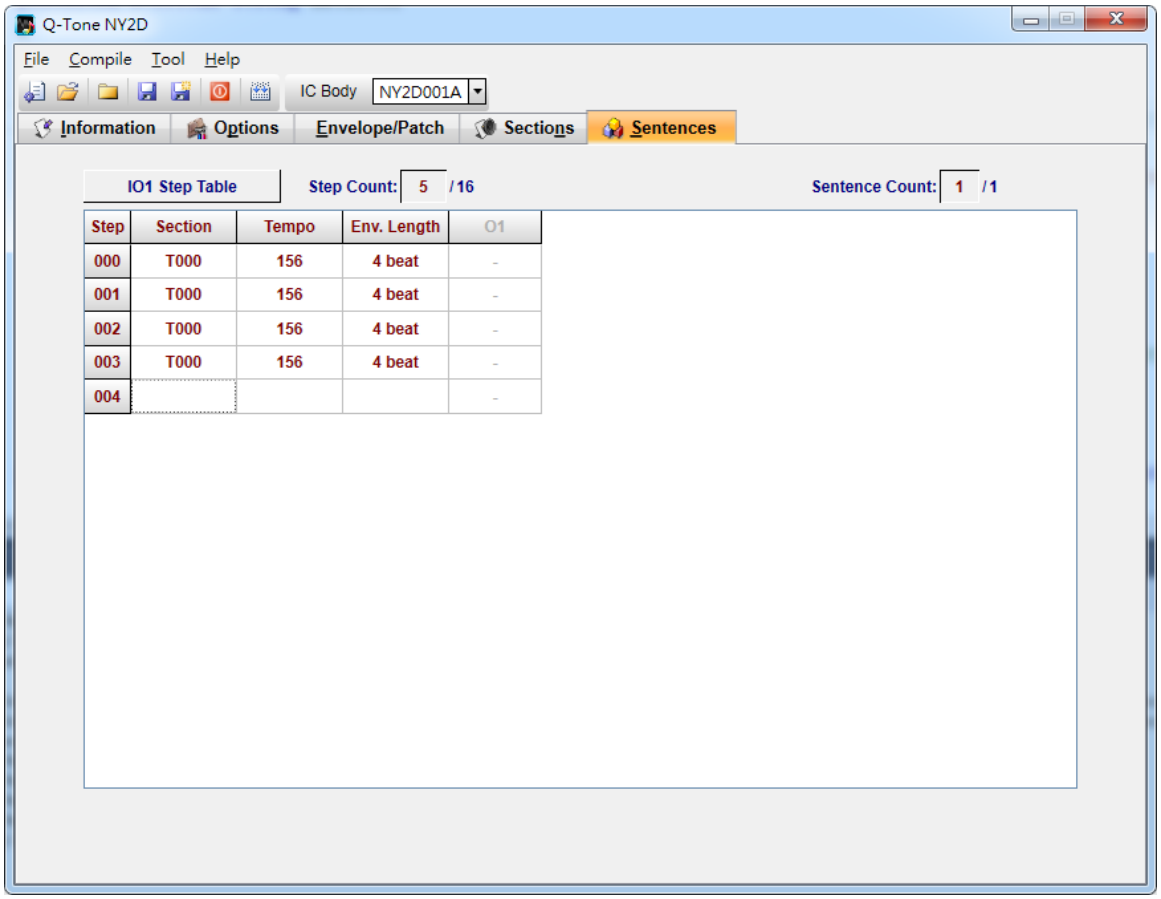
### 5.6.12 Right-click Menu

A right-click menu will show on the right by right clicking on the MIDI section table or mute section table. The functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| Add MIDI | Add one or numbers of MIDI file or section at the end of all section. |
| Add Section | Add a section at the end of all section. |
| Remove Section | Delete the selected section. |
| Insert Section | Insert a MIDI section before the selected section. |

## 5.7 Arranging the Sentences

A “sentence” means a combination of MIDI or mute sections to be played when triggered. For NY2D there is only 1 sentence available under the limit of total 16 steps.




### 5.7.1 Step Column

For NY2D there are total 16 (000 to 015) steps that can be defined for the step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. The total number of defined steps is shown beyond the step table in this window.

### 5.7.2 Section Column

Selecting a section here means the corresponding MIDI file defined on Sections page will be arranged in the sentence.

### 5.7.3 Tempo Column

Tempos applied to sentences refer to the settings on Sections Page, and they cannot be edited at this page.

### 5.7.4 Env. Length Column

Env. Length Column determines the envelope length that is drawn on Envelope page. There are 4 options: 1 beat, 2 beat, 4 beat, and 8 beat; each step could be given a unique envelope length.

### 5.7.5 O1/Int. FB Column

When IO1 is set as output in Options page, the O1 step in O1 Step Table must be specified to make IC's output functional. There are 10 kinds of output options available in NY2D, including 9 kinds of fix output types and user-defined QLED. (Please see 5.4.11–NY2D Selecting Output Type)

When "Internal-Feedback" on Options Page is enabled, O1 Column in the Sentence Page will become "Int. FB" automatically. Thus, user could indicate which sentences will trigger the intended sentence (Internal Feedback Path) when it stops or ends. (Please see Chapter 5.4.6 for the details of "Internal-Feedback".)

### 5.7.6 Right-click Menu

A right-click menu will show on the right by right-click. The functions of the menu items are as follows:

| Menu Item | Function |
|---|---|
| Add Step | Add a step at the end of all sections. |
| Remove Step | Delete the selected step. |
| Insert Step | Insert a step at the selected step. |
| Import the Sentence List | Import the edited sentence list (*.csv). |
| Export the Sentence List | Export all sentences as a sentence list (*.csv). |

# 6. How to Release Code

After finishing *Q-Tone* editing, please follow instructions in this chapter to release the code.

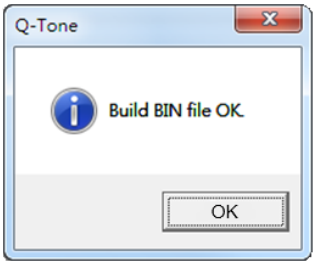
## 6.1 Saving the Project

By selecting [Save] from the [File] menu or by clicking the [Save] button on the toolbar, the current *Q-Tone* project will be saved. Choose [Save As…] if in need of saving the project with a different name and/or to a different location. Names of *Q-Tone* project files will have the **.prj** extension.

***Note: Due to Q-Tone does not provide the auto-save function, please save the undone project frequently in order to avoid unexpected Windows system crash or power failure causing data missing.***

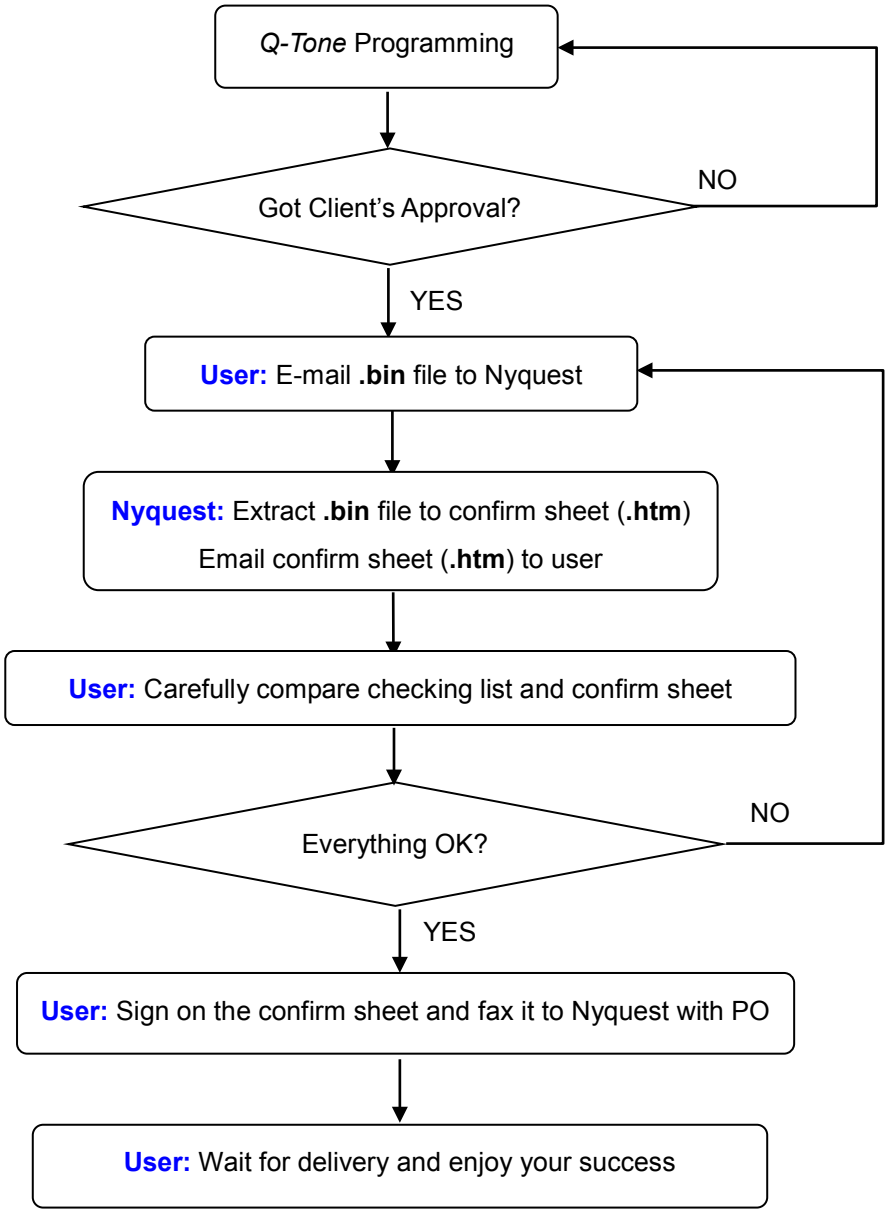
## 6.2 Building Up the .bin File

By selecting [Build] from the [Compile] menu or by clicking the [Build] button on the toolbar, the building process will start. *Q-Tone* will check all the settings and options first. If there are no errors, the target file (.bin) and checking list file (.htm) will be generated. These two files will be put in the same folder as the project file (.prj) folder. If the building is successfully completed, a dialog box that says “Build BIN file OK!” will pop up. If any unexpected system errors occur during the compiling, please contact the engineers of Nyquest.



## 6.3 New Code Release Flow

When the client approves of the project, a target file (.bin) and checking list (.htm) will be generated after *Q-Tone* finishing the compiling process. Please send the .bin file to Nyquest or Nyquest's agent. As Nyquest receives the file, Nyquest would offer a confirm sheet to the client for double checking, for example, a confirm sheet named "NY2A001A-XXXX.htm" (XXXX is the code numbers provided by Nyquest). After a careful and thorough review, please send the confirm sheet with signatures via fax machine along with official PO to Nyquest. Nyquest will start IC mask production immediately. All our clients need to do is wait for our delivery and enjoy success. The complete flowchart is shown below.

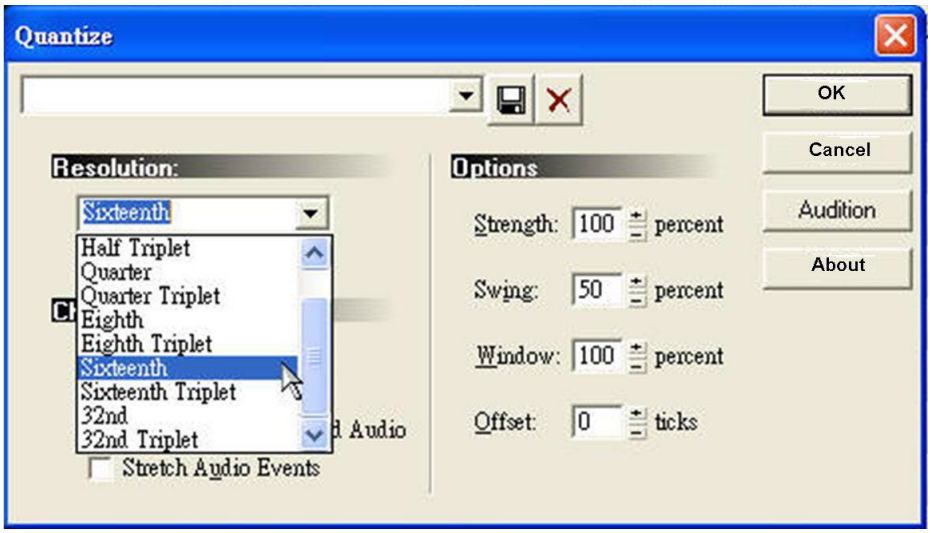


# 7 Appendix

## 7.1 Making Quantization by Cakewalk

NY2 Series supports limited kinds of beat length, and not all beat length will not output faithfully if not properly quantized. So, the music has to be regulated to specific beat length by MIDI editing software like Cakewalk to ensure the beat length meets the NY2's format. And this is so-called "Quantization".

To making quantization by Cakewalk, please select all tracks first. Second, select "Quantize" on Edit menu. Then set the resolution according to the music and then press OK to complete quantization.




## 7.2 Use Import/Export function of sentences

*Q-Tone* allows user to export defined sentences to a .csv (Comma Separated Values), or import a .csv file, for modifying content through text editor.

In appearance of the Sentences page, by right clicking to choose [Export the Sentence List] can export defined sentences which converts to .csv format to file. User can modify content through text editor, as follows is a .csv file example and format description :( opened by text editor)

```
1 Step,Sentence,Order,Section,Play Speed,Tempo,Env. Length,O1,O2
2 1,1,1,T000,,120,4,optioned,-
3 2,1,2,T001,,117,2,-,qled
4 3,3,1,T002,,89,1,qled,-
5 4,3,2,V001,6.1k,,,qio,optioned
6 5,4,1,T003,,72,1,-,optioned
7
```

The first line of .csv file is column name (such as Sentence, Section, Play Speed), and each column is separated by comma. Each line stands for a step. Each column is necessary, and is described as following:

| Column | Description |
|---|---|
| Step | The id of Step, start from zero. |
| Sentence | The id of Sentences, start from one. |
| Order | The order of Step, start from one. |
| Section | The name of voice / melody Sections, such as T001 or V001. |
| Play Speed | The play speed of voice Section (Unit: Hz), such as 8.0K. |
| Tempo | The play speed of music, such as 117. |
| Env. Length | The Envelope Length used by melody Sections, only allows 1, 2, 4 or 8. |
| O1, O2, O3, O4, O5 | Output type of each pin, only allows – (NO OUTPUT), QLED or Optioned. |

After finishing .csv file editing, the user can choose sentences page, right clicking and choose [Import the Sentence List] to import .csv file. When the value of .csv file content does not match current project setting, it will pop up a hint of mistake, and neglect Import action. If the value matches, the content of .csv file will be inserted to current sentences of project, previous the chosen row. If no row is chosen, it will pop up a hint to overwrite all current sentences.

# 8 Revision History

| *Rev* | *Date* | *Description* | *Modified Page* |
|---|---|---|---|
| 1.0 | 2009/11/27 | New release. | - |
| 1.1 | 2010/01/15 | Descriptions added. | - |
| 1.2 | 2010/03/04 | 1. Modify NY2B004A ROM size.<br>2. Modify NY2C ROM size. | 42<br>60 |
| 1.3 | 2010/05/20 | Modify description of Noise-Trigger. | 20, 36, 53 |
| 1.4 | 2010/11/02 | 1. Add Low-Voltage-Reset description.<br>2. Add Right-click Import /Export Menu.<br>3. Add Appendix Use Import /Export function of sentences. | 22, 37, 54<br>32, 48, 69<br>72 |
| 1.5 | 2012/06/12 | 1. Add NY2P010A IC Body.<br>2. Add Voice File accepts *Q-Sound* file (**.nyw**).<br>3. Add Main Interface.<br>4. *Q-Writer* substitutes for FDB_Writer. | -<br>-<br>10<br>11 |
| 1.6 | 2012/08/30 | Add Download function and its shortcuts. | 12, 13 |
| 2.0 | 2016/05/13 | Update main interface of *Q-Tone* and its function descriptions. | - |
| 2.1 | 2016/11/30 | 1. Add the Radix function.<br>2. Add NY2D series. | 34, 51, 69<br>75 |
| 2.2 | 2017/08/07 | Add Export function to [File]. | 12 |
| 2.3 | 2018/08/21 | Update the image of Mute Column. | 32, 50, 69, 83 |
| 2.4 | 2019/02/26 | 1. Add the description of “Optimize” function for MIDI or voice section.<br>2. Add “Import” and “Export” functions for sentence.<br>3. Modify the description of LVR in NY2D. | 34, 46, 68<br>34, 52, 70, 83<br>76 |
| 2.5 | 2019/05/60 | Modify the dialog box and description of Setting. | 12 |
| 2.6 | 2022/02/11 | 1. Remove the descriptions of *Q-Melody*.<br>2. Add the descriptions of *Q-MIDI*. | -<br>29, 46, 66, 81 |
| 2.7 | 2023/08/23 | Remove the Order of sentences in NY2D. | - |
| 2.8 | 2024/11/05 | Add NY2A001A1, NY2B001A1 and NY2B002A1. | 21, 30, 37, 47 |