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

User Manual

Q-Speech for NY3/NY4 Series

Easy Speech Synthesizer Programmer

Version 5.2

Aug. 6, 2025

Table of Contents

1 Introduction

Q-Speech is an integrated software development system for NY3 and NY4 speech synthesizer IC by Nyquest Technology. The intuitive interface and real-time rehearse bring more convenience to programmers. To cooperate with its powerful peripherals, *Quick-IO* and *Q-Writer*, it would make works much more simple and efficient.

Contents:

1.1 What is *Q-Speech*

Q-Speech 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-Speech* program. To install *Q-Speech*, 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.

System Requirements:

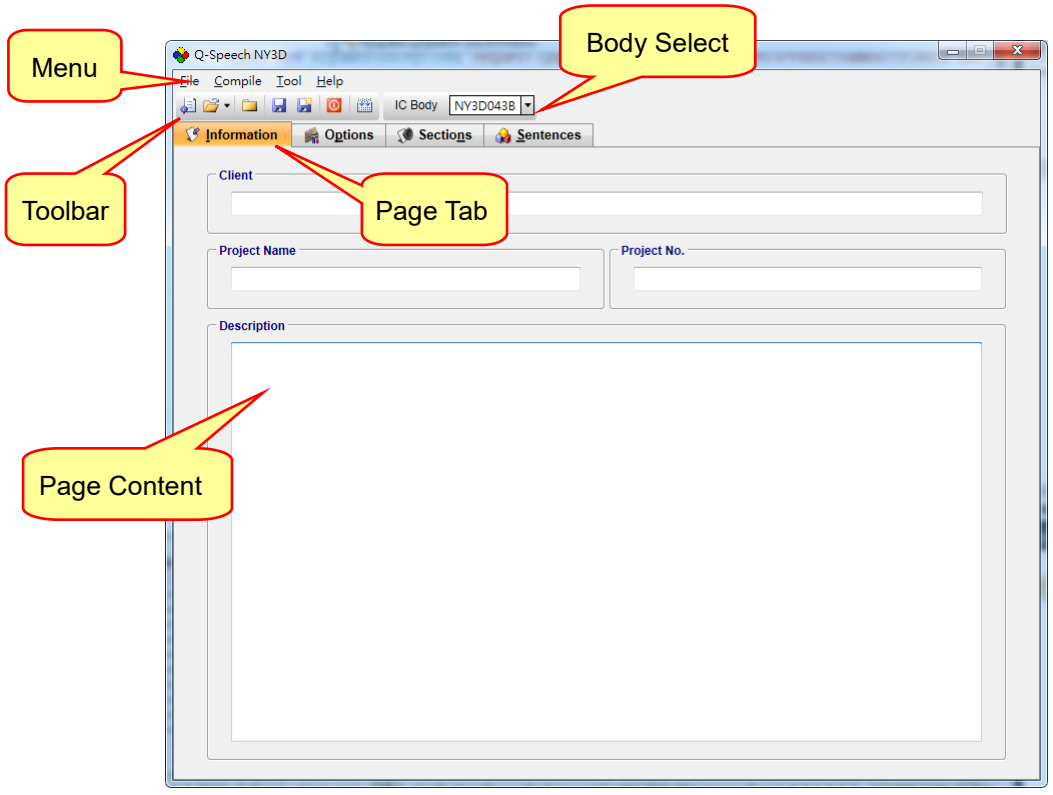
- A PC complied with Pentium 1.3GHz or higher CPU, Windows 7 / 8 / 10 / 11.
- At least 1G RAM.
- At least 2G hardware space.
- A display card and monitor that support 1366x768 resolution or higher

1.3 The Main Interface of *Q-Speech*

When executing *Q-Speech*, the initial window of *Q-Speech* will show up and the choice of IC series will be required to get going next step.

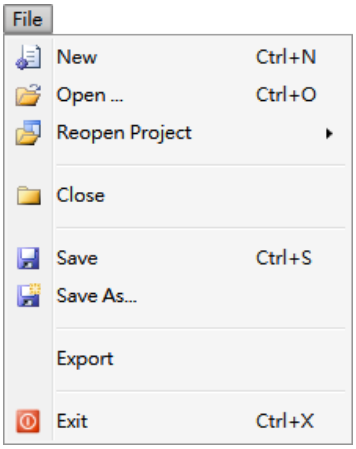
IC series	Abbr.	IC series	Abbr.
NY3AxxxD	NY3A(D)	NY3PxxxD	NY3P(D)
NY3AxxxE	NY3A(E)	NY3PxxxE	NY3P(E)
NY3B	NY3B	NY3L	NY3L
NY3C	NY3C	NY4A	NY4A
NY3D	NY3D	NY4B	NY4B
NY3PxxxC	NY3D	NY5Q	NY5Q

After IC series selected, a starting window with menu and toolbar will display. Then execute [File/New] or [File/Open] to get editing with Body Select, Page Tabs and Page Contents.



1.4 Using the Menus

1.4.1 File Menu

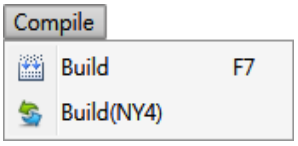


Functions of the File menu items are as follows:

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

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

1.4.2 Compile Menu

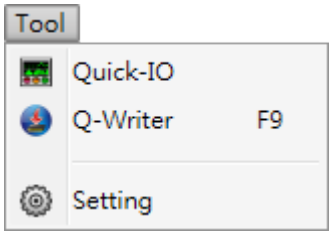


Functions of the Complie menu items are as follows:

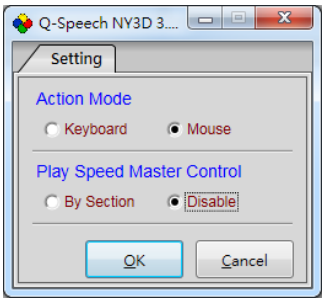
Menu Item	Function
Build	The Build function is used for converting a *Q-Speech* project file (.prj) into a target binary file (.bin). Click on the header [Compile] and then select [Build]. A target binary file (**xxx.bin**) and a checking list file (**xxx.htm**) will be generated after compiling.
Build NY4	The Build(NY4) function is used for converting a *Q-Speech NY3L* project file (.prj) into a target binary file (.bin) for NY4 series demo. Click on the header [Compile] and then select [Build]. A target binary file **(xxx_NY4.bin)** and a Q-Code file (.htm) will be generated after compiling.

Note: Before execute the [Build(NY4)] function, please install the related software- Q-Code 3.11 and NYASM 2.16 or above version, otherwise this function is unable to work.

1.4.3 Tool Menu

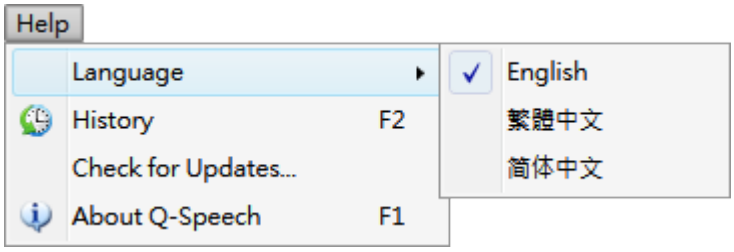


Functions of the Tool menu items are as follows:

Menu Item	Function
Quick-IO	*Quick-IO* is the software to edit synchronized output signals for voices. To use *Quick-IO*, users can simply click on [Quick-IO] on the menu.
Q-Writer	*Q-Writer* is the software to download the .bin file to the demo board. To use *Q-Writer*, users can simply click on [Q-Writer] on the menu.
Setting	*Setting* is the function to set the environment variable of *Q-Speech,* such as Action Mode and Play Speed Master Control.  User can select Keyboard mode or Mouse mode to enhance editing effectively via Action Mode. The default is Keyboard mode. 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: Quick-IO and Q-Writer must be installed first, or they can't be functional.

1.4.4 Help Menu

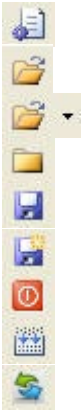


Functions of the Help menu items are as follows:

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

1.5 Using the Buttons

There are 9 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-Speech* project.

Open – Open an existing *Q-Speech* project.

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

Close – Close the currently opened *Q-Speech* project.

Save – Save the *Q-Speech* project.

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

Exit – Quit present project and exit *Q-Speech*.

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

Build (NY4) – Build *Q-Speech NY3L* Project (**.prj**) as a binary file (**.bin**) for NY4 series demo.

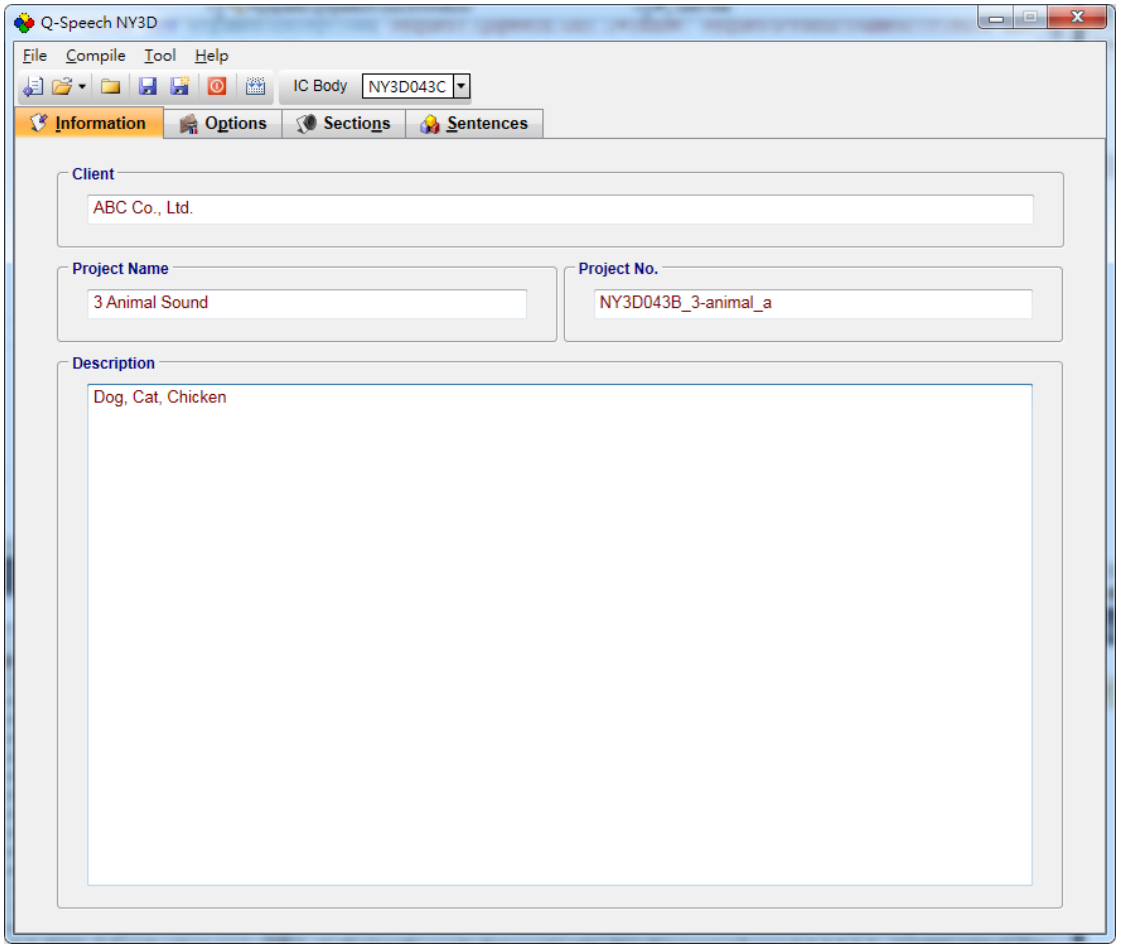
Note: Only NY3L series support the Build(NY4) function.

1.6 Controlling the Page

Page contents vary for different IC series. There are 6 pages available in the window: Information, Options, I/O, Voice Sections, Sentences and Alone/Matrix. To view a page, simply click on the corresponding page tab.

1.6.1 Information Page

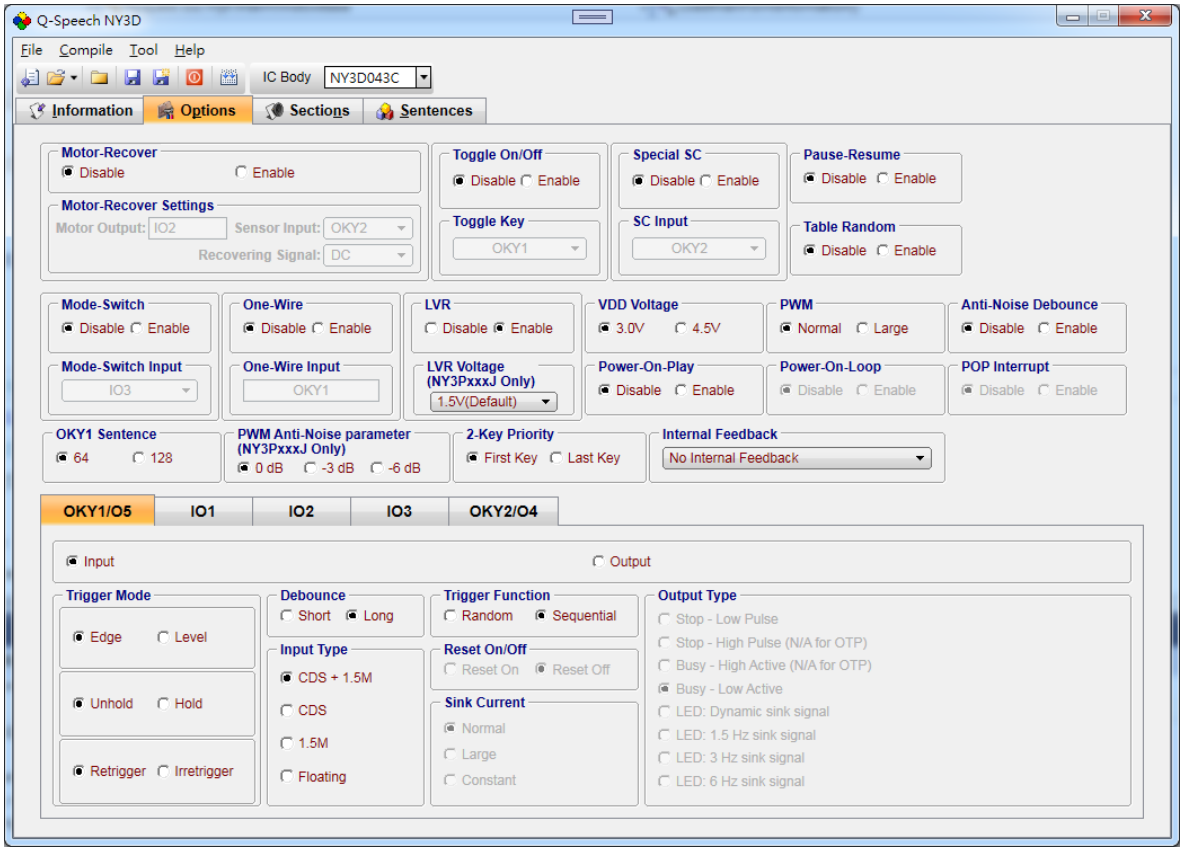
The Information Page is designed for recording the client name, project information and important points to be noted. The information on this page is for your reference and will be saved ONLY in the .prj file. It will not be checked, compiled and included in the .bin file except the client name.



Note: The "Client" column is required! Project building fails if "Client" left blank. 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.

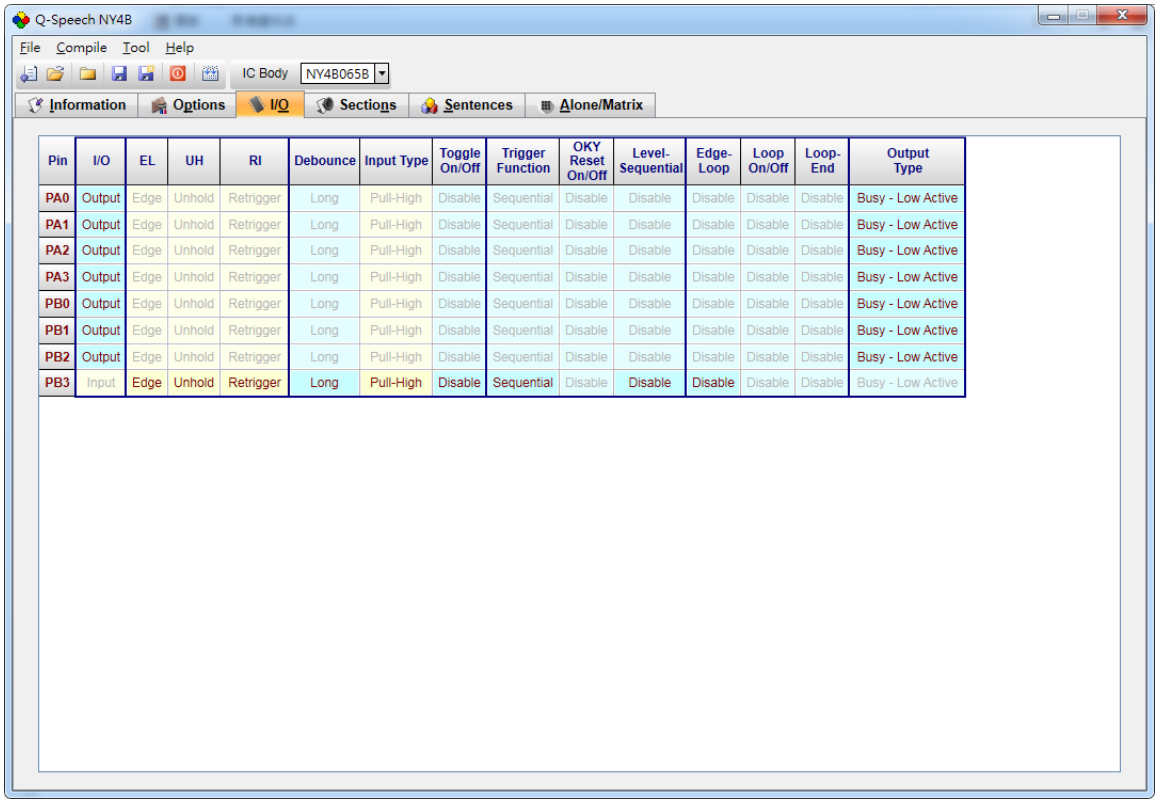
1.6.2 Options Page

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 I/O page

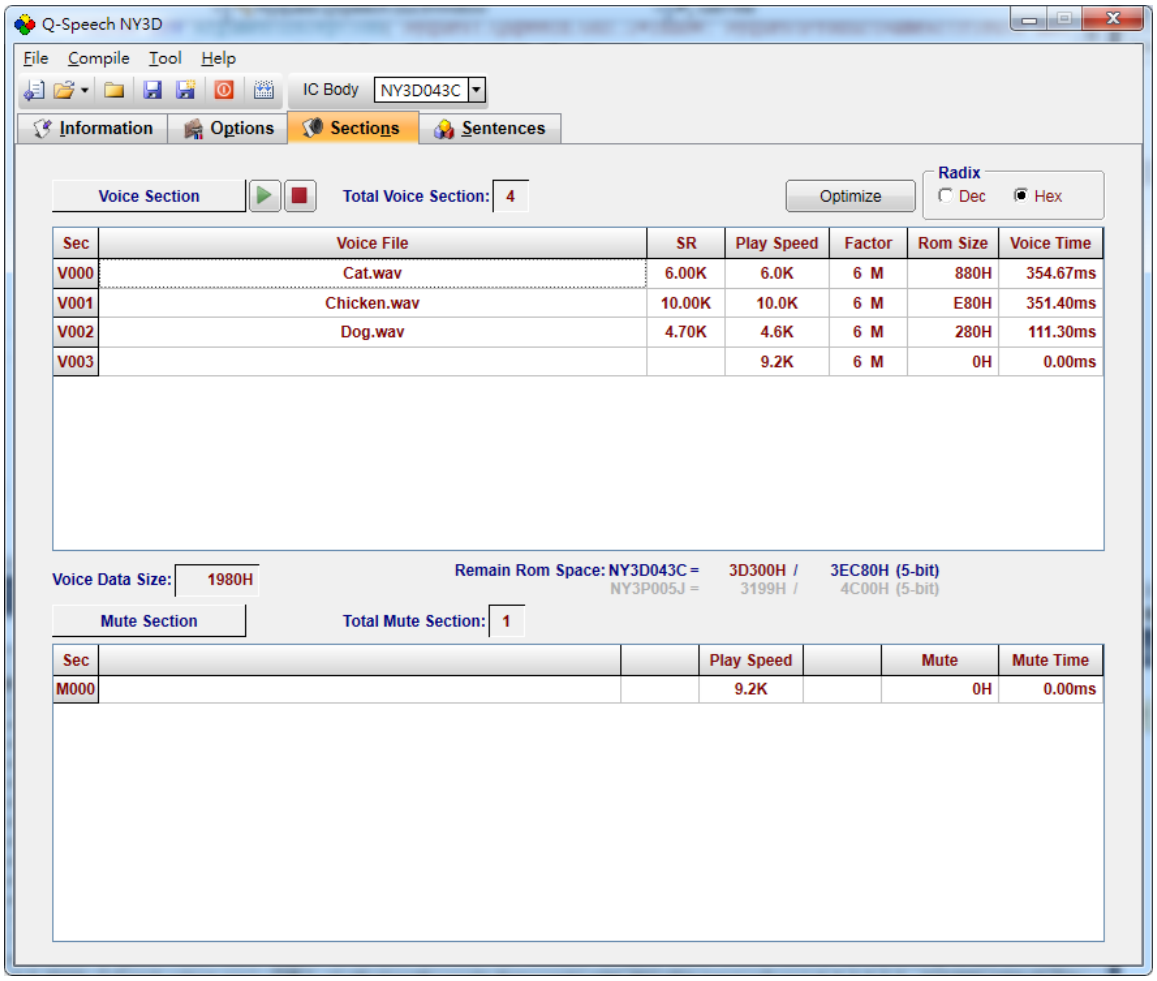
By selecting different options on the I/O page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page.



Note: The I/O page only supports NY4A / NY4B / NY5Q Series IC.

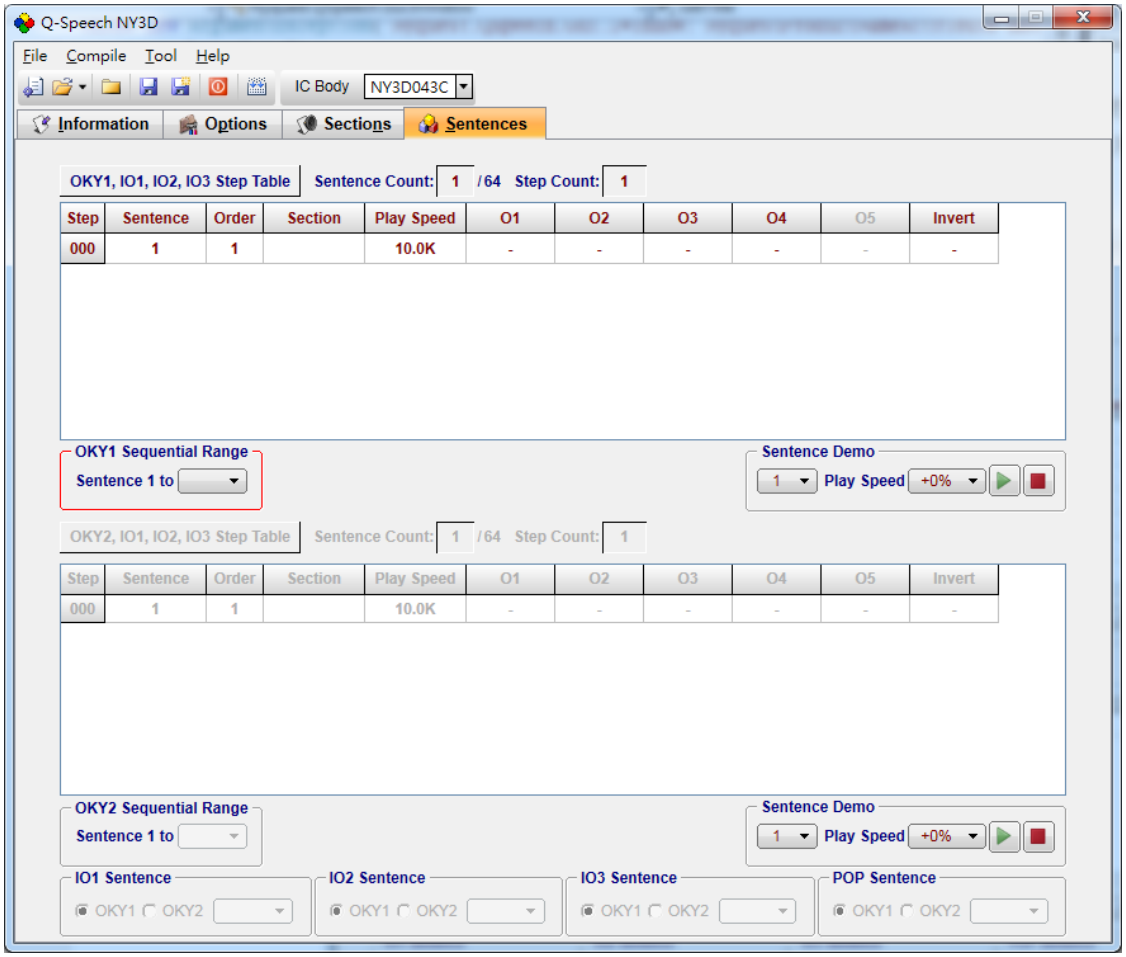
1.6.4 Sections Page

The Sections Page is designed for including and managing the sections. After sections appropriately included here, they could be arranged on the Sentences page later. Functions of different IC series are not the same, so the appearance of the Sections page will be different for different IC series.



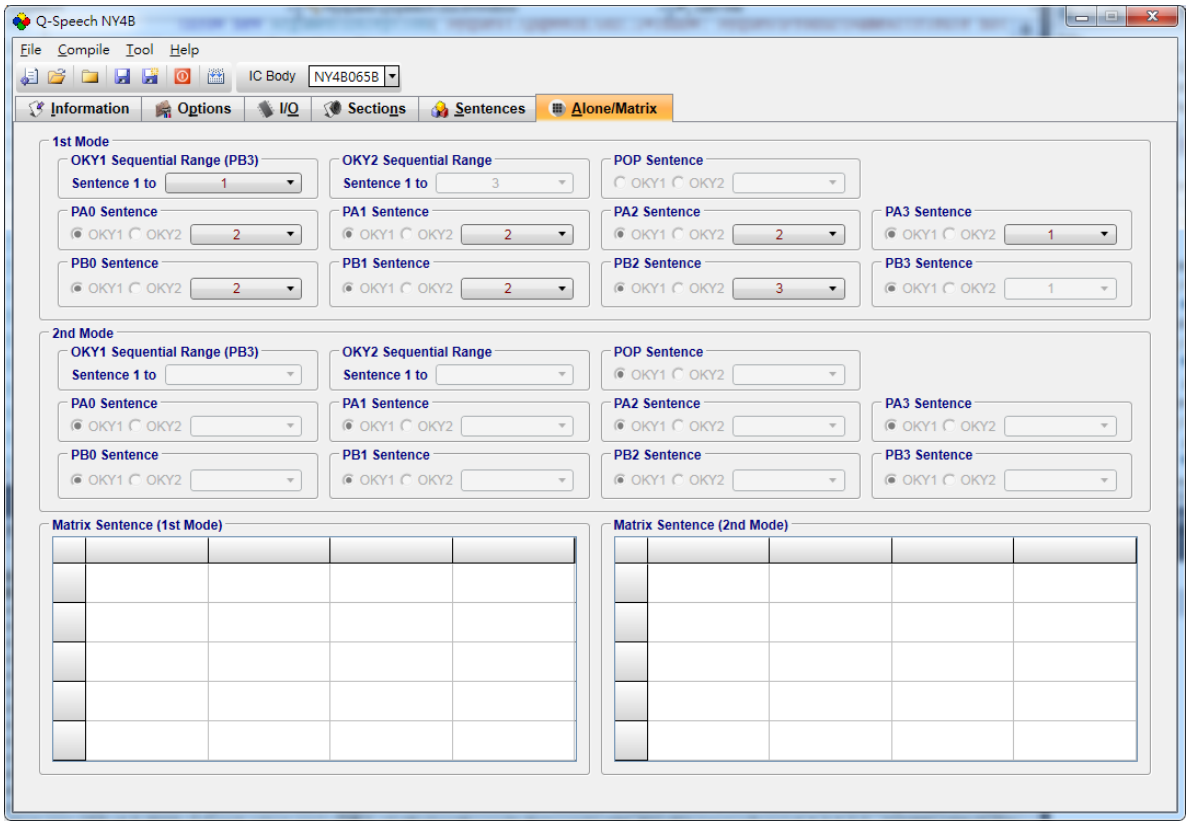
1.6.5 Sentences Page

The Sentences Page is designed for arranging voice sentences. By altering steps of a sentence, different combinations of 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 The Alone/Matrix Page

The sentences played by input functions, such as OKYx / PAx / PBx / POP Sentence, are defined at Sentence / Matrix Page. Matrix Key and Alone Key could coexist, and each key can be defined a unique sentence. By altering steps of a sentence, different combinations of 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.



Note: The Alone/Matrix page only supports NY4A / NY4B / NY5Q Series IC.

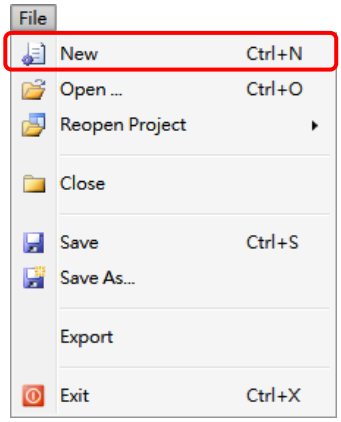
2 Using *Q-Speech* for NY3A(D) Series

In this chapter, the details of using *Q-Speech* for NY3A(D) will be presented step by step.

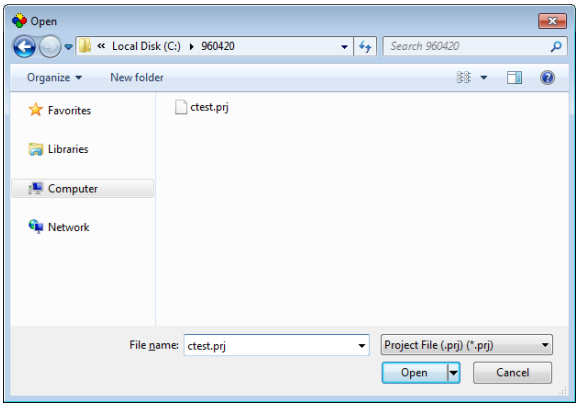
Contents:

2.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY3A(D), a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

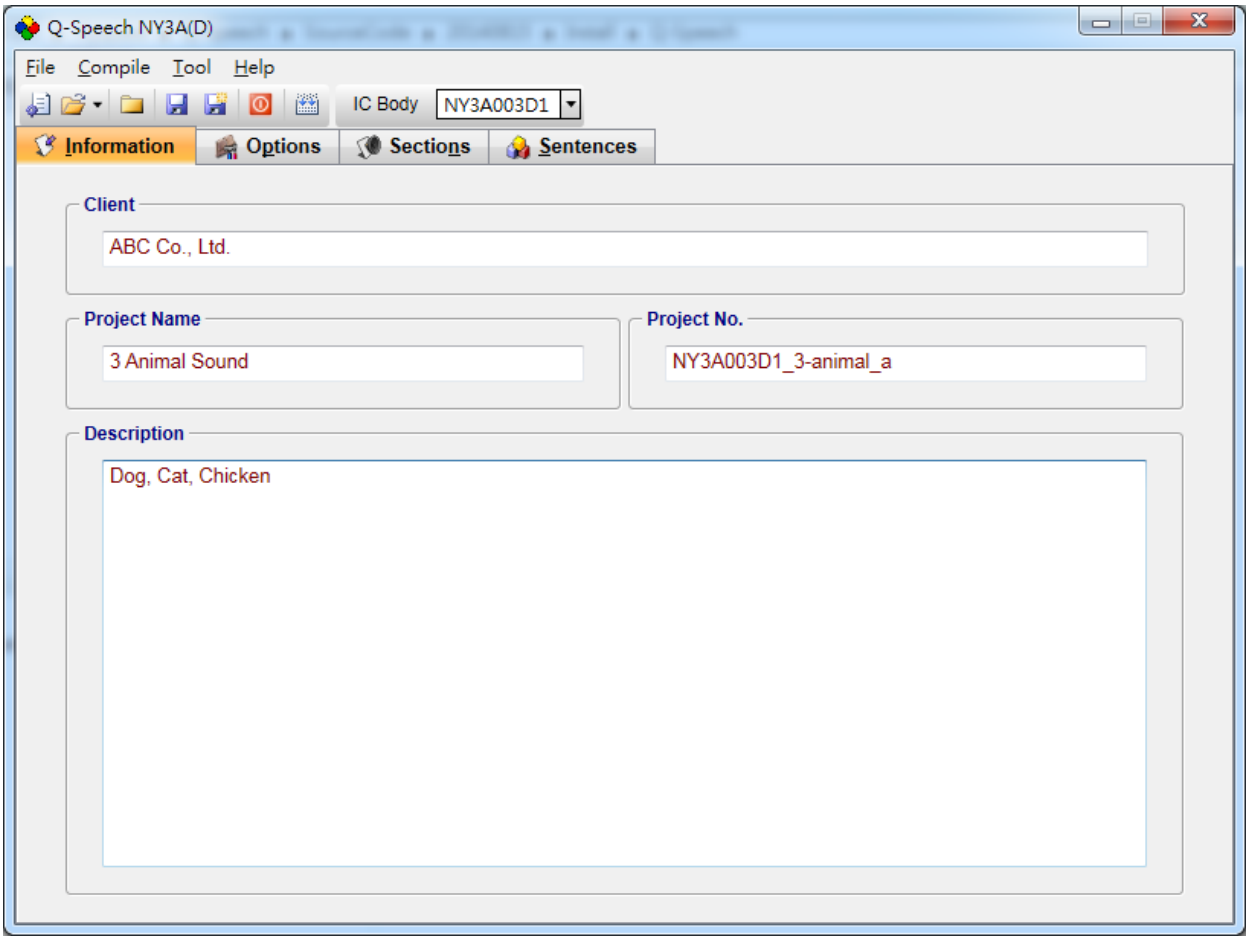


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



2.2 Filling in the Information

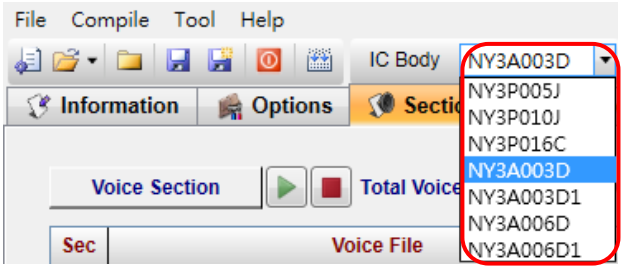
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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

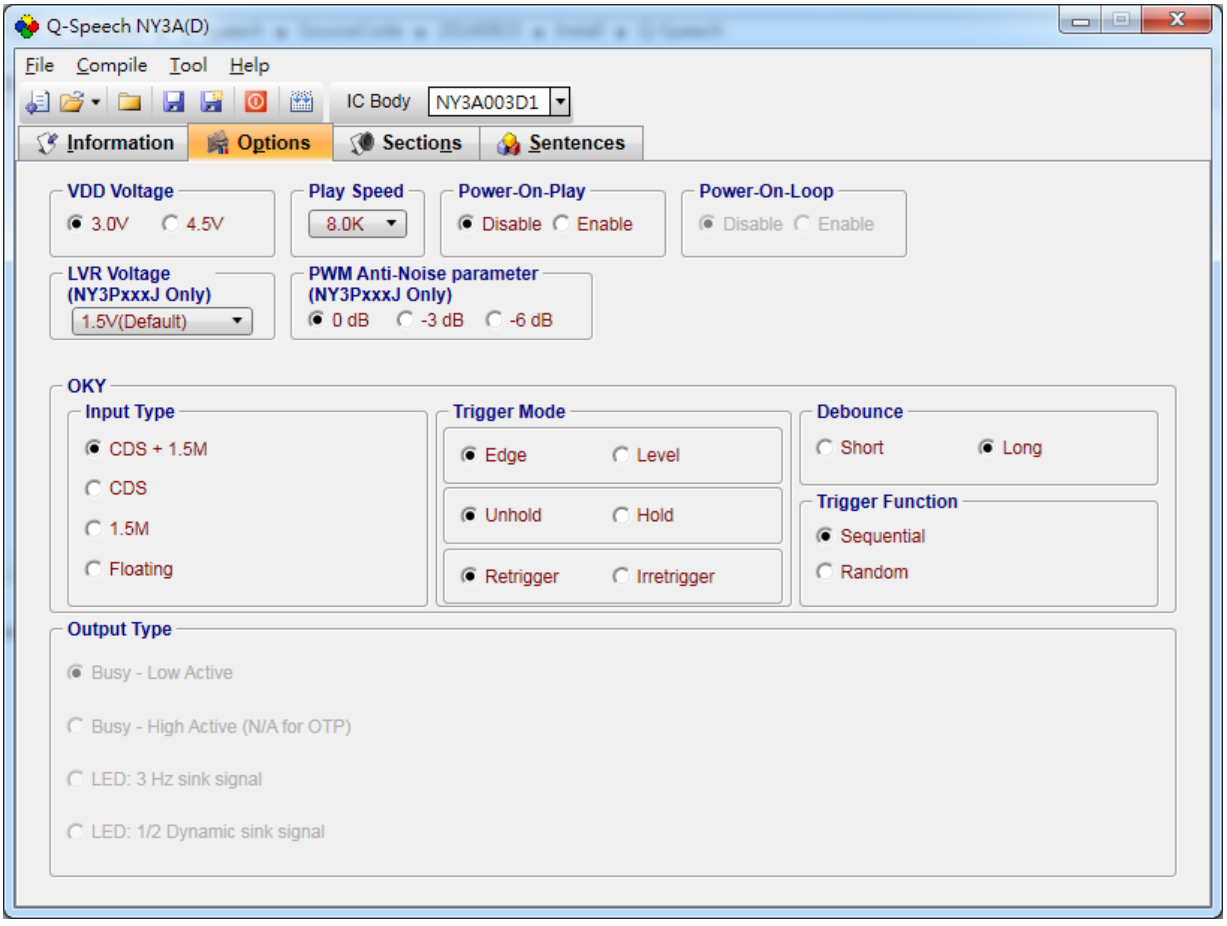
A drop-down list named [IC Body] can be found at the top of the window. By clicking the Down button of the drop-down list, all available IC bodies will be listed for selection. IC body could be changed during editing a project, but an error message may display if the total ROM Size of



current sections exceeds the capacity of selected IC body.

2.4 Selecting the Options

By selecting different options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Play Speed, Trigger mode, etc, could be set easily on this page.



2.4.1 Selecting 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.

2.4.2 Selecting Play Speed

Play Speed determines the built-in oscillation circuitry. It is always the first function that should be specified since some other functions such as debounce time, LED flashing rate and mute time depend on it.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
20.0 KHz	17.1 KHz	15.0 KHz	13.3 KHz	12.0 KHz	10.9 KHz	10.0 KHz	9.2 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
8.6 KHz	8.0 KHz	7.5 KHz	7.1 KHz	6.7 KHz	6.3 KHz	6.0 KHz	5.7 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
5.5 KHz	5.2 KHz	5.0 KHz	4.8 KHz	4.6 KHz	4.4 KHz	4.3 KHz	4.1 KHz
25	*26*	*27*					
4.0 KHz	3.9 KHz	3.8 KHz					

2.4.3 Setting Power-On-Play (POP)

"POP Sentence" would be played one time as the power is turned on. If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won't stop until user sets other options and play the specified sentence immediately.

2.4.4 Setting Power-On-Loop

The settings of Power-On-Loop will decide the switch of Power-On-Play. When user selects "Enable" and IC is powered on, IC will play POP Sentence repeatedly. The trigger mode is fixed in Level / Unhold / Irretrigger.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

2.4.5 Setting LVR Voltage

When the VDD voltage is lower than the selected LVR voltage, IC will reset. The LVR voltage setting is only available for NY3PxxxJ series which provides 4 different kinds of LVR voltage, the default is 1.5V.

1	*2*	*3*	*4*
1.8V	1.7V	1.6V	1.5V

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When LVR voltage is not 1.8V, it must work with Q-Writer 3.10 or above version. Otherwise, the setting will fail.***

2.4.6 PWM Anti-Noise Parameter

NY3PxxxJ can reduce noise by adjusting PWM Anti-Noise Parameter. When the surrounding noise is too large and the sound has obvious noise, user can choose the different anti-noise degree to

decrease the noise. But it may affect the output voice quality slightly. The lower the anti-noise value, the worse the sound quality. The PWM Anti-Noise Parameter setting is only available for NY3PxxxJ series which provides 3 different parameters, the default is 0dB.

1	*2*	*3*
0dB	-3dB	-6dB

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When PWM Anti-Noise Parameter voltage is not the default value 0dB, it must work with Q-Writer 3.60 or above version. Otherwise, the setting will fail.***

2.4.7 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY3A(D) series there are 4 input type options for different applications.

Option	Input Type Description
CDS + 1.5M	Normal selection for button trigger. 1.5MΩ pull-low resistance when button is pressed, and 300KΩ+1.5MΩ (parallel) pull-low resistance when button is released.
CDS	Internal 300KΩ pull-low resistance, usually for photo-resistor trigger. 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.

2.4.8 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:

- 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.

For the timing diagrams describing the trigger modes, please see NY3A(D) Data Sheet.

2.4.9 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

2.4.10 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.

2.4.11 Selecting Output Type

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

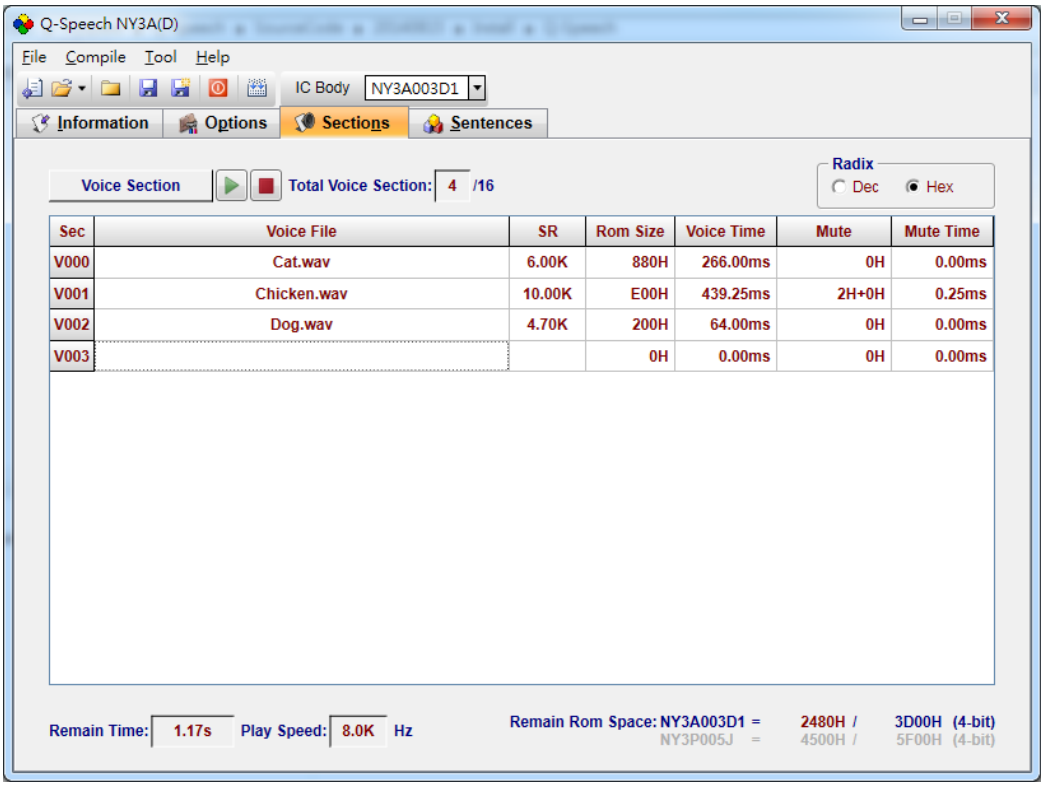
Table 2.4.11 – NY3A(D) Output Type

Option	Output Type Description
Busy – Low Active	Low active signal output during playing.
Busy – High Active	High active signal output during playing. **This option doesn’t support OTP IC.**
LED: 3 Hz	3.00Hz (@6 KHz) sink signal output for driving LED.
LED: 1/2 Dynamic	Low active signal output during playing.

The flashing rate for LED 3 Hz is positive relative to the Play Speed of sections. Only when the Play Speed is 6 KHz, are their flashing rates equal to the settings on Options page (3 Hz).

2.5 Managing the Sections

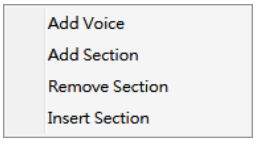
User can use the Sections page to include and manage the sections for a project. NY3A(D) Series contain 16 sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.



2.5.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V015(totally 16 sections) in NY3A(D).

2.5.2 Voice File Column



Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY3A(D) only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

sections.

2.5.3 SR Column

SR stands for the sample rate of the voice file.

2.5.4 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected by the features of different IC series. For NY3A003D1, the ROM Size for every section must be the multiple of 80H whereas 100H for the other NY3A(D) bodies. For most IC bodies of NY3A(D), the ROM Size for every section must be the multiple of 100H, when the ROM Size of section is less than the multiple of 100H, the voice encoder will automatically adjust the compressed data o fit the multiple of 100H. The minimum unit of NY3A(D) section is 4H. If the ROM size is less than 4H, the voice encoder will adjust the section by using mute signal to fill in the gap between the actual voice file. Such mute signal will be shown in the Mute Column and will be played following the voice file.

Please note that every NY3A(D) Series IC actually imposes a maximum limit on each type of section including pure section, voice+mute section and pure mute section. The maximum limits imposed on all the NY3A(D) Series ICs are tabulated below.

Table 2.5.4 – The maximum limits imposed by NY3A(D)Series ICs

Body	MaxV	Max(V+M)	MaxM	Max Total
NY3P005J	5F00H	FFFCH	FFFCH	5F00H
NY3P010J	FFFCH	FFFCH	FFFCH	11F00H
NY3P016C	FFFCH	FFFCH	FFFCH	1DF00H
NY3A003D	3D00H	FFFCH	FFFCH	3D00H
NY3A003D1	3D00H	FFFCH	FFFCH	3D00H
NY3A006D	7A00H	FFFCH	FFFCH	7A00H
NY3A006D1	7A00H	FFFCH	FFFCH	7A00H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section (voice file only) or a combination of voice+mute section.
- **Max(V+M)** column shows the maximum sum of the ROM Size taken up by the voice file and the mute data when the section combines voice and mute section.
- **MaxM** column shows the maximum value of the mute data when the 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 NY3A006D1 as an example. For this body the ROM Size taken up by the voice file of each section must not exceed 7A00H. And one section with a mute data must not exceed FFFCH. If

the ROM Size taken up by that voice file is 4100H, then this file can be followed by a maximum of BEFCH mute data (FFFCH - 4100H = BEFCH). If this section does not contain a voice file, then it can have a maximum of FFFCH mute data. The max total of NY3A006D1 sections has to be under 7A00H ROM size.

2.5.5 Voice Time Column

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

2.5.6 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY3A(D) must be the multiple of 4H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 4H whereas pressing the Down button makes the mute data decrease by 4H.

2.5.7 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

2.5.8 Remain Time

Remain Time column show the available remaining time of sections.

2.5.9 Radix

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

2.5.10 Total Voice Section & Remain ROM Space

The total number of valid sections is displayed at the top of the page and the total remain ROM space is displayed at the bottom of the page. The total used ROM Size must not exceed the available total ROM Size displayed to the right of slash (“/”). Please see **Table 2.5.4** for more details.

2.5.11 Right-click Menu

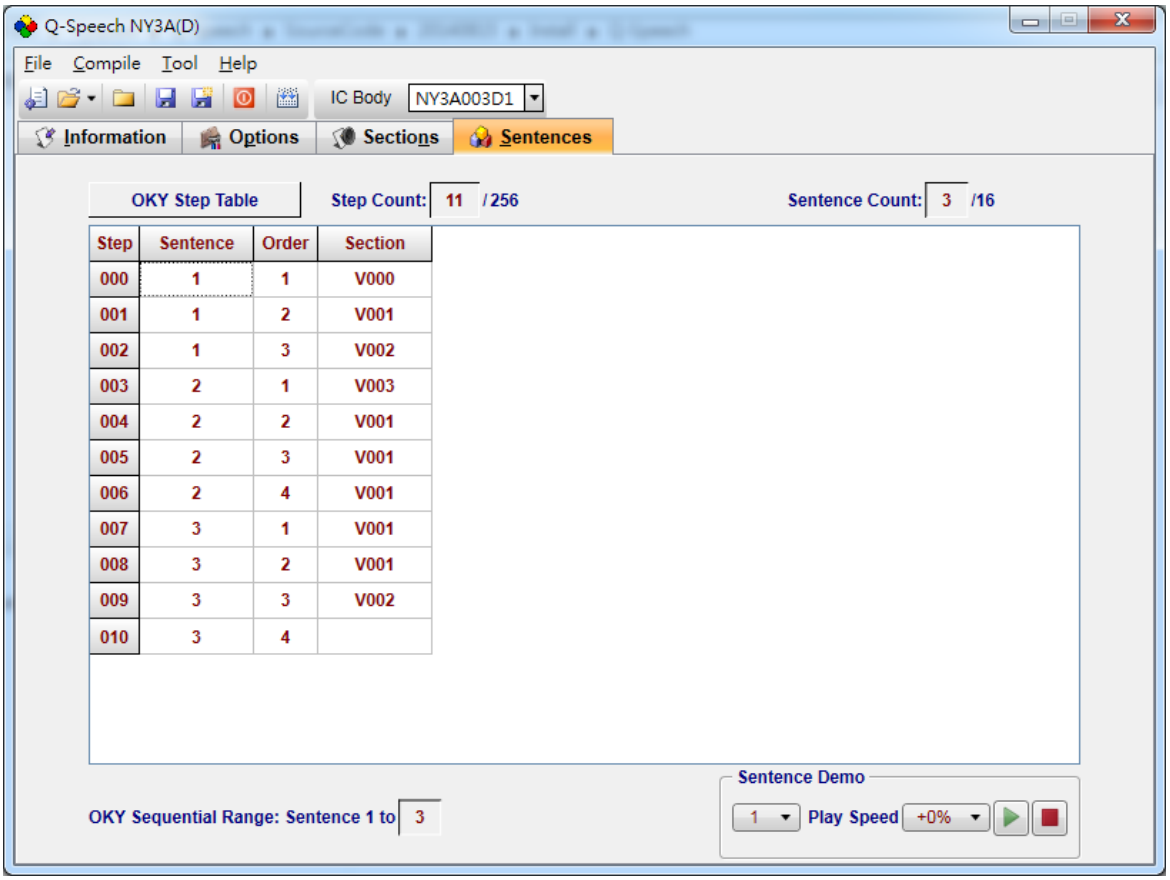
A right-click menu will show on the right by right clicking on the section table or mute section table.

The functions of the menu items are as follows:

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections.
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.

2.6 Arranging the Sentences

A “sentence” means a combination of sections to be played when triggered. For NY3A(D), there are 16 sentences, and the steps maximum is 256 steps.

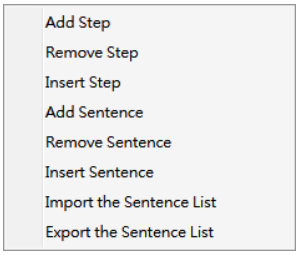


2.6.1 Step Column

For NY3A(D), there are totally 256 (000 to 255) steps that can be defined for each step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. There mustn’t be any undefined steps between defined steps. The total number of defined steps is shown above the step table.

2.6.2 Sentence Column

The Sentence Column shows the sentence numbers the steps belong to. For NY3A(D), there are total 16 (1 to 16) sentences available. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / Import / Export a step or sentence, right-clicking on the desired Step or Sentence Column, then select the actions in the pop-up menu.



2.6.3 Order Column

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, steps will be played sequentially. *Q-Speech* will automatically generate the numbers of all the steps according with order in a sentence.

2.6.4 Section Column

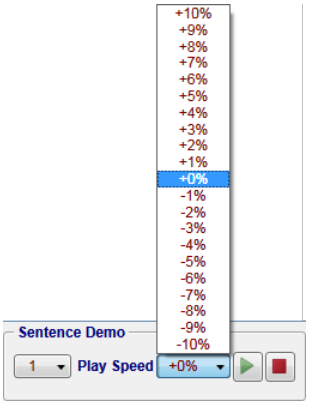
Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

2.6.5 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.

2.6.6 Sentence Demo

Select any Sentence, and it could be auditioned by using the Media Player (). Users also can adjust the Play Speed of sentence. However, the adjustment will not have any effect on BIN file and Demo Board. It's just a demonstration function on PC.



2.6.7 Right-click Menu

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

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

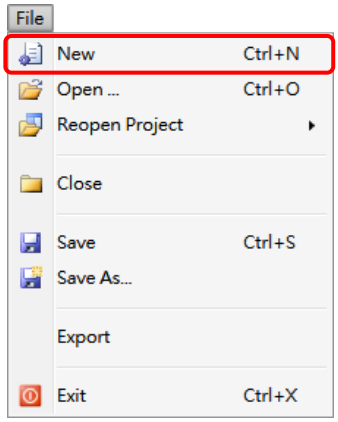
3 Using *Q-Speech* for NY3A(E)Series

In this chapter, the details of using *Q-Speech* for NY3A(E) will be presented step by step.

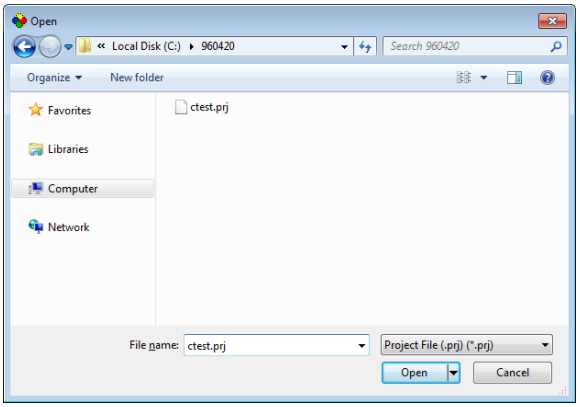
Contents:

3.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY3A(E), a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

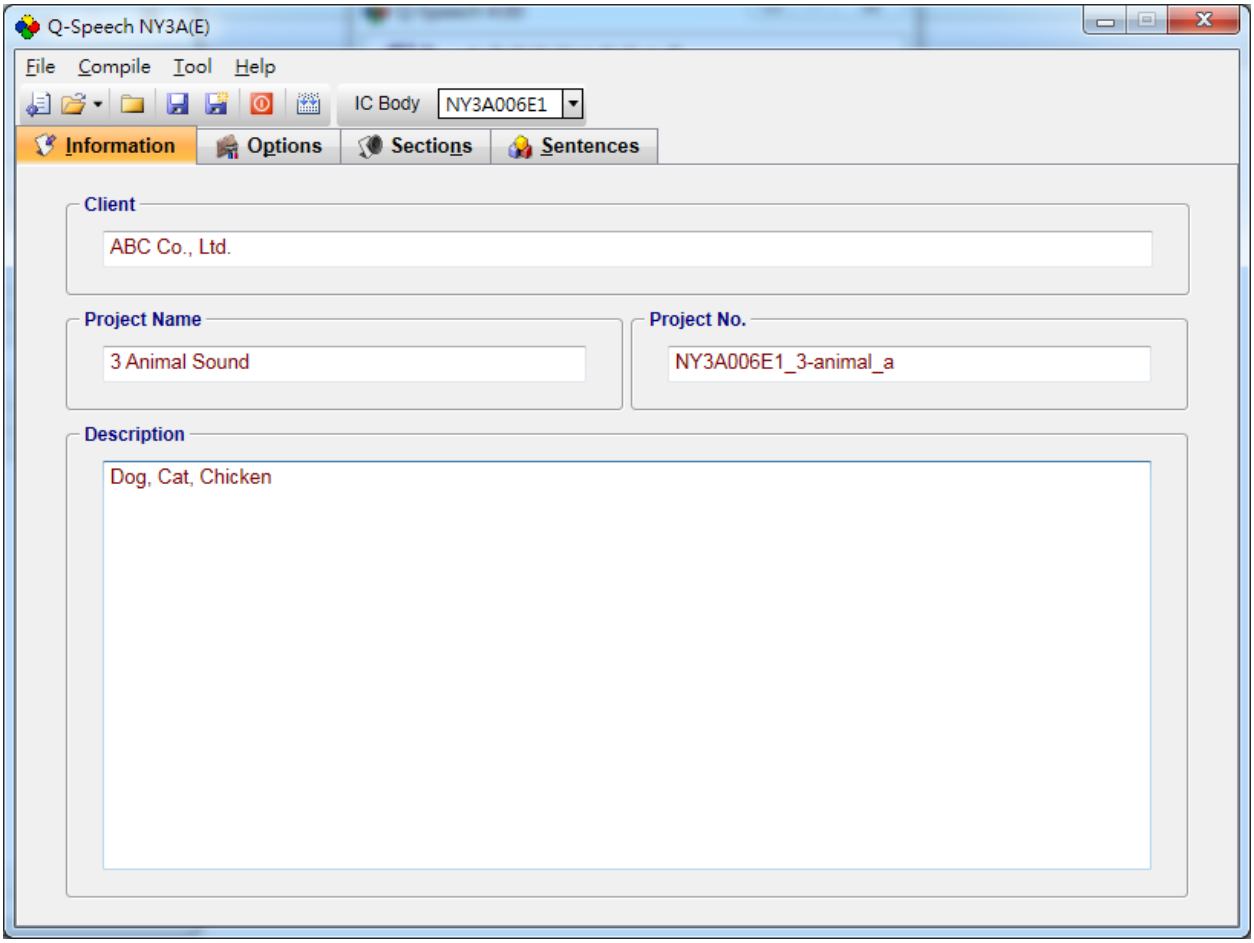


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



3.2 Filling in the Information

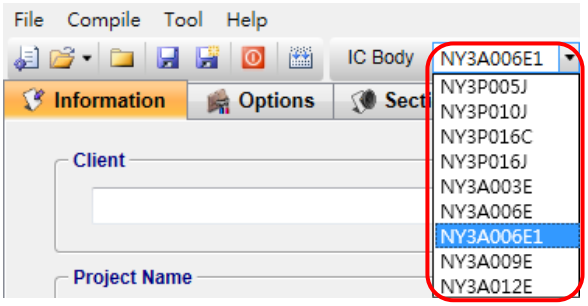
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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.

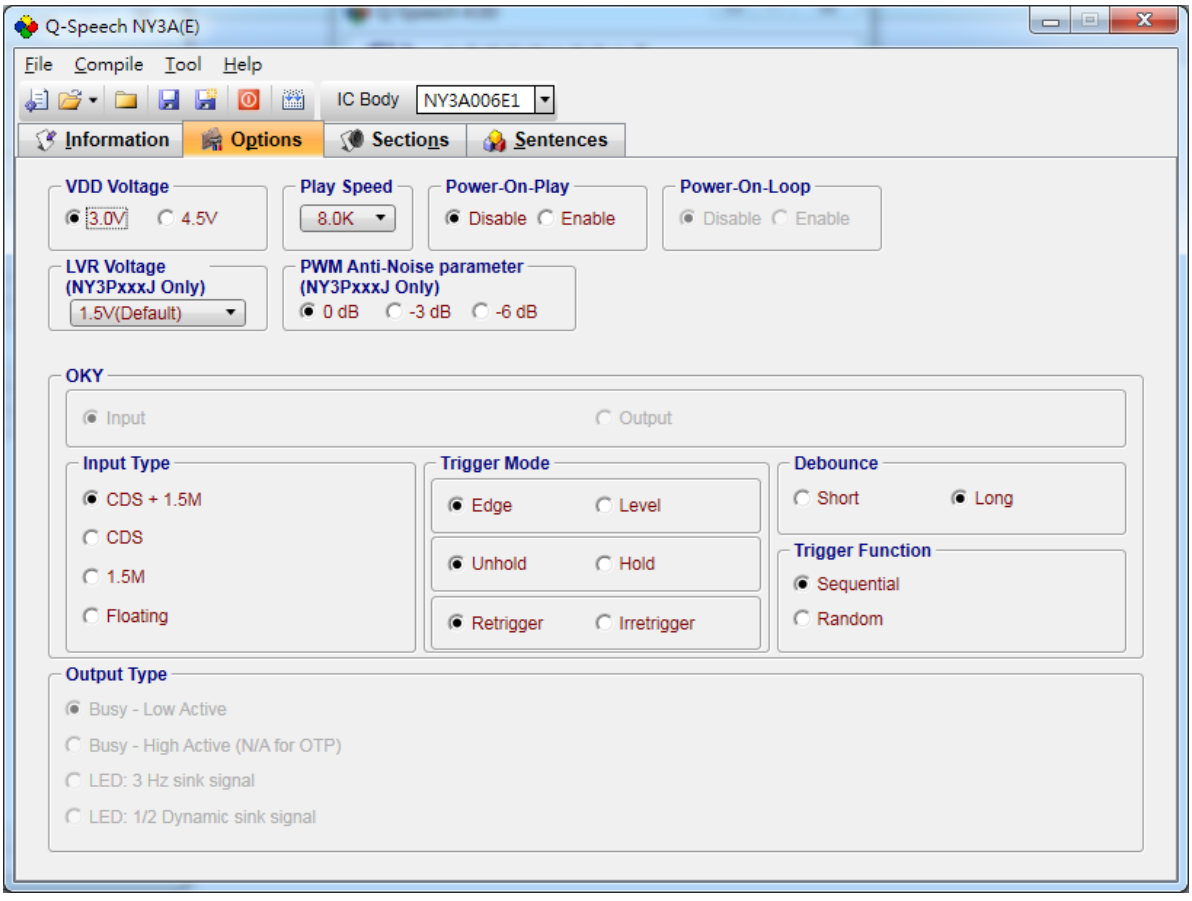
3.3 Selecting the IC Body

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



3.4 Selecting the Options

By selecting different options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Play Speed, Trigger Mode, etc, could be set easily on this page.



3.4.1 Selecting 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.

3.4.2 Selecting Play Speed

Play Speed determines the built-in oscillation circuitry. It is always the first function that should be specified since some other functions such as debounce time, LED flashing rate and mute time depend on it.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
20.0 KHz	17.1 KHz	15.0 KHz	13.3 KHz	12.0 KHz	10.9 KHz	10.0 KHz	9.2 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
8.6 KHz	8.0 KHz	7.5 KHz	7.1 KHz	6.7 KHz	6.3 KHz	6.0 KHz	5.7 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
5.5 KHz	5.2 KHz	5.0 KHz	4.8 KHz	4.6 KHz	4.4 KHz	4.3 KHz	4.1 KHz
25	*26*	*27*					
4.0 KHz	3.9 KHz	3.8 KHz					

3.4.3 Setting Power-On-Play (POP)

“POP Sentence” would be played one time as the power is turned on. If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won’t stop until user sets other options and play the specified sentence immediately.

3.4.4 Setting Power-On-Loop

The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects “Enable” and IC is powered on, IC will play POP Sentence repeatedly. The trigger mode is fixed in Level / Unhold / Irretrigger.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

3.4.5 Setting LVR Voltage

When the VDD voltage is lower than the selected LVR voltage, IC will reset. The LVR voltage setting is only available for NY3PxxxJ series which provides 4 different kinds of LVR voltage, the default is 1.5V.

1	*2*	*3*	*4*
1.8V	1.7V	1.6V	1.5V

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When LVR voltage is not 1.8V, it must work with Q-Writer 3.10 or above version. Otherwise, the setting will fail.***

3.4.6 PWM Anti-Noise Parameter

NY3PxxxJ can reduce noise by adjusting PWM Anti-Noise Parameter. When the surrounding noise is too large and the sound has obvious noise, user can choose the different anti-noise degree to

decrease the noise. But it may affect the output voice quality slightly. The lower the anti-noise value, the worse the sound quality. The PWM Anti-Noise Parameter setting is only available for NY3PxxxJ series which provides 3 different parameters, the default is 0dB.

1	*2*	*3*
0dB	-3dB	-6dB

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When PWM Anti-Noise Parameter voltage is not the default value 0dB, it must work with Q-Writer 3.60 or above version. Otherwise, the setting will fail.***

3.4.7 Selecting OKY Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY3A(E) series there are 4 input type options for different applications.

Option	Input Type Description
CDS + 1.5M	Normal selection for button trigger. 1.5MΩ pull-low resistance when button is pressed, and 300KΩ+1.5MΩ (parallel) pull-low resistance when button is released.
CDS	Internal 300KΩ pull-low resistance, usually for photo-resistor trigger. 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.

3.4.8 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:

- 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.

For the timing diagrams describing the trigger modes, please see NY3A(E) Data Sheet.

3.4.9 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.

3.4.10 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

3.4.11 Selecting Output Type

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

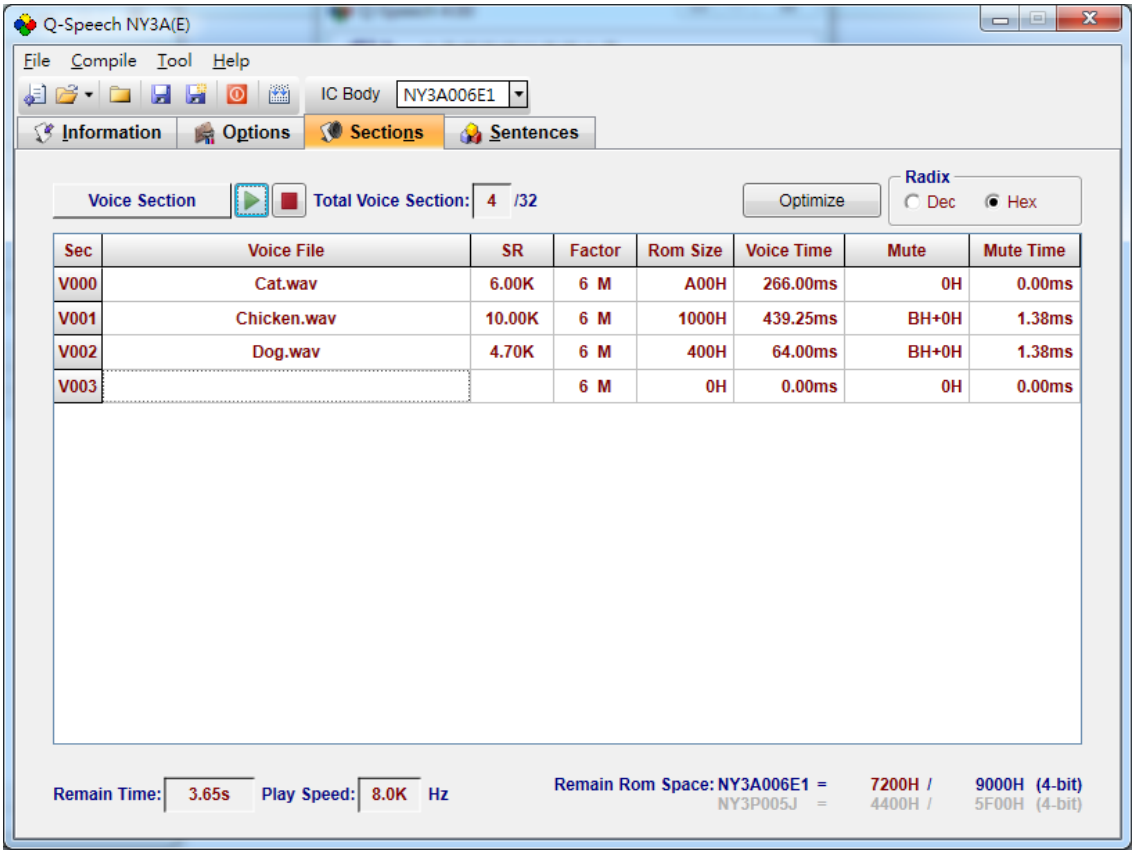
Table 3.4.11 – NY3A(E) Output Type

Option	Output Type Description
Busy – Low Active	Low active signal output during playing.
Busy – High Active	High active signal output during playing. **This option doesn’t support OTP IC**.
LED: 3 Hz	3.00Hz (@6 KHz) sink signal output for driving LED.
LED: 1/2 Dynamic	Low active signal output during playing.

The flashing rate for LED 3 Hz is positive relative to the Play Speed of sections. Only when the Play Speed is 6 KHz, are their flashing rates equal to the settings on Options page (3 Hz).

3.5 Managing the Sections

User can use the Sections page to include and manage the sections for a project. NY3A(E) Series contain 32 sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.

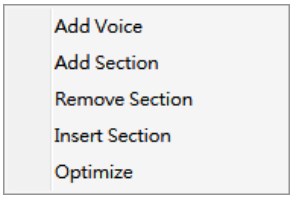


3.5.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V031 (totally 32 sections) in NY3A(E).

3.5.2 Voice File Column

Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY3A(E) only accepts 16/24/32-bit mono and stereo wave files (.wav) , *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting/Optimizing Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.



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

3.5.3 SR Column

SR stands for the sample rate of the voice file.

3.5.4 Factor Column

The Factor Column shows the quality factor of compression. Altering this Factor may cause changes in compression quality and ROM Size simultaneously. After compressing, the ROM Size will be directly shown in ROM Size Column. There are 12 Factors, which from '1' to '12' are compressed while PCM is uncompressed. Normally, a bigger Factor will lead to bigger ROM Size but better quality after compression. The default Factor is '6'.

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

3.5.5 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected by the features of different IC series. For NY3A003E, the ROM Size for every section must be the multiple of 100H whereas 200H. For the other NY3A(E) bodies, the ROM Size for every section must be the multiple of 200H, when the ROM Size of section is less than the multiple of 200H, the voice encoder will automatically adjust the compressed data o fit the multiple of 200H. The minimum unit of NY3A(E) section is 10H. If the ROM size is less than 10H, the voice encoder will adjust the section by using mute signal to fill in the gap between the actual voice file. Such mute signal will be shown in the Mute Column and will be played following the voice file.

Please note that every NY3A(E) Series IC actually imposes a maximum limit on each type of section including pure section, voice+mute section and pure mute section. The maximum limits imposed on all the NY3A(E) Series ICs are tabulated below.

Table 3.5.5 – The maximum limits imposed by NY3A(E) Series ICs

Body	MaxV	Max(V+M)	MaxM	Max Total
NY3P005J	5F00H	FFF0H	FFF0H	5F00H
NY3P010J	FFF0H	FFF0H	FFF0H	11F00H
NY3P016C	FFF0H	FFF0H	FFF0H	1DF00H

Body	MaxV	Max(V+M)	MaxM	Max Total
NY3P016J	FFF0H	FFF0H	FFF0H	1DF00H
NY3A003E	4800H	FFF0H	FFF0H	4800H
NY3A006E	9000H	FFF0H	FFF0H	9000H
NY3A006E1	9000H	FFF0H	FFF0H	9000H
NY3A009E	D800H	FFF0H	FFF0H	D800H
NY3A012E	FFF0H	FFF0H	FFF0H	12000H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section (section with a voice file only) or a voice+mute section (section with a voice file and mute data).
- **Max(V+M)** column shows the maximum sum of the ROM Size taken up by the voice file and the mute data when the section is a voice+mute section.
- **MaxM** column shows the maximum value of the mute data when the 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 NY3A012E as an example. For this body the ROM Size taken up by the voice file of each section must not exceed FFF0H. If the ROM Size taken up by that voice file is F800H, then this file can be followed by a maximum of 7F0H mute data (FFF0H - F800H = 7F0H). If this section does not contain a voice file, then it can have a maximum of FFF0H mute data. All the voice files in a project can occupy up to FFF0H ROM Size. If a section file exceeds maximum size, it has to be separated into sections and every size is less than FFF0H.

3.5.6 Voice Time Column

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

3.5.7 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY3A(E) must be the multiple of 10H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 10H whereas pressing the Down button makes the mute data decrease by 10H.

3.5.8 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

3.5.9 Remain Time

Remain Time column shows the available remaining time of sections.

3.5.10 Radix

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

3.5.11 Total Voice Section & Remain ROM Space

The total number of valid sections is displayed at the top of the page and the total remain ROM space is displayed at the bottom of the page. The total used ROM Size must not exceed the available total ROM Size displayed to the right of slash (“/”). Please see **Table 3.5.5** for more details.

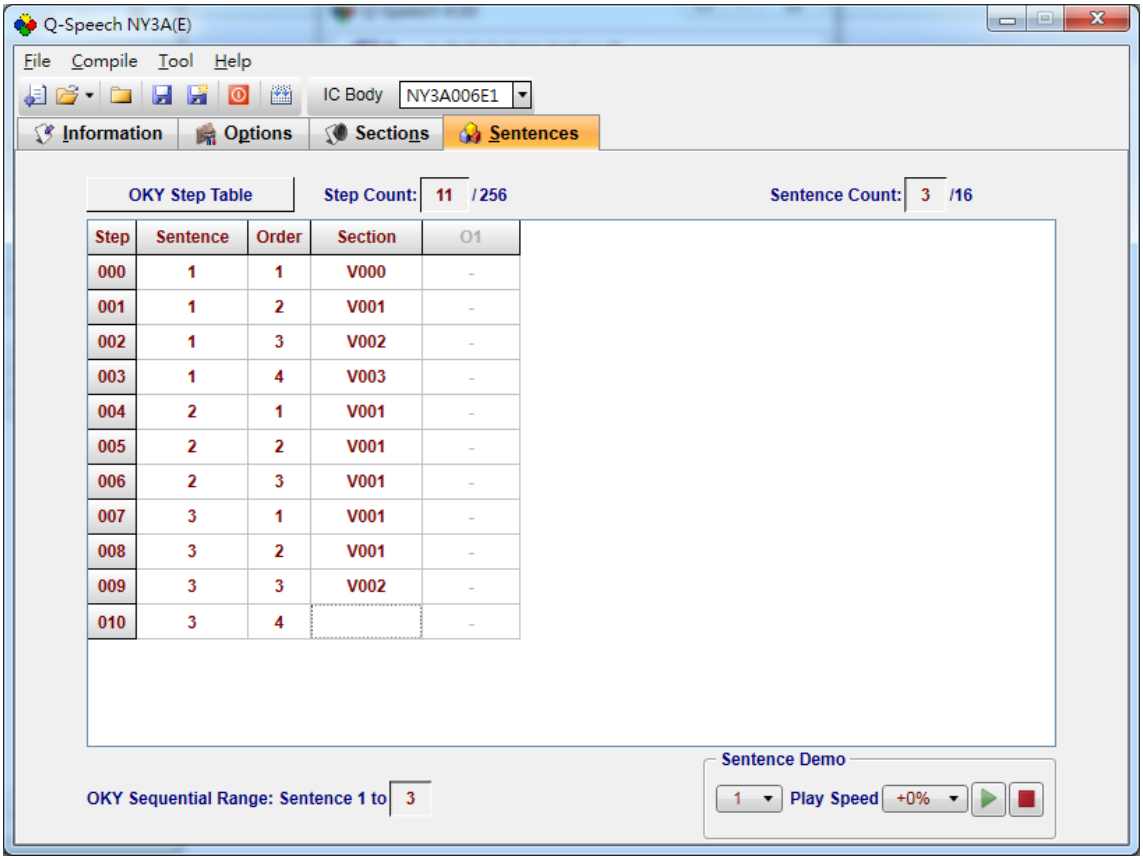
3.5.12 Right-click Menu

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

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections.
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.
Optimize	Automatically adjust the compression ratio of the section with using the full capacity as objective.

3.6 Arranging the Sentences

A “sentence” means a combination of sections to be played when triggered. For NY3A(E), there are 16 sentences, and the steps maximum is 256 steps.

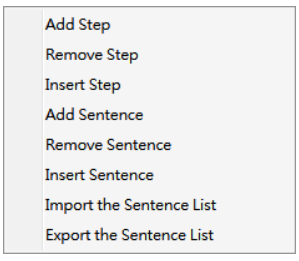


3.6.1 Step Column

For NY3A(E), there are totally 256 (000 to 255) steps that can be defined for each step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. There mustn’t be any undefined steps between defined steps. The total number of defined steps is shown above the step table.

3.6.2 Sentences Column

The Sentence Column shows the sentence numbers the steps belong to. For NY3A(E), there are total 16 (1 to 16) sentences available. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / Import / Export a step or sentence, right-clicking on the desired Step or Sentence Column, then select the actions in the pop-up menu.



3.6.3 Order Column

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, steps will be played sequentially. *Q-Speech* will automatically generate the numbers of all the steps according with order in a sentence.

3.6.4 Section Column

Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

3.6.5 O1 Column

When OKY is set as output on Options page, the O1 steps in step table must be specified to implement IC's output function. There are 5 kinds of output options available in NY3A(E), which includes 4 kinds of regular options (see **Table 3.4.11** for details) and 1 user-defined output signal, whereas Q1 is available only when the voice is in *Quick-IO* format (.nyq).

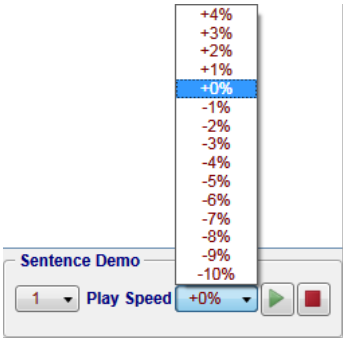
The flashing rate for LED 3 Hz is positive relative to the Play Speed selected on the Options page. Only when the Play Speed is 6 KHz, is its flashing rate equal to the option.

3.6.6 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.

3.6.7 Sentence Demo

Select any Sentence, and it could be auditioned by using the Media Player (). Users also can adjust the Play Speed of sentence. However, the adjustment will not have any effect on BIN file and Demo Board. It's just a demonstration function on PC.



3.6.8 Right-click Menu

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

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

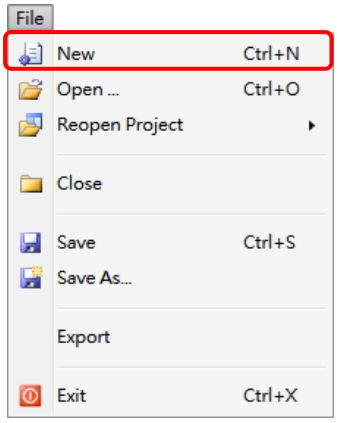
4 Using *Q-Speech* for NY3B Series

In this chapter, the details of using *Q-Speech* for NY3B (C) will be presented step by step.

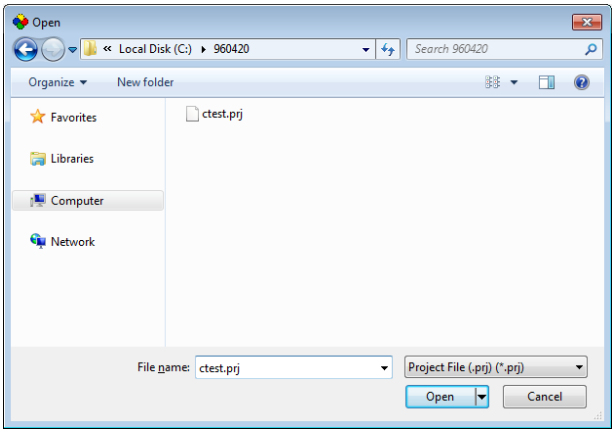
Contents:

4.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY3B, a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

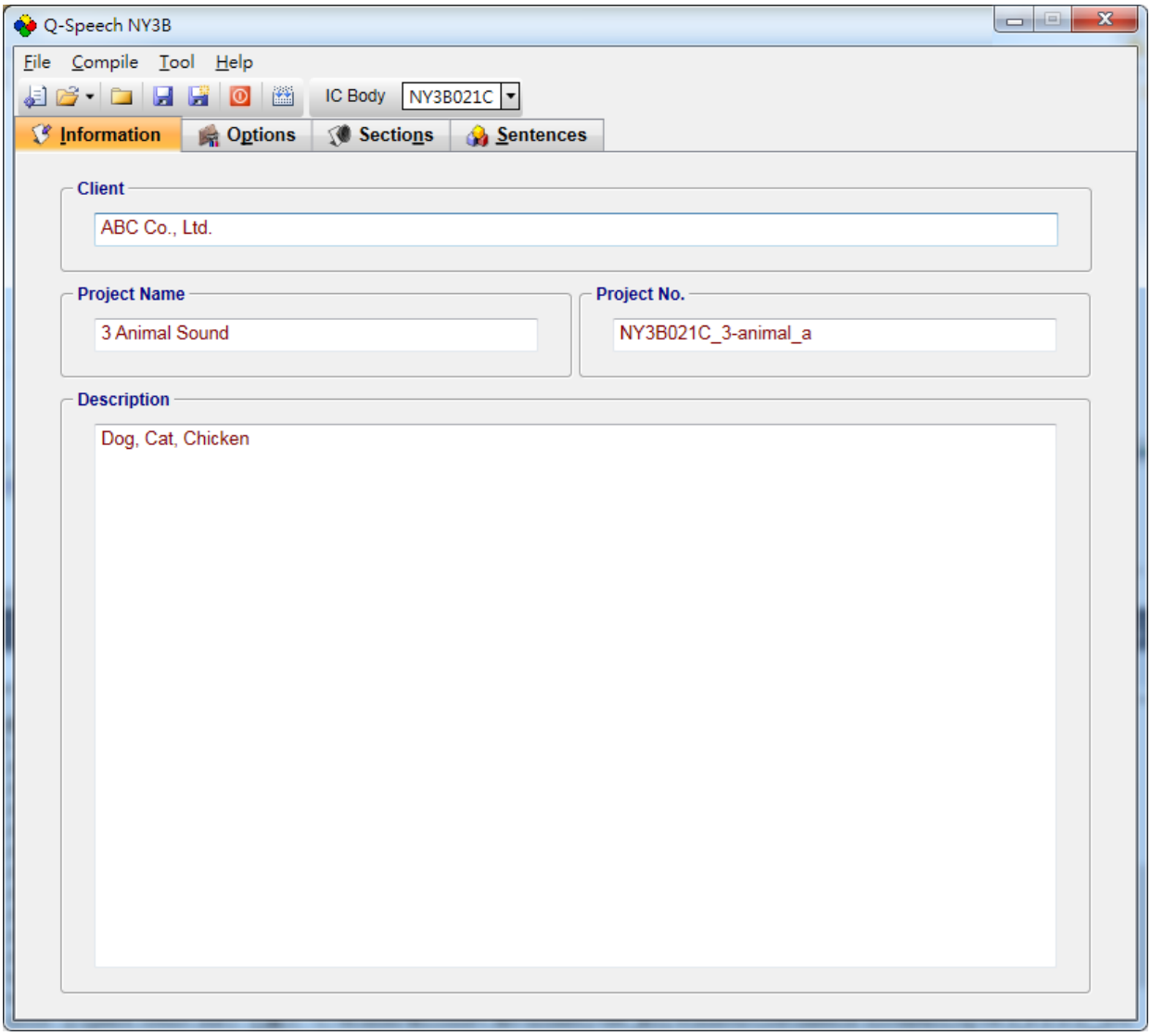


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



4.2 Filling in the Information

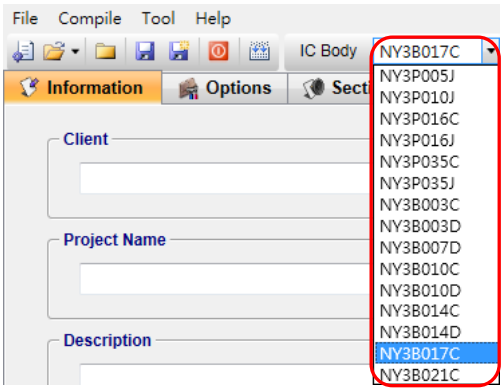
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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.

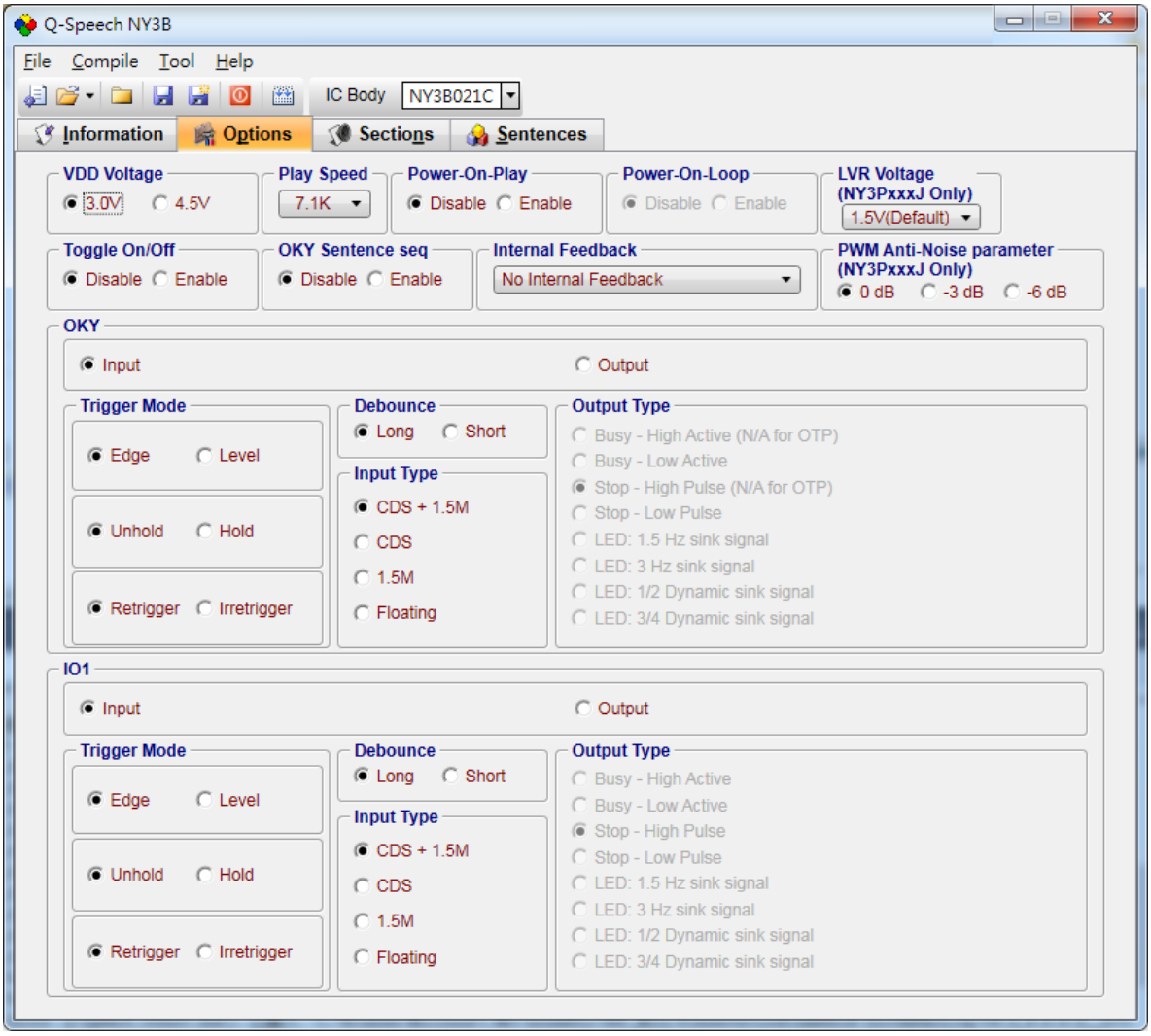
4.3 Selecting the IC Body

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



4.4 Selecting the Options

By selecting different options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Play Speed, Trigger Mode, etc, could be set easily on this page.



4.4.1 Selecting 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.

4.4.2 Selecting Play Speed

Play Speed determines the built-in oscillation circuitry. It is always the first function that should be specified since some other functions such as debounce time, LED flashing rate and mute time depend on it.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
20.0 KHz	17.1 KHz	15.0 KHz	13.3 KHz	12.0 KHz	10.9 KHz	10.0 KHz	9.2 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
8.6 KHz	8.0 KHz	7.5 KHz	7.1 KHz	6.7 KHz	6.3 KHz	6.0 KHz	5.7 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
5.5 KHz	5.2 KHz	5.0 KHz	4.8 KHz	4.6 KHz	4.4 KHz	4.3 KHz	4.1 KHz
25	*26*	*27*					
4.0 KHz	3.9 KHz	3.8 KHz					

4.4.3 Setting Power-On-Play (POP)

“POP Sentence” would be played one time as the power is turned on. If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won’t stop until user sets other options and play the specified sentence immediately.

4.4.4 Setting Power-On-Loop

The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects “Enable” and IC is powered on, IC will play POP Sentence repeatedly. The trigger mode is fixed in Level / Unhold / Irretrigger.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

4.4.5 Setting LVR Voltage

When the VDD voltage is lower than the selected LVR voltage, IC will reset. The LVR voltage setting is only available for NY3PxxxJ series which provides 4 different kinds of LVR voltage, the default is 1.5V.

1	*2*	*3*	*4*
1.8V	1.7V	1.6V	1.5V

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When LVR voltage is not 1.8V, it must work with Q-Writer 3.10 or above version. Otherwise, the setting will fail.***

4.4.6 PWM Anti-Noise Parameter

NY3PxxxJ can reduce noise by adjusting PWM Anti-Noise Parameter. When the surrounding noise is too large and the sound has obvious noise, user can choose the different anti-noise degree to decrease the noise. But it may affect the output voice quality slightly. The lower the anti-noise value, the worse the sound quality. The PWM Anti-Noise Parameter setting is only available for NY3PxxxJ series which provides 3 different parameters, the default is 0dB.

1	*2*	*3*
0dB	-3dB	-6dB

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When PWM Anti-Noise Parameter voltage is not the default value 0dB, it must work with Q-Writer 3.60 or above version. Otherwise, the setting will fail.***

4.4.7 Setting Toggle On/Off

The Toggle On/Off function allows users to immediately stop the voice playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To use this function, switch the option to “Enable”, and the input type must be set to Unhold and Retrigger. Please note OKY is the only one key available for Toggle On/Off in NY3B series.

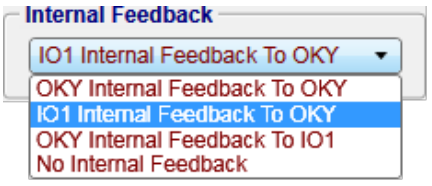
Note: When OKY is set as Toggle On/Off function, IO1 can only set as output.

4.4.8 OKY Sentence Sequential

When OKY Sentence Sequential is chosen “Enable”, OKY is fixed as Input, and IO1 is fixed as Output. That leads to OKY Step Table could build two Sentences, meanwhile IO1 Step Table is “Disable”.

4.4.9 Internal Feedback

Internal Feedback is a particular application for OKY/IO1. When sentences end or stop, “Stop – High Pulse” would trigger Internal Feedback Path of OKY/IO1 automatically, and play the sentences again.



4.4.10 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.

For more details describing the trigger modes, please see NY3B Data Sheet.

4.4.11 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

4.4.12 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY3B series there are 4 input type options for different applications.

Option	Input Type Description
CDS + 1.5M	Normal selection for button trigger. 1.5MΩ pull-low resistance when button is pressed, and 300KΩ+1.5MΩ (parallel) pull-low resistance when button is released.
CDS	Internal 300KΩ pull-low resistance, usually for photo-resistor trigger. 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.

4.4.13 Selecting Output Type

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

Table 4.4.13 – NY3B Output Type

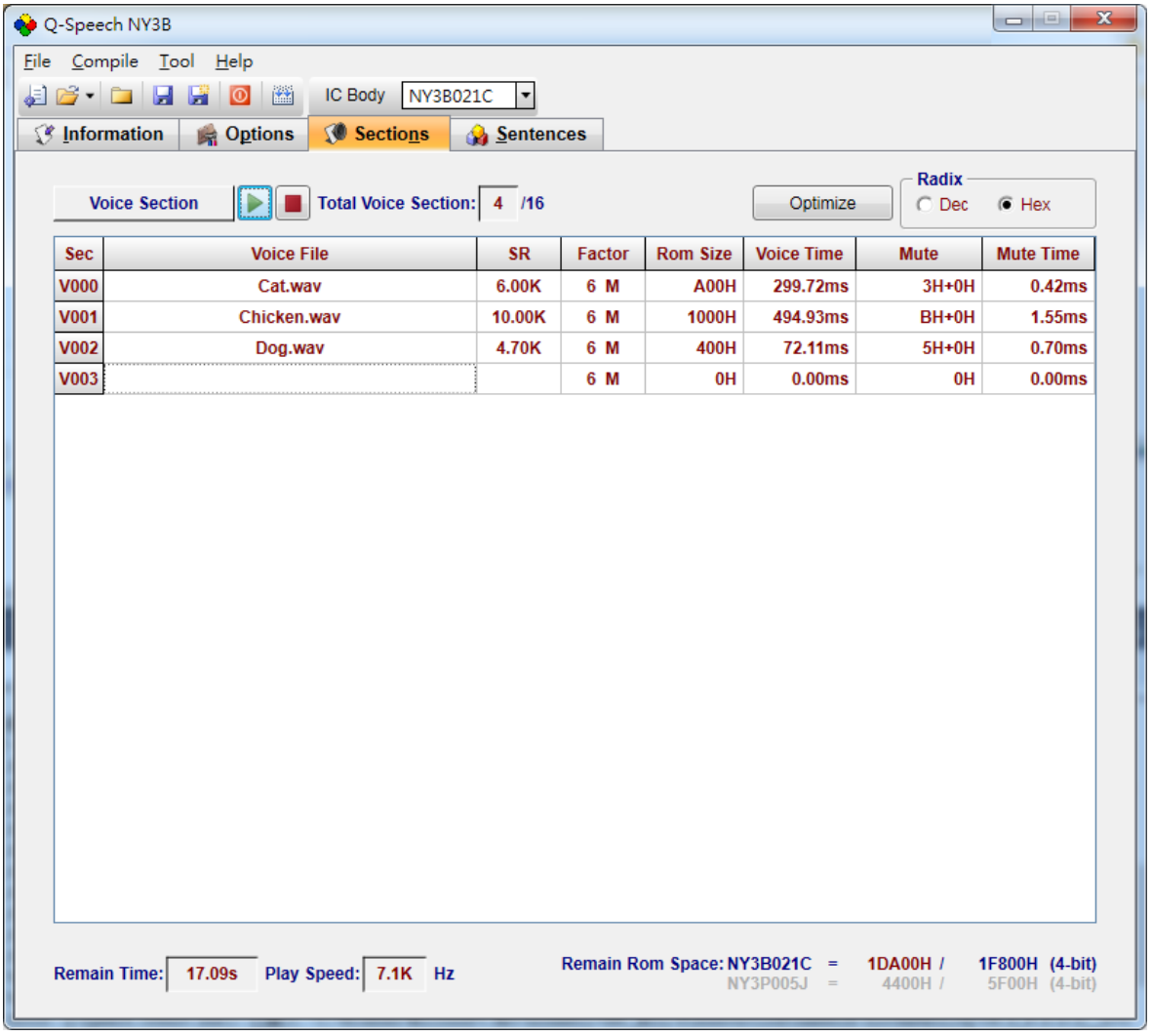
Option	Output Type Description
Stop – Low Pulse	Low pulse signal output when stop playing.
Stop – High Pulse	High pulse signal output when stop playing. **This option doesn't support OTP IC.**
Busy – High Active	High active signal output during playing. **This option doesn't support OTP IC.**

Option	Output Type Description
Busy – Low Active	Low active signal output during playing.
LED: 1.5 Hz	1.5 Hz (@6 KHz) sink signal output for driving LED.
LED: 3 Hz	3 Hz (@6 KHz) sink signal output for driving LED.
LED: 1/2 Dynamic	1/2 dynamic sink signal output for driving LED.
LED: 3/4 Dynamic	3/4 dynamic sink signal output for driving LED.

The actual flashing rates for LED 1.5 Hz and LED 3 Hz options are positive relative to the Play Speed of sections. Only when the Play Speed is 6 KHz, are their flashing rates equal to the settings on Options page (1.5 Hz and 3 Hz).

4.5 Managing the Sections

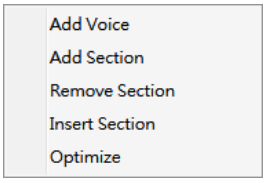
User can use the Sections page to include and manage the sections for a project. NY3B Series contain 16 sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.



4.5.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V015 (totally 16 sections) in NY3B.

4.5.2 Voice File Column



Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY3B only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting/optimzing Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

4.5.3 SR Column

SR stands for the sample rate of the voice file.

4.5.4 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 13 Factors, which from '1' to '12' are compressed while PCM is uncompressed. Normally, a bigger Factor will lead to bigger ROM Size but better quality after compression. The default Factor is '6'.

Factor	Comment
PCM	Ultra high sound quality, but largest ROM Size.
12 H	The best compressed sound quality.
…	…
6 M	Middle sound quality (default).
…	…
1 L	Very low sound quality, but smallest ROM Size.

4.5.5 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected not only by the quality factor, but also by the features of

different IC series. For NY3B003D, the ROM Size for every section must be the multiple of 100H whereas 200H. For most IC bodies of NY3B, the ROM Size for every section must be the multiple of 200H, when the ROM Size of section is less than the multiple of 200H, the voice encoder will automatically adjust the compressed data o fit the multiple of 200H. The minimum unit of NY3B section is 10H. If the ROM size is less than 10H, the voice encoder will adjust the section by using mute signal to fill in the gap between the actual voice file. Such mute signal will be shown in the Mute Column and will be played following the voice file.

Please note that every NY3B Series IC actually imposes a maximum limit on each type of section including pure section, voice+mute section and pure mute section. The maximum limits imposed on all the NY3B Series ICs are tabulated below.

Table 4.5.5 – The maximum limits imposed by NY3B Series ICs

Body	MaxV	Max(V+M)	MaxM	Max Total
NY3P005J	5F00H	1FFF0H	1FFF0H	5F00H
NY3P010J	11F00H	1FFF0H	1FFF0H	11F00H
NY3P016C	1DF00H	1FFF0H	1FFF0H	1DF00H
NY3P016J	1DF00H	1FFF0H	1FFF0H	1DF00H
NY3P035C	1FFF0H	1FFF0H	1FFF0H	3DF00H
NY3P035J	1FFF0H	1FFF0H	1FFF0H	3DF00H
NY3B003C	5400H	1FFF0H	1FFF0H	5400H
NY3B003D	5400H	1FFF0H	1FFF0H	5400H
NY3B007D	A800H	1FFF0H	1FFF0H	A800H
NY3B010C	FC00H	1FFF0H	1FFF0H	FC00H
NY3B010D	FC00H	1FFF0H	1FFF0H	FC00H
NY3B014C	15000H	1FFF0H	1FFF0H	15000H
NY3B014D	15000H	1FFF0H	1FFF0H	15000H
NY3B017C	1A400H	1FFF0H	1FFF0H	1A400H
NY3B021C	1F800H	1FFF0H	1FFF0H	1F800H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section (voice file only) or a combination of voice+mute section.
- **Max(V+M)** column shows the maximum sum of the ROM Size taken up by the voice file and the mute data when the section is a voice+mute section.
- **MaxM c**olumn shows the maximum value of the mute data when the 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 NY3B003D as an example. For this body the ROM Size taken up by the voice file of each section must not exceed 5400H. If the ROM Size taken up by that voice file is 3200H, then this file can be followed by a maximum of 1CDF0H mute data (1FFF0H - 3200H = 1CDF0H). If this section

does not contain a voice file, then it can have a maximum of 1FFF0H mute data. If a section file exceeds maximum size, it has to be separated into sections and every size is less than 5400H.

4.5.6 Voice Time Column

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

4.5.7 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY3B must be the multiple of 10H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 10H whereas pressing the Down button makes the mute data decrease by 10H.

4.5.8 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

4.5.9 Remain Time

Remain Time column shows the available remaining time of sections.

4.5.10 Radix

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

4.5.11 Total Voice Section & Remain ROM Space

The total number of valid sections is displayed at the top of the page and the total remain ROM Space is displayed at the bottom of the page. The total used ROM Size must not exceed the available total ROM Size displayed to the right of slash (“/”). Please see **Table 4.5.5** for more details.

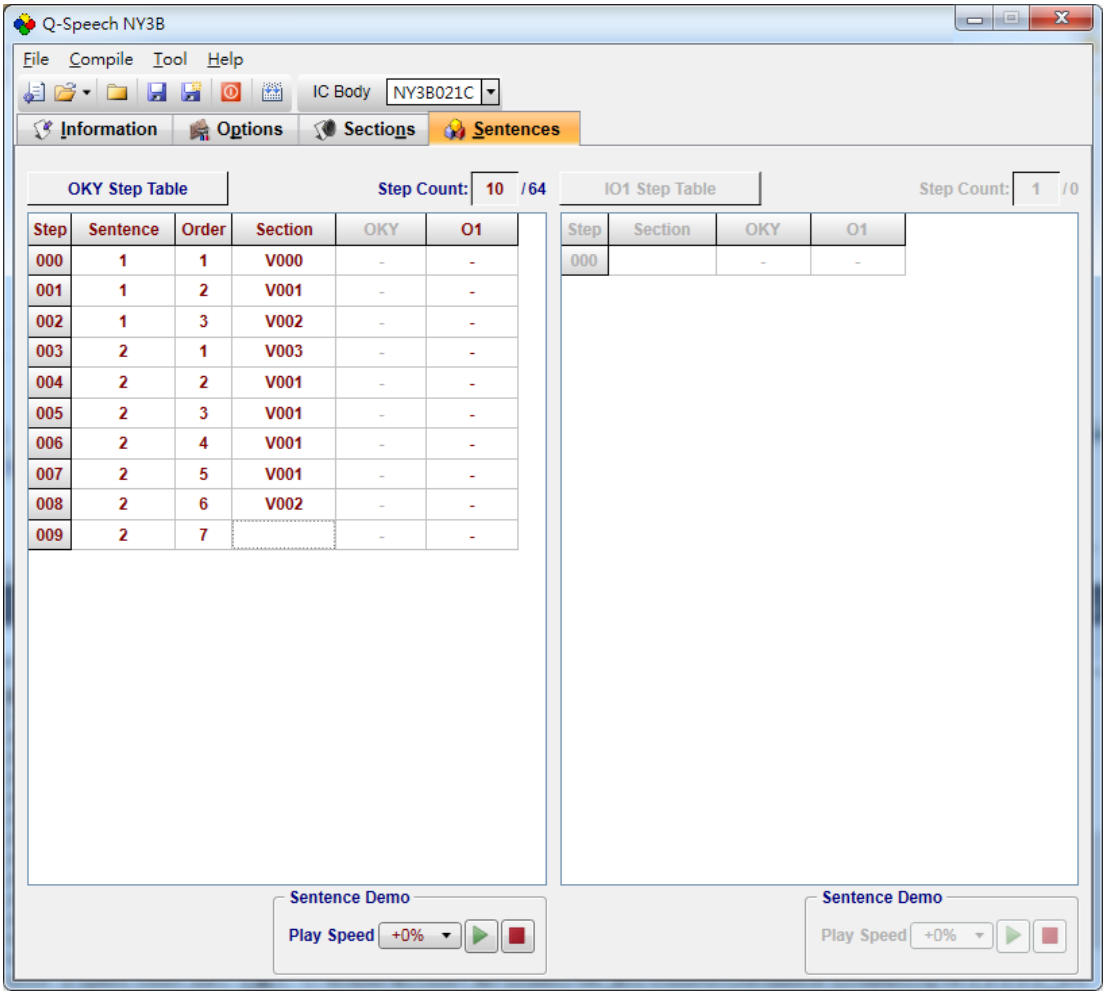
4.5.12 Right-click Menu

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

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections.
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.
Optimize	Automatically adjust the compression ratio of the section with using the full capacity as objective.

4.6 Arranging the Sentences

A “sentence” means a combination of sections to be played when triggered. For NY3B, there is only one sentence of max 32 steps for OKY and IO1 each. But when IO1 is set as output, its steps can be utilized so that OKY sentence can be extended to 64 steps.



4.6.1 Step Column

For NY3B, there are totally 32 (000 to 031) steps that can be defined for each step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. There mustn't be any undefined steps between defined steps. The total number of defined steps is shown above the step table.

4.6.2 Section Column

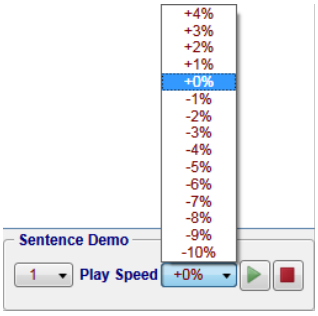
Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

4.6.3 OKY / O1 Column

When OKY/ O1 is set as output on Options page, the OKY/ O1 steps in step table must be specified to implement IC's output function. There are 9 kinds of output options available in NY3B, which includes 8 kinds of regular options (see Table 4.4.13 for details) and 1 user-defined output signal, whereas Q1 and Q2 are available only when the voice is in *Quick-IO* format (.nyq).
The flashing rate for LED 3 Hz option is positive relative to the Play Speed selected on the Options page. Only when the Play Speed is 6 KHz, is its flashing rate equal to the option.

4.6.4 Sentence Demo

The step table of OKY and IO1 could be auditioned by using the Media Player (). Users also can adjust the Play Speed of step table. However, the adjustment will not have any effect on BIN file and Demo Board. It's just a demonstration function on PC.



4.6.5 Right-click Menu

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

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above the selected sentence.
Import the Sentence List	Import the edited sentence list (*.csv).

Option	Function
Export the Sentence List	Export all sentences as a sentence list (*.csv).

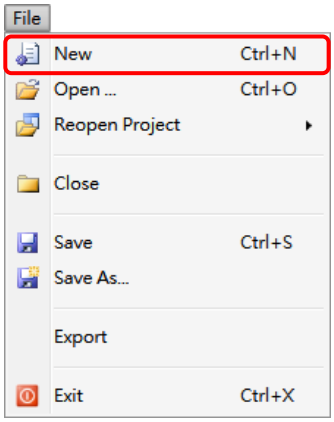
5 Using *Q-Speech* for NY3C Series

In this chapter, the details of using *Q-Speech* for NY3C will be presented step by step.

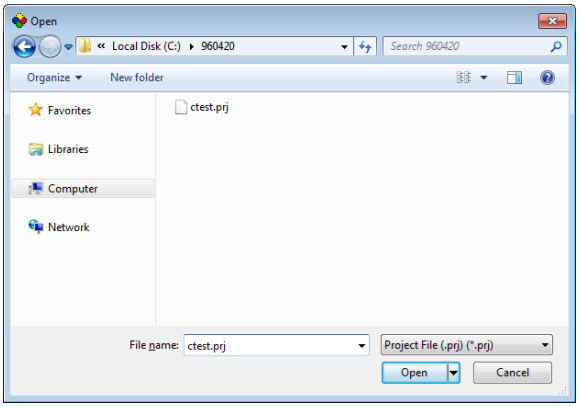
Contents:

5.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY3C, a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

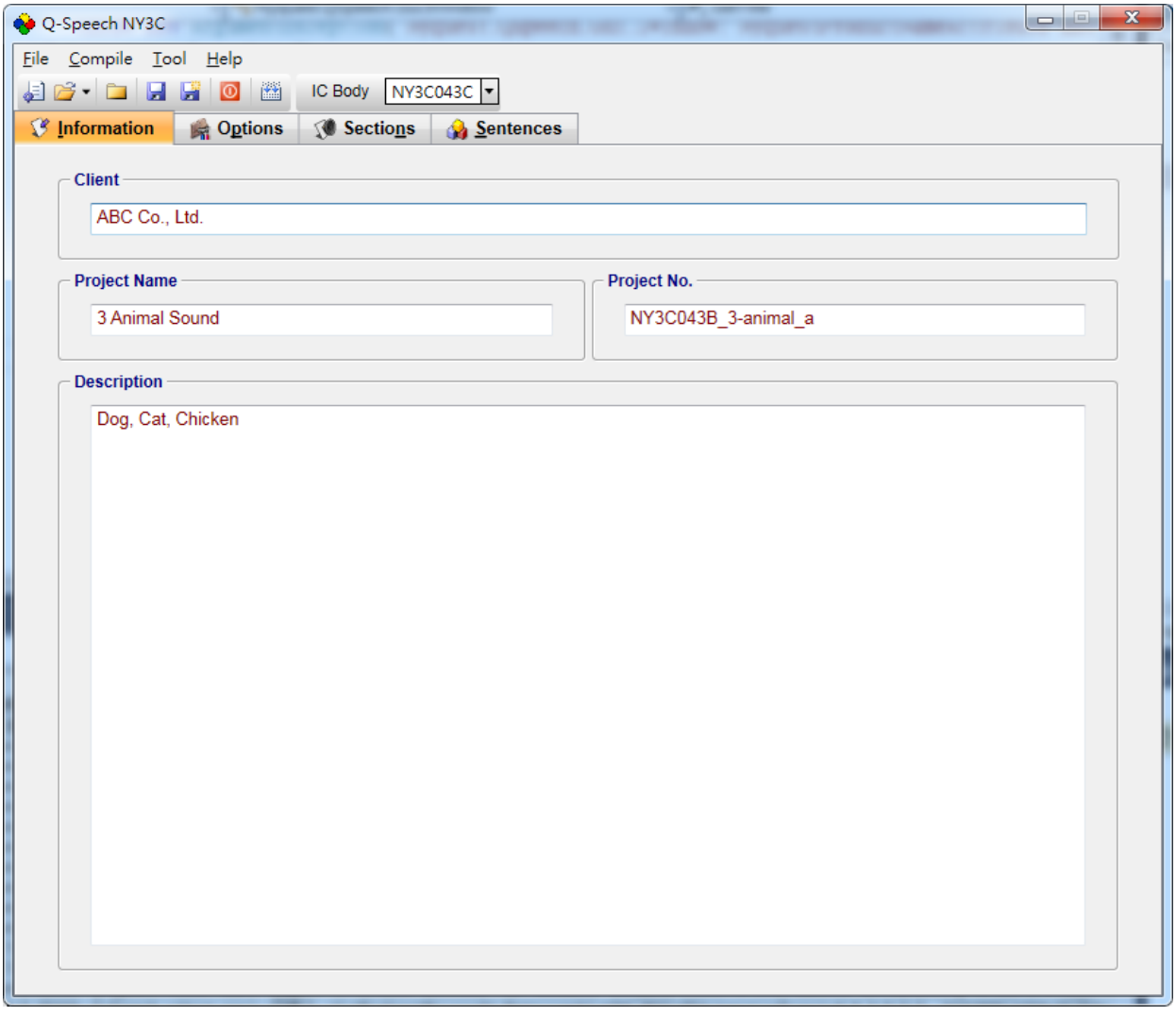


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



5.2 Filling in the Information

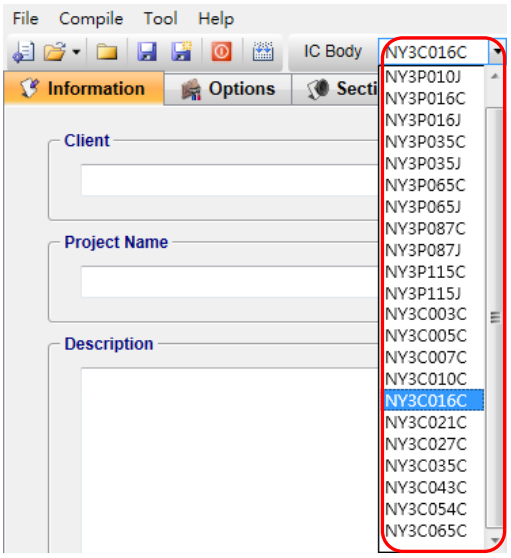
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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.

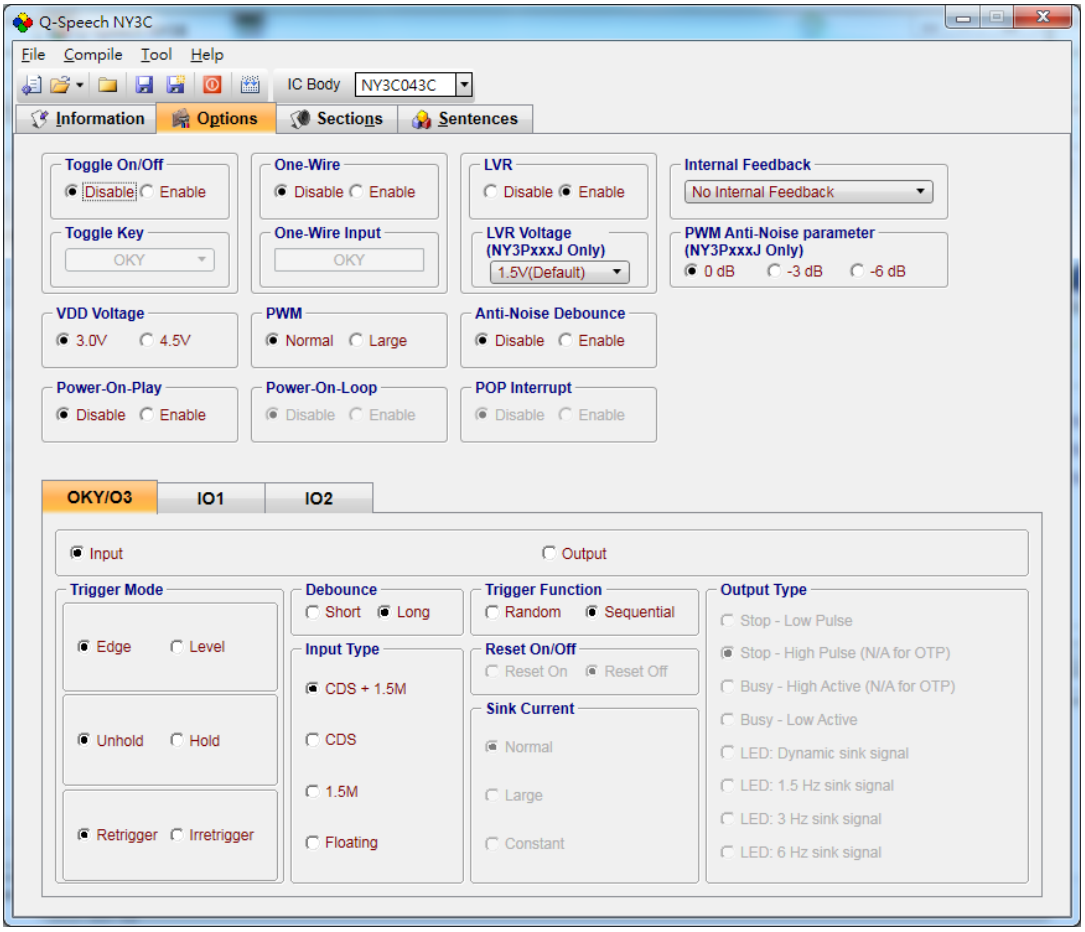
5.3 Selecting the IC Body

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



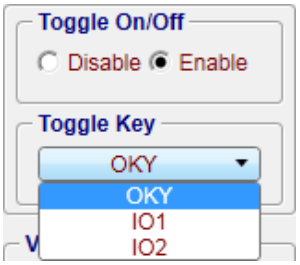
5.4 Selecting the Options

By selecting different options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Input Type, Trigger Mode, etc, could be set easily on this page.



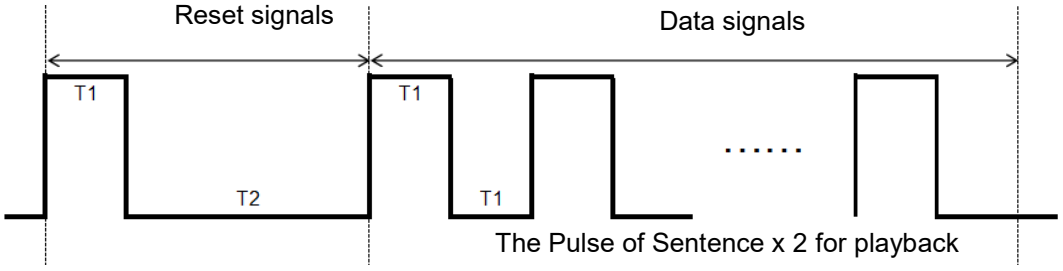
5.4.1 Toggle On/Off

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



5.4.2 One-Wire

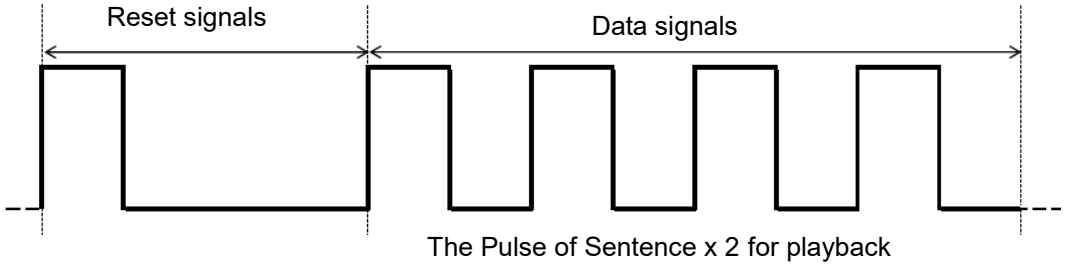
The One-Wire option provides the one-wire communication for the main control MCU and NY3 series. When NY3 receives the triggered signals, it will play the corresponding voice section. Please note that the available amount of Sentence will be halved. The coummnication protocol for controlling NY3 is shown below which can be divided into the reset signals and data signal.



The supported range for the trigger period.

Time	Min.	Typ.	Max.
T1	50us	100us	250us
T2	1,200us	1,500us	1,800us

Example. Play the voice of Sentence 2.



5.4.3 Selecting 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.

5.4.4 Setting PWM Output

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

5.4.5 Setting Low-Voltage-Reset (LVR)

When VDD voltage is lower than 1.7V in transient, IC would reset automatically. The default setting of LVR function is “Enable”. If users don’t use this function, please set as “Disable”

Note: If user already sets POP function, the LVR would make IC replay POP Sentence. If user presses OKY and LVR is operating, IC would replay the first Sentence.

5.4.6 Setting LVR Voltage

When the VDD voltage is lower than the selected LVR voltage, IC will reset. The LVR voltage setting is only available for NY3PxxxJ series which provides 4 different kinds of LVR voltage, the default is 1.5V.

1	*2*	*3*	*4*
1.8V	1.7V	1.6V	1.5V

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When LVR voltage is not 1.8V, it must work with Q-Writer 3.10 or above version. Otherwise, the setting will fail.***

5.4.7 PWM Anti-Noise Parameter

NY3PxxxJ can reduce noise by adjusting PWM Anti-Noise Parameter. When the surrounding noise is too large and the sound has obvious noise, user can choose the different anti-noise degree to decrease the noise. But it may affect the output voice quality slightly. The lower the anti-noise value, the worse the sound quality. The PWM Anti-Noise Parameter setting is only available for NY3PxxxJ series which provides 3 different parameters, the default is 0dB.

1	*2*	*3*
0dB	-3dB	-6dB

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When PWM Anti-Noise Parameter voltage is not the default value 0dB, it must work with Q-Writer 3.60 or above version. Otherwise, the setting will fail.***

5.4.8 Setting Power-On-Play (POP)

“POP Sentence” would be played one time as the power is turned on.

If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won't stop until user sets other options and play the specified sentence immediately.

Note: When POP is set as "Enable", user could specify the sections on Sentence tab.

5.4.9 Setting Power-On-Loop

The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects "Enable" and IC is powered on, IC will play POP Sentence repeatedly.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

5.4.10 Setting Power-On-Play Interrupt (POP Interrupt)

The settings of Power-On-Play Interrupt will decide whether interrupt POP. When user selects "Enable", the Trigger button could interrupt POP Sentence immediately.

Note: This setting could be enabled only when user set Power-On-Play first.

5.4.11 Setting Anti-Noise Debounce

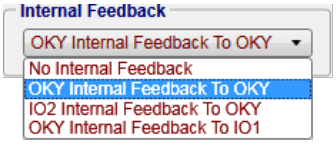
The setting of Anti-Noise Debounce can avoid triggering repeatedly or inadvertent trigger that are caused by noises. When the button is pressed and held, the noise will cause the input signals to be level low temporarily. But this setting will start counting Debounce time, and IC will ignore the variation of signals for achieving the purpose of filtering noise and avoiding unnecessary repeated trigger.

When the button is released, the input signals will present as level low. Only after the Debounce time can IC receive the next trigger.

Note: After activating Anti-Noise Debounce, Q-Speech will switch Debounce time on Long.

5.4.12 Selecting Internal Feedback

Internal Feedback is a particular application for OKY/IO2. When sentences end or stop, "Stop – High Pulse" would trigger Internal Feedback Path of OKY/IO2 automatically, and play the sentences again.



5.4.13 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.

For more details describing the trigger modes, please see NY3C Data Sheet.

5.4.14 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

5.4.15 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY3C series there are 4 input type options for different applications.

Option	Input Type Description
CDS + 1.5M	Normal selection for button trigger. 1.5MΩ pull-low resistance when button is pressed, and 300KΩ+1.5MΩ (parallel) pull-low resistance when button is released.
CDS	Internal 300KΩ pull-low resistance, usually for photo-resistor trigger. 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.

5.4.16 Selecting OKY Trigger Function

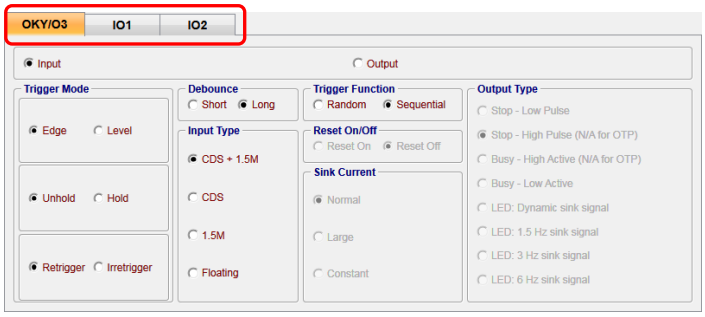
The OKY Trigger Function allows users to set the IC to play sentences in a sequential or random manner for two consecutive triggers applied to OKY pin. When sequential trigger function is selected, the IC will play the “next” sentence whereas a random sentence will be played when random trigger function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

5.4.17 Setting 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 another 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.

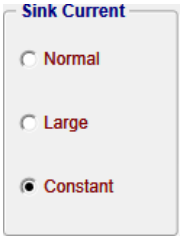
5.4.18 Setting Functions of IO1 and IO2



To set functions of IO1 and IO2, user must switch to their own setting page by selecting tabs around the OKY/O3 tab.

Input functions of IO1 and IO2 are similar to which of OKY, whereas OKY can be set as random mode but IO1 and IO2 can't be. Besides, when under sequential mode, OKY sequence can be reset by another trigger but IO1 and IO2 can't be.

5.4.19 Selecting Sink Current



When OKY1/O3, IO1 or IO2 is set as Sink output, user can specify one kind of Sink current. The following are the available Sink current type options:

1. Normal Sink Current.
2. Large Sink Current.
3. Constant Sink Current.

5.4.20 Selecting Output Type

When OKY1/O3, IO1 or IO2 is set as output, user can specify a status signal as the output signal. The following are the available output type options:

Table 5.4.20 – NY3C Output Type

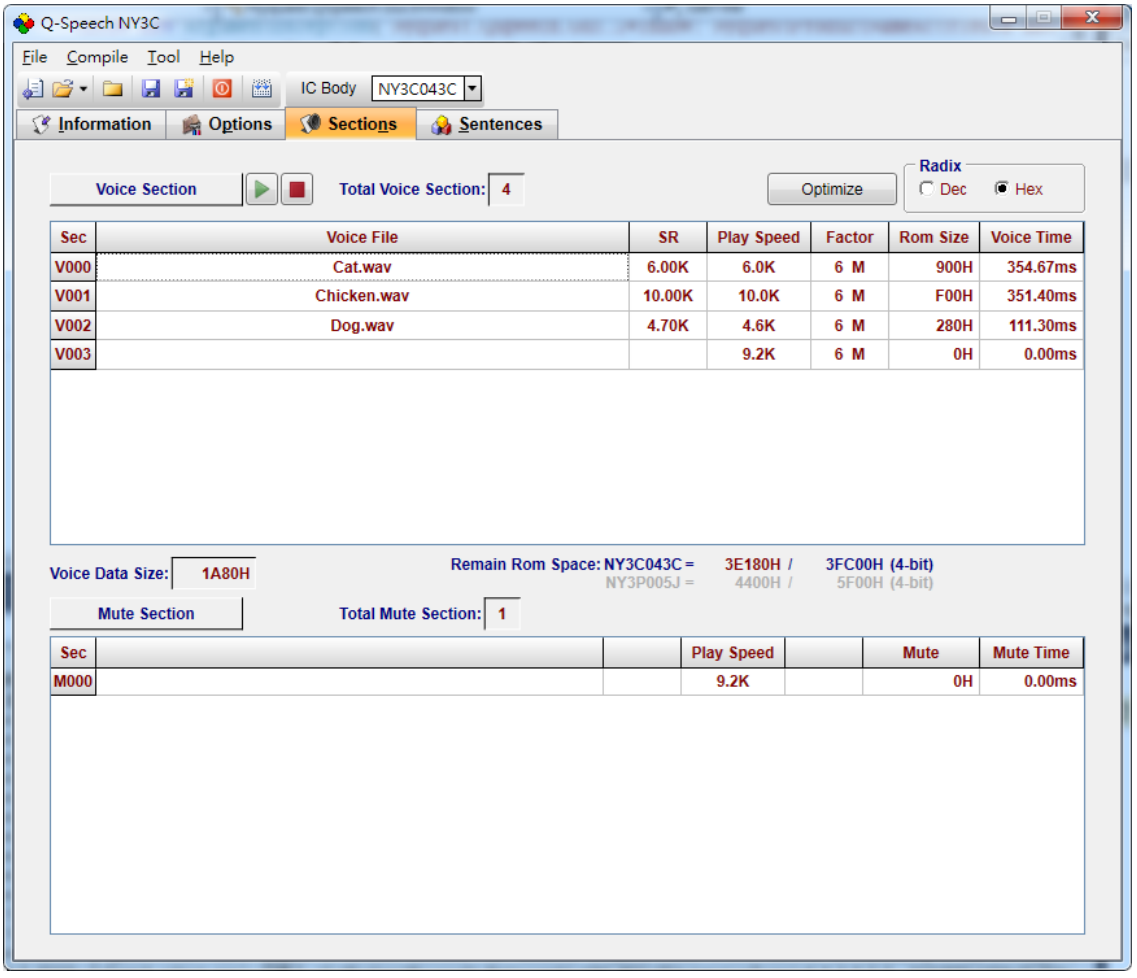
Option	Output Type Description
Stop – Low Pulse	Low pulse signal output when stop playing.
Stop – High Pulse	High pulse signal output when stop playing. **This option doesn't support OTP IC.**
Busy – High Active	High active signal output during playing. **This option doesn't support OTP IC.**
Busy – Low Active	Low active signal output during playing.
LED: Dynamic	Dynamic sink signal output for driving LED.
LED: 1.5 Hz	1.50Hz (@6 KHz) sink signal output for driving LED.
LED: 3 Hz	3.00Hz (@6 KHz) sink signal output for driving LED.
LED: 6 Hz	6.00Hz (@6 KHz) sink signal output for driving LED.

The actual flashing rates for LED 1.5 Hz, LED 3 Hz and LED 6 Hz options are positive relative to the

Play Speed of sections. Only when the Play Speed is 6 KHz, are their flashing rates equal to the settings on Options page (1.5 Hz, 3 Hz and 6 Hz).

5.5 Managing the Sections

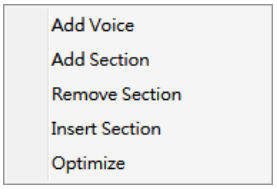
User can use the Sections page to include and manage the sections for a project. For NY3C, there are two kinds of sections: Voice Section and Mute Section. A section contains a voice file whereas a mute section contains only the mute length without voice file, and it allows total 1000 sections of section and mute section altogether. The upper part of the page is for editing sections whereas the lower part of the page is for editing mute sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.



5.5.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V499 (totally 500 sections) while which of mute sections are from M000 to M499 for NY3C.

5.5.2 Voice File Column



Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY3C only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting/optimizing Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

5.5.3 SR Column

SR stands for the sample rate of the voice file.

5.5.4 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a section here. There are 28 kinds of Play Speed available, and each section can be given a unique Play Speed.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
24.0 KHz	20.0 KHz	17.1 KHz	15.0 KHz	13.3 KHz	12.0 KHz	10.9 KHz	10.0 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
9.2 KHz	8.6 KHz	8.0 KHz	7.5 KHz	7.1 KHz	6.7 KHz	6.3 KHz	6.0 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
5.7 KHz	5.5 KHz	5.2 KHz	5.0 KHz	4.8 KHz	4.6 KHz	4.4 KHz	4.3 KHz
25	*26*	*27*	*28*				
4.1 KHz	4.0 KHz	3.9 KHz	3.8 KHz				

5.5.5 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 13 Factors, which from '1' to '12' are compressed while PCM is uncompressed. Normally, a bigger Factor will lead to bigger ROM Size but better quality after compression. The default Factor is '6'.

Factor	Comment
PCM	Ultra high sound quality, but largest ROM Size.
12 H	The best compressed sound quality.
…	…
6 M	Middle sound quality (default).

Factor	Comment
…	…
1 L	Very low sound quality, but smallest ROM Size.

5.5.6 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected not only by the quality factor, but also by the features of different IC series. For NY3C, the ROM Size for every section must be the multiple of 80H. In most cases, when the data ROM size is less than the multiple of 80H, the voice encoder will automatically adjust the compressed data to fit the multiple of 80H.

Table 5.5.6 – The maximum limits imposed by NY3C Series ICs

Body	MaxV	MaxM	Max Total
NY3P005J	5F00H	7FF80H	5F00H
NY3P010J	11F00H	7FF80H	11F00H
NY3P016C	1DF00H	7FF80H	1DF00H
NY3P016J	1DF00H	7FF80H	1DF00H
NY3P035C	3DF00H	7FF80H	3DF00H
NY3P035J	3DF00H	7FF80H	3DF00H
NY3P065C	7DF00H	7FF80H	7DF00H
NY3P065J	7DF00H	7FF80H	7DF00H
NY3P087C	A1F00H	7FF80H	A1F00H
NY3P087J	A1F00H	7FF80H	A1F00H
NY3P115C	DDF00H	7FF80H	DDF00H
NY3P115J	DDF00H	7FF80H	DDF00H
NY3C003C	5C00H	7FF80H	5C00H
NY3C005C	7C00H	7FF80H	7C00H
NY3C007C	BC00H	7FF80H	BC00H
NY3C010C	FC00H	7FF80H	FC00H
NY3C016C	17C00H	7FF80H	17C00H
NY3C021C	1FC00H	7FF80H	1FC00H
NY3C027C	27C00H	7FF80H	27C00H
NY3C035C	37C00H	7FF80H	37C00H
NY3C043C	3FC00H	7FF80H	3FC00H
NY3C054C	4FC00H	7FF80H	4FC00H
NY3C065C	5FC00H	7FF80H	5FC00H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section.
- **MaxM** column shows the maximum value of the mute data when the 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.

5.5.7 Voice Time Column

The Voice Time Column shows the voice playing time estimated by Q-Speech. Voice time varies depending on Play Speed, so changing the Play Speed on Options page may lead to change of voice time.

5.5.8 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY3C must be the multiple of 80H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 80H whereas pressing the Down button makes the mute data decrease by 80H.

5.5.9 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

5.5.10 Radix

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

5.5.11 Total Voice Section & Total Mute Section

The Voice Section Count and Mute Section Count above section table and mute section table respectively show the total number of valid sections and mute sections.

5.5.12 Voice Data Size & Remain ROM Space

Voice Data Size shows the sum of all used voice length, while Remain ROM Space shows the remainder of total ROM Size, which is displayed to the right of slash (“/”). Please see **Table 5.5.6** for more details.

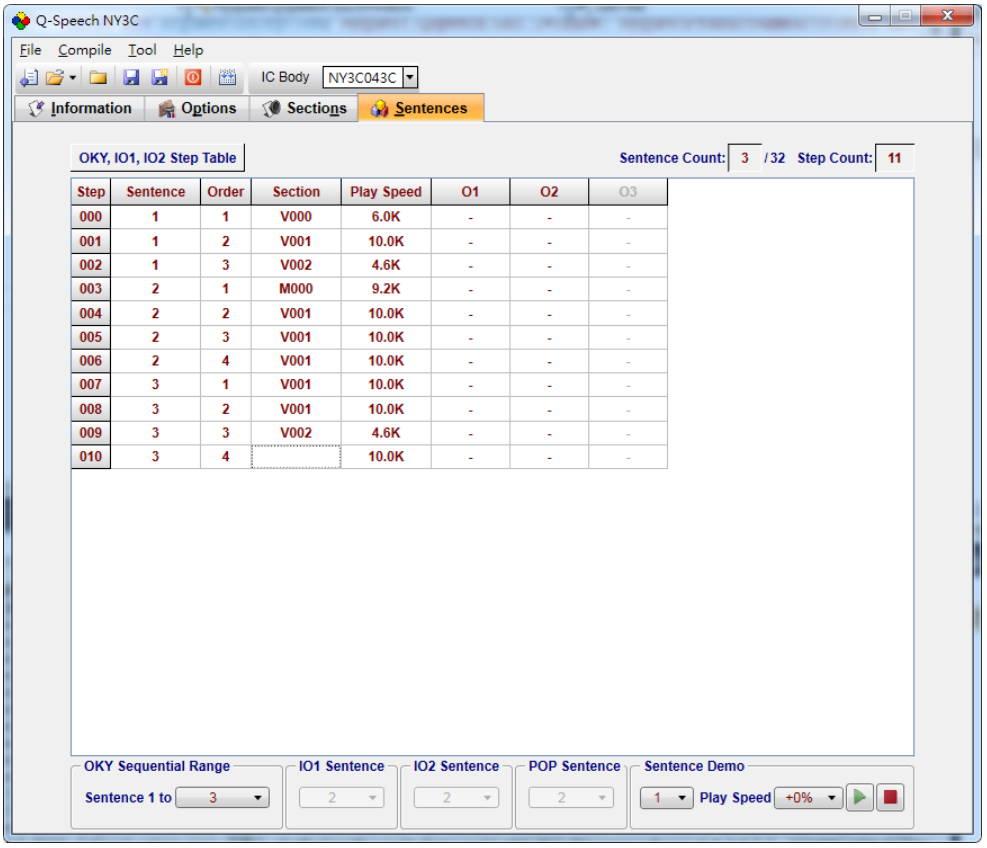
5.5.13 Right-click Menu

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

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections. **(This function doesn't support mute sections.)**.
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.
Optimize	Automatically adjust the compression ratio of the section with using the full capacity as objective.

5.6 Arranging the Sentences

A "sentence" means a combination of sections to be played when triggered. For NY3C, there are 32 sentences available under the limit of total 892 steps.



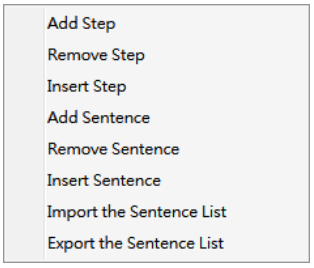
5.6.1 Step Column

For NY3C there are totally 892 (0 to 891) 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.

Note: For data ROM is shared by Voice Sections and Sentences, the steps available for arranging sentences may actually less than 896. In other words, the more space occupied by sections the less space left for sentence steps, and vice versa.

5.6.2 Sentence Column

The Sentence Column shows the sentence numbers the steps belong to. For NY3C, there are total 32 (1 to 32) sentences available. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / import / export a step or sentence, right-clicking on the desired Step or Sentence Column, then select the actions in the pop-up menu.



5.6.3 Order Column

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, step 1 will be played first, followed by step 2 and step 3. *Q-Speech* will automatically generate the sequence numbers for all the steps in a sentence in ascending order.

5.6.4 Section Column

Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

5.6.5 Play Speed

Play Speed means the speed (samples per second) that IC plays a section here. There are 28 kinds of Play Speed available, and each section can be given a unique Play Speed. Please see **5.5.4 Play Speed Column**.

5.6.6 O1/ O2 / O3 Column

When IO1 / IO2 / IO3 is set as output on Options page, the O1 / O2 / O3 steps in step table must be specified to implement IC's output function. There are 9 kinds of output options available in NY3C, which includes 8 kinds of regular options (see **Table 5.4.20** for details) and 1 user-defined output signal, whereas Q1 and Q2 are available only when the voice is in *Quick-IO* format (.nyq), but not support Q3 as output. .

The flashing rate for LED 1.5 Hz, LED 3 Hz and LED 6 Hz option is positive relative to the Play Speed selected on the Options page. Only when the Play Speed is 6 KHz, is its flashing rate equal to the option.

5.6.7 OKY Sequential Range

When the OKY Trigger Function is sequential, the Sequential Range means it will loop sentences in

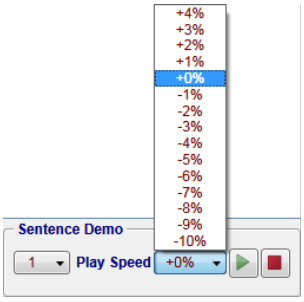
the range by triggering OKY. For example, if this range is 4, triggering OKY repeatedly will play sentences 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, and so on. When the OKY Trigger Function is random, the Random Range means the range of random selection for the next executing sentence. In other words, if 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.

5.6.8 IO1 / IO2 / POP Sentence

IO1 / IO2 Sentence or POP Sentence is available only when IO1 or IO2 is set as input or POP is enabled on Options page. User can 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. IO1 and IO2 Sentence must be restricted as 30th and 31st if the number of defined sentences exceeds 30. IO1 / IO2 / POP Sentence must be restricted as 30th, 31st and 32nd respectively if the number of defined sentences exceeds 31.

5.6.9 Sentence Demo

Select any Sentence, and it could be auditioned by using the Media Player (). Users also can adjust the Play Speed of sentence. However, the adjustment will not have any effect on BIN file and Demo Board. It's just a demonstration function on PC.



5.6.10 Right-click Menu

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

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

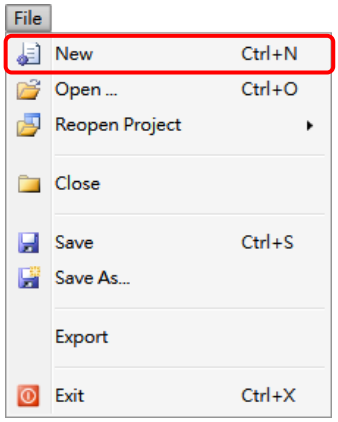
6 Using *Q-Speech* for NY3D Series

In this chapter, the details of using *Q-Speech* for NY3D will be presented step by step.

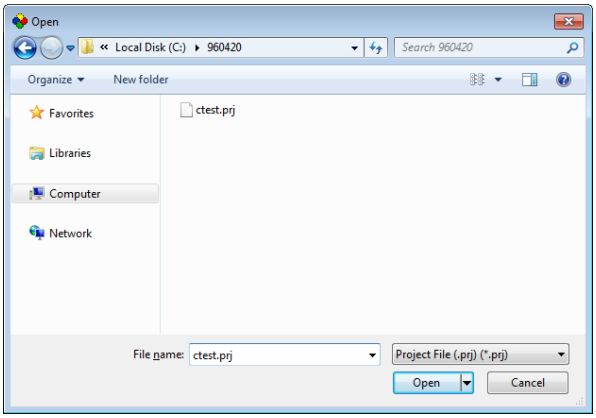
Contents:

6.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY3D, a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

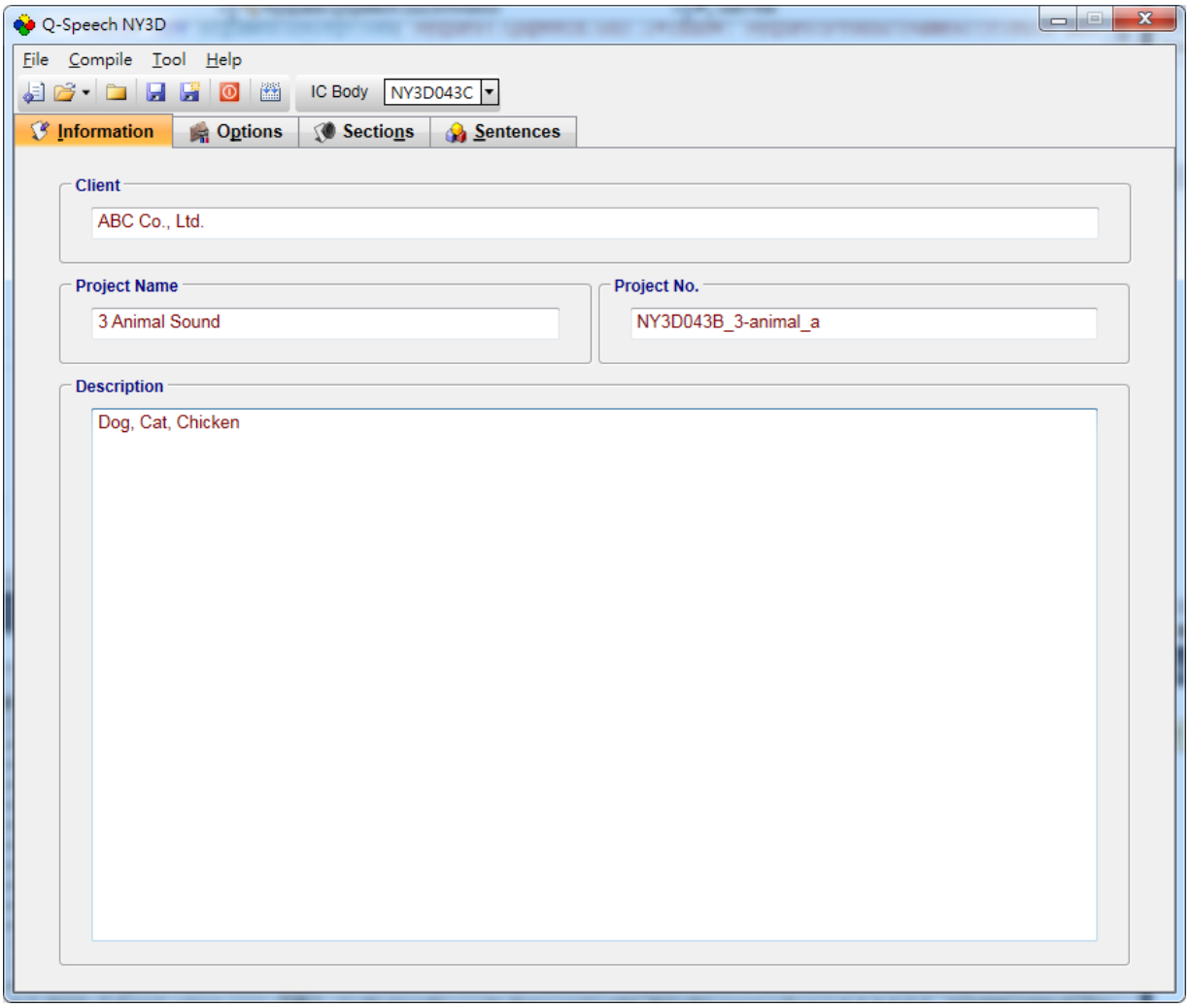


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



6.2 Filling in the Information

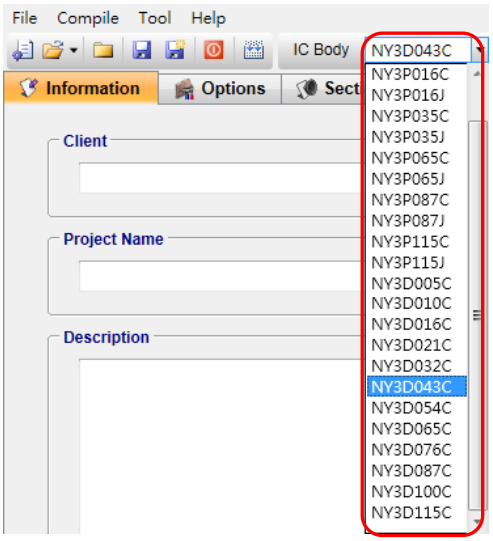
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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.

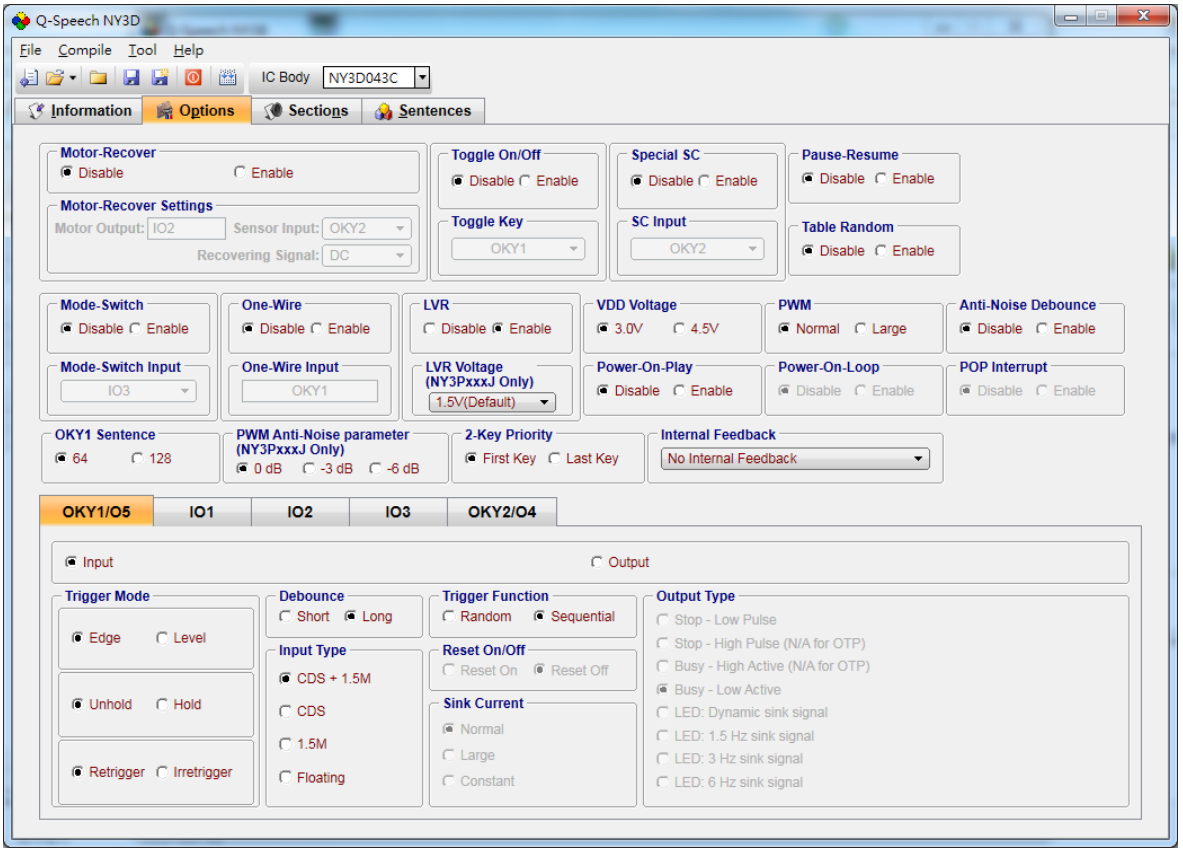
6.3 Selecting the IC Body

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



6.4 Selecting the Options

By selecting different options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Input Type, Trigger Mode, etc, could be set easily on this page.



6.4.1 Motor-Recover

Motor-Recover option allows user to enable (or disable) the special application for motor recovering.

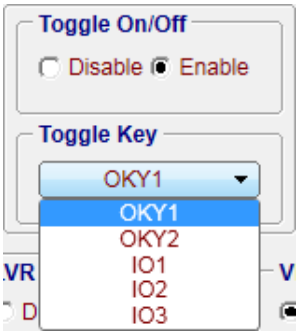
6.4.2 Motor-Recover Settings

When Motor-Recover function is enabled, IO2 will be fixed as motor output.

- Sensor Input: This option is to set an input pin as motor recovering sensor, which detects if the motor is back to initial status. User can specify OKY2 or IO3 as the sensor.
- Recovering Signal: There are 3 kinds of signal, which are DC, 6 Hz and 12 Hz, available for motor recovering signal.

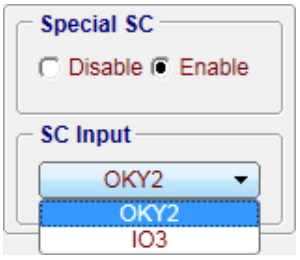
6.4.3 Setting Toggle On/Off

The Toggle On/Off function allows users to immediately stop the voice playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To use this function, the specific trigger must be set to Unhold and Retrigger. Then switched it to “Enable”, and specify the key in “Toggle Key” column. Please note there is only one key available for Toggle On/Off function, although all 5 keys could be set as input trigger.



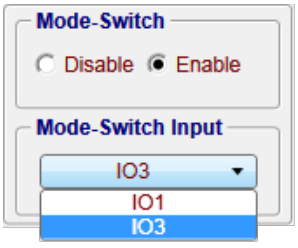
6.4.4 Selecting Special SC

The Special SC (Sound Control) function could play voice files by triggering OKY2 or IO3 through sound-control input. And when using sound-control to trigger IC for playing voice, the voice would be interrupted if user triggers other keys. But when IC is playing voice, the sound-control input couldn’t be triggered to interrupt the voice playing. This function is used to achieve sound-control and key-control in one module, and then sound-control won’t interrupt the key switching.



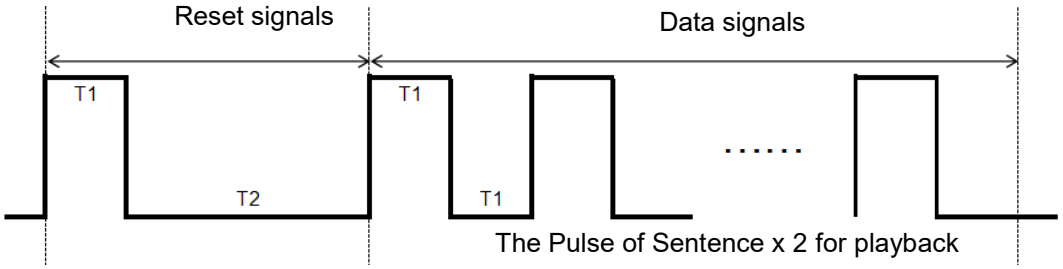
6.4.5 Selecting Mode-Switch

Mode-Switch enables inputs to have 2 kinds of functions with the same key. IO3 can be set as Switch Pin, and then IO3 connecting can be switched between GND (the 1st Mode) and VDD (the 2nd Mode) to realize Mode-Switching. Although input functions can be different between modes, the output functions (current & connected type) must be the same between modes.



6.4.6 One-Wire

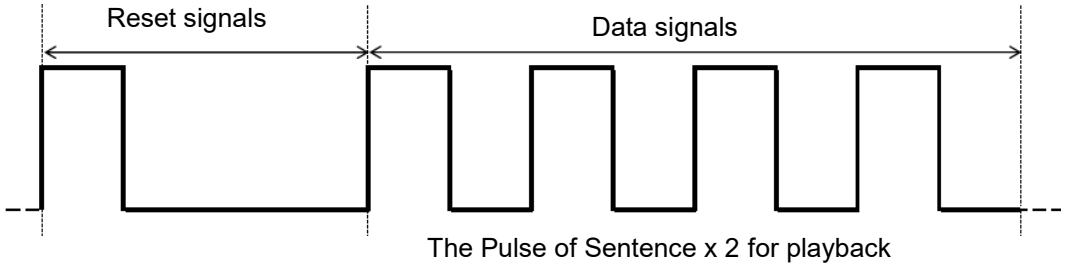
The One-Wire option provides the one-wire communication for the main control MCU and NY3 series. When NY3 receives the triggered signals, it will play the corresponding voice section. Please note that the available amount of Sentence will be halved. The coummnication protocol for controlling NY3 is shown below which can be divided into the reset signals and data signal.



The supported range for the trigger period.

Time	Min.	Typ.	Max.
T1	50us	100us	250us
T2	1,200us	1,500us	1,800us

Example. Play the voice of Sentence 2.



6.4.7 Selecting 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.

6.4.8 Setting PWM Output

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

6.4.9 Anti-Noise Debounce

The setting of Anti-Noise Debounce can avoid triggering repeatedly or inadvertent trigger that are caused by noises. When the button is pressed and held, the noise will cause the input signals to be level low temporarily. But this setting will start counting Debounce time, and IC will ignore the variation of signals for achieving the purpose of filtering noise and avoiding unnecessary repeated

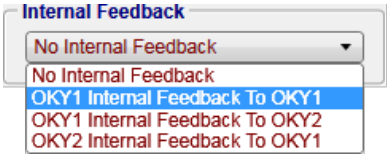
trigger.

When the button is released, the input signals will present as level low. Only after the Debounce time can IC receive the next trigger.

Note: After activating Anti-Noise Debounce, Q-Speech will switch Debounce time on Long.

6.4.10 Selecting Internal Feedback

Internal Feedback is a particular application for OKY1/OKY2. When sentences end or stop, “Stop – High Pulse” would trigger Internal Feedback Path of OKY1/OKY2 automatically, and play the sentences again.



6.4.11 Setting Power-On-Play (POP)

“POP Sentence” would be played one time as the power is turned on.

If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won’t stop until user sets other options and play the specified sentence immediately.

Note: When POP is set as “Enable”, user could specify the sections on Sentence tab.

6.4.12 Setting Power-On-Loop

The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects “Enable” and IC is powered on, IC will play POP Sentence repeatedly.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

6.4.13 Power-On-Play Interrupt (POP Interrupt)

The settings of Power-On-Play Interrupt will decide whether interrupt POP. When user selects “Enable”, the Trigger key could interrupt POP Sentence immediately.

Note: This setting could be enabled only when user set Power-On-Play first.

6.4.14 2-Key Priority

The 2-Key Priority function could decide the priority of the pressed 2 keys, “First Key” means the first key has priority, “Last Key” means the later key has priority. But “Last Key” only supports OKY1 and OKY2.

6.4.15 Pause-Resume

When user enables the Pause-Resume function and triggers OKY1 to play sentence, the playing sentence would be paused as user presses OKY1; when user presses OKY1 again, the song would be continued to play the rest part.

6.4.16 Table Random

When user enables the Table Random function and triggers OKY1 to play sentence at the first time, one sentence would be played from OKY1 Step Table randomly. For the later triggers, the sentences after last triggered sentence will be played sequentially.

Note: If executes the Table Random and Mode-Switch function simultaneously, the OKY Random Range of Sentences and Sentences (2nd Mode) have to be the same setting.

6.4.17 Selecting OKY1 Sentence

The maximum of selected OKY1 voice sentences are up to 64 or 128. When selecting 128 sentences, OKY2 can only be output. With more sentences cooperating with Table Random function, the more random sequence combination can be arranged.

6.4.18 Selecting Low-Voltage-Reset (LVR)

When VDD voltage is lower than 1.7V in transient, IC would reset automatically. The default setting of LVR function is “Enable”. If users don’t use this function, please set as “Disable”.

Note: If user already sets POP function, the LVR would make IC replay POP Sentence. If user presses OKY and LVR is operating, IC would replay the first Sentence.

6.4.19 Setting LVR Voltage

When the VDD voltage is lower than the selected LVR voltage, IC will reset. The LVR voltage setting is only available for NY3PxxxJ series which provides 4 different kinds of LVR voltage, the default is 1.5V.

1	*2*	*3*	*4*
1.8V	1.7V	1.6V	1.5V

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When LVR voltage is not 1.8V, it must work with Q-Writer 3.10 or above version. Otherwise, the setting will fail.***

6.4.20 PWM Anti-Noise Parameter

NY3PxxxJ can reduce noise by adjusting PWM Anti-Noise Parameter. When the surrounding noise is too large and the sound has obvious noise, user can choose the different anti-noise degree to decrease the noise. But it may affect the output voice quality slightly. The lower the anti-noise value, the worse the sound quality. The PWM Anti-Noise Parameter setting is only available for NY3PxxxJ series which provides 3 different parameters, the default is 0dB.

1	2	3
0dB	-3dB	-6dB

Note:

1. ***It only supports NY3PxxxJ series.***
2. ***When PWM Anti-Noise Parameter voltage is not the default value 0dB, it must work with Q-Writer 3.60 or above version. Otherwise, the setting will fail.***

6.4.21 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.

For more details describing the trigger modes, please see NY3D Data Sheet.

6.4.22 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

6.4.23 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY3D series there are 4 input type options for different applications.

Option	Input Type Description
CDS + 1.5M	Normal selection for button trigger. 1.5MΩ pull-low resistance when button is pressed, and 300KΩ+1.5MΩ (parallel) pull-low resistance when button is released.
CDS	Internal 300KΩ pull-low resistance, usually for photo-resistor trigger. 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.

Option	Input Type Description
Floating	No internal resistor connection, and is usually connected to other output pin or connected to GND by an external resistor.

6.4.24 Selecting OKY1/OKY2 Trigger Function

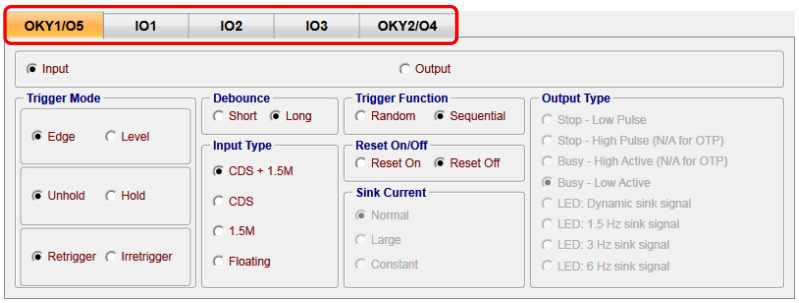
The OKY1 / OKY2 Trigger Function allows users to set the IC to play sentences in a sequential or random manner for two consecutive triggers applied to OKY1 / OKY2 pin. When sequential trigger function is selected, the IC will play the “next” sentence whereas a random sentence will be played when random trigger function is selected.

6.4.25 Selecting OKY1 / OKY2 Reset On/Off

This function is available only when the OKY1 (or OKY2) Trigger Function is sequential. When Reset is ON, the IC will reset the sentence sequential pointer once another input pin (OKY2, IO1, IO2, or IO3) is pressed. It means after another key is pressed, pressing OKY1 / OKY2 will lead to the playing of sentence 1. When Reset is OFF, the playing sequence of OKY1 /OKY2 will keep unaffected.

6.4.26 Setting Functions of IO1, IO2, IO3 and OKY2/O4

To set functions of IO1, IO2, IO3 and OKY2/O4, user must switch to their own setting page by selecting tabs around the IO1 tab.

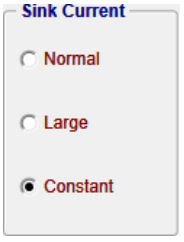


Input functions of IO1, IO2 and IO3 are similar to which of OKY1 and OKY2, whereas OKY1 and OKY2 can be set as random mode but IO1, IO2 and IO3 can’t be. Besides, when under sequential mode, OKY1 and OKY2 sequence can be reset by another trigger but IO1, IO2 and IO3 can’t be.

6.4.27 Selecting Sink Current

When OKY1/O5, IO1, IO2, IO3 or OKY2/O4 is set as Sink output, user can specify one kind of Sink current. The following are the available Sink current type options:

1. Normal Sink Current.
2. Large Sink Current.
3. Constant Sink Current.



6.4.28 Selecting Output Type

When OKY1/O5, IO1, IO2, IO3 or OKY2/O4 is set as output, user can specify a status signal as the output signal. The following are the available output type options:

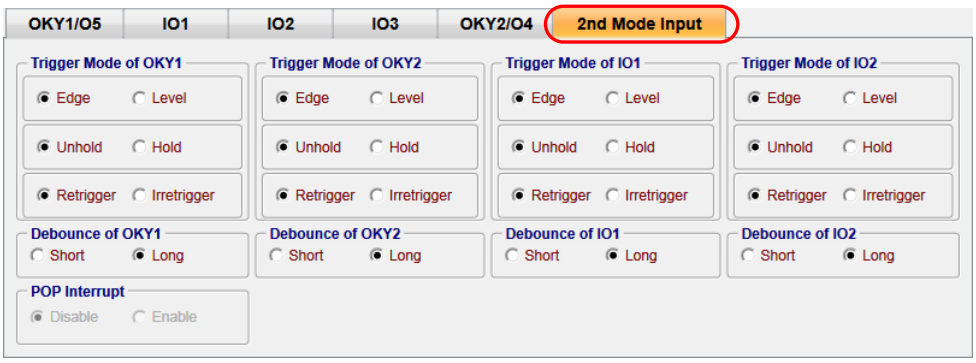
Table 6.4.28 – NY3D Output Type

Option	Output Type Description
Stop – Low Pulse	Low pulse signal output when stop playing.
Stop – High Pulse	High pulse signal output when stop playing. **This option doesn't support OTP IC.**
Busy – High Active	High active signal output during playing. **This option doesn't support OTP IC.**
Busy – Low Active	Low active signal output during playing.
LED: Dynamic	Dynamic sink signal output for driving LED.
LED: 1.5 Hz	1.50Hz (@6 KHz) sink signal output for driving LED.
LED: 3 Hz	3.00Hz (@6 KHz) sink signal output for driving LED.
LED: 6 Hz	6.00Hz (@6 KHz) sink signal output for driving LED.

The flashing rates for LED 1.5 Hz, LED 3 Hz and LED 6 Hz options are positive relative to the Play Speed of sections. Only when the Play Speed is 6 KHz, are their flashing rates equal to the settings on Options page (1.5 Hz, 3 Hz and 6 Hz).

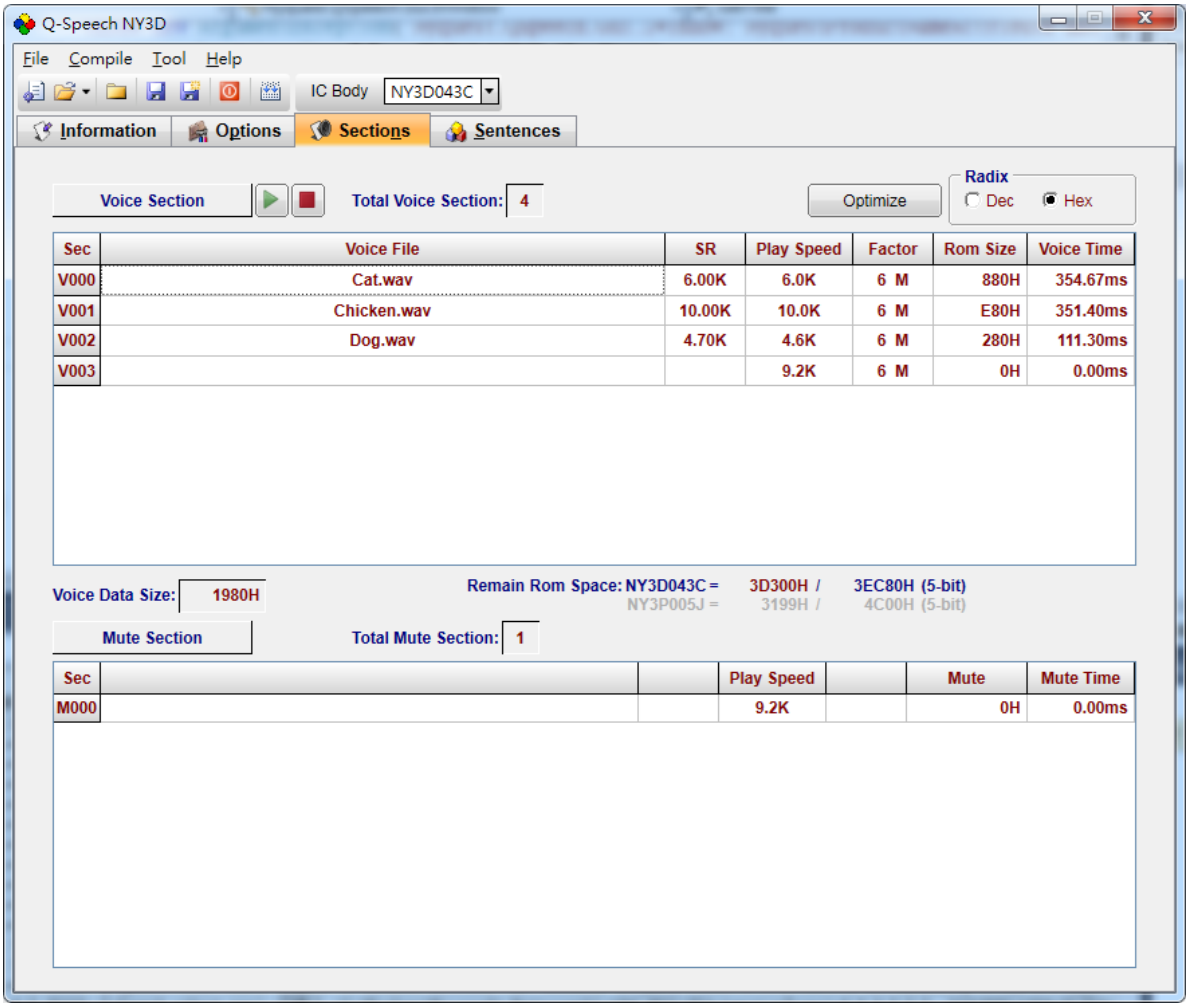
6.4.29 Selecting 2nd Mode Input

When user selects the 2nd Mode-Switch, user could set the trigger of Trigger Mode, Debounce and POP Interrupt functions in the second mode.



6.5 Managing the Sections

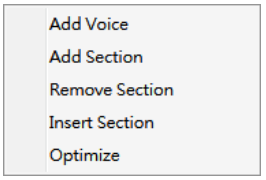
User can use the Sections page to include and manage the sections for a project. For NY3D, there are two kinds of sections: Voice Section and Mute Section. A section contains a voice file whereas a mute section contains only the mute length without voice file, and it allows total 1000 sections of section and mute section altogether. The upper part of the page is for editing sections whereas the lower part of the page is for editing mute sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.



6.5.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V499(totally 500 sections) while which of mute sections are from M000 to M499 for NY3D.

6.5.2 Voice File Column



Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY3D only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting/optimizing Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

6.5.3 SR Column

SR stands for the sample rate of the voice file.

6.5.4 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a section here. There are 28 kinds of Play Speed available, and each section can be given a unique Play Speed.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
24.0 KHz	20.0 KHz	17.1 KHz	15.0 KHz	13.3 KHz	12.0 KHz	10.9 KHz	10.0 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
9.2 KHz	8.6 KHz	8.0 KHz	7.5 KHz	7.1 KHz	6.7 KHz	6.3 KHz	6.0 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
5.7 KHz	5.5 KHz	5.2 KHz	5.0 KHz	4.8 KHz	4.6 KHz	4.4 KHz	4.3 KHz
25	*26*	*27*	*28*				
4.1 KHz	4.0 KHz	3.9 KHz	3.8 KHz				

6.5.5 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' are compressed while PCM is uncompressed. Normally, a bigger Factor will lead to bigger ROM Size but better quality after compression. The default Factor is '6'.

Factor	Comment
PCM	Ultra high sound quality, but largest ROM Size.
12 H	The best compressed sound quality.
…	…
6 M	Middle sound quality (default).
…	…

Factor	Comment
1 L	Very low sound quality, but smallest ROM Size.

6.5.6 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected not only by the quality factor, but also by the features of different IC series. For NY3D, the ROM Size for every section must be the multiple of 80H, when the data ROM size is less than the multiple of 80H, the voice encoder will automatically adjust the compressed data to fit the multiple of 80H.

Table 6.5.6 – The maximum limits imposed by NY3D Series ICs

Body	MaxV	MaxM	Max Total
NY3P005J	4C00H	FFF80H	4C00H
NY3P010J	E59AH	FFF80H	E59AH
NY3P016C	17F34H	FFF80H	17F34H
NY3P016J	17F34H	FFF80H	17F34H
NY3P035C	318CDH	FFF80H	318CDH
NY3P035J	318CDH	FFF80H	318CDH
NY3P065C	64C00H	FFF80H	64C00H
NY3P065J	64C00H	FFF80H	64C00H
NY3P087C	818CDH	FFF80H	818CDH
NY3P087J	818CDH	FFF80H	818CDH
NY3P115C	B18CDH	FFF80H	B18CDH
NY3P115J	B18CDH	FFF80H	B18CDH
NY3D005C	6C80H	FFF80H	6C80H
NY3D010C	EC80H	FFF80H	EC80H
NY3D016C	16C80H	FFF80H	16C80H
NY3D021C	1EC80H	FFF80H	1EC80H
NY3D032C	2EC80H	FFF80H	2EC80H
NY3D043C	3EC80H	FFF80H	3EC80H
NY3D054C	4EC80H	FFF80H	4EC80H
NY3D065C	5EC80H	FFF80H	5EC80H
NY3D076C	6EC80H	FFF80H	6EC80H
NY3D087C	7EC80H	FFF80H	7EC80H
NY3D100C	96C80H	FFF80H	96C80H
NY3D115C	A6C80H	FFF80H	A6C80H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section.
- **MaxM** column shows the maximum value of the mute data when the 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.

6.5.7 Voice Time Column

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

6.5.8 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY3D must be the multiple of 80H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 80H whereas pressing the Down button makes the mute data decrease by 80H.

6.5.9 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by Q-Speech. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

6.5.10 Radix

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

6.5.11 Total Voice Section & Total Mute Section

The Voice Section Count and Mute Section Count above section table and mute section table respectively show the total number of valid sections and mute sections.

6.5.12 Voice Data Size & Remain ROM Space

Voice Data Size shows the sum of all used voice length, while Remain ROM Space shows the remainder of total ROM Size, which is displayed to the right of slash (“/”). Please see **Table 6.5.6** for more details.

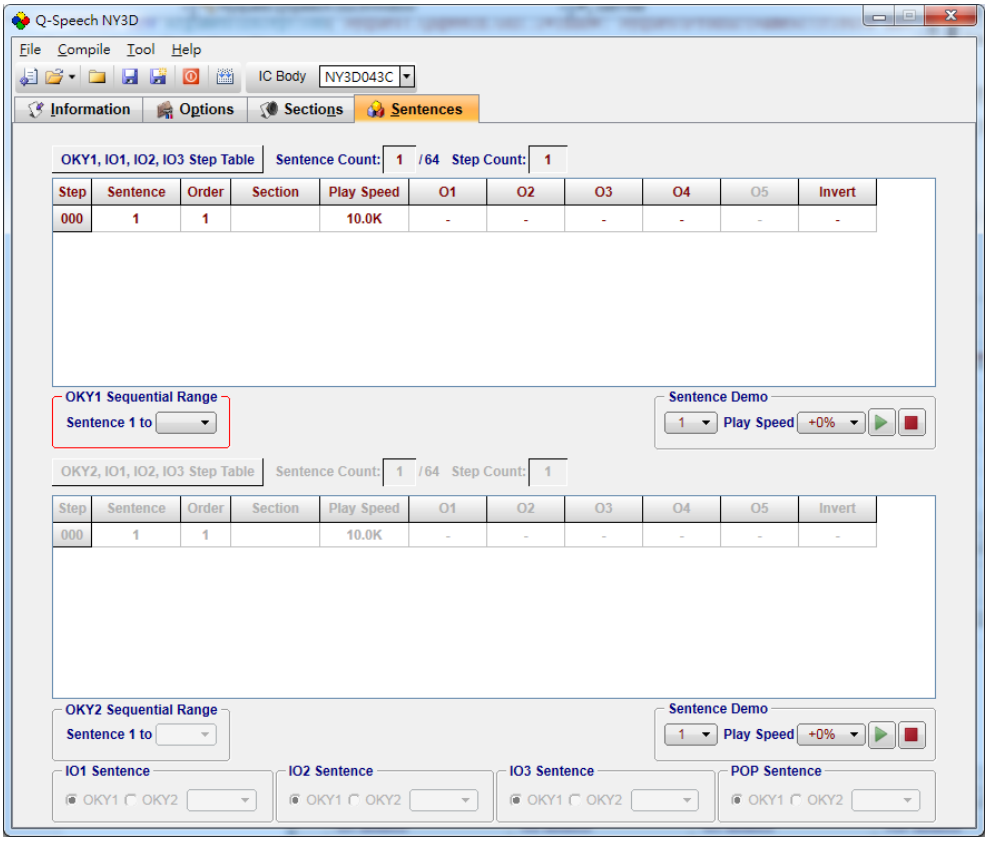
6.5.13 Right-click Menu

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

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections. **(This function doesn't support mute sections.)**
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.
Optimize	Automatically adjust the compression ratio of the section with using the full capacity as objective.

6.6 Arranging the Sentences

A "sentence" means a combination of sections to be played when triggered. For NY3D, there are 64 or 128 sentences available under the limit of total 1530 steps.



6.6.1 Step Column

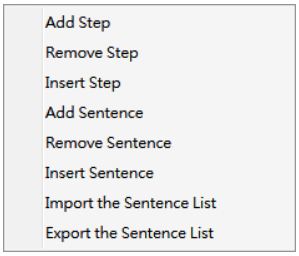
For NY3D there are totally 1530 (0 to 1529) steps that can be defined for the upper (OKY1) and the lower (OKY2 and others) step tables altogether. Every step can have a section with associated

output actions, and the sequence is defined one by one starting from Step 000. The total number of defined steps is shown beyond each step table.

Note: For data ROM is shared by Voice Sections and Sentences, the steps available for arranging sentences may actually less than 1530. In other words, the more space occupied by sections the less space left for sentence steps, and vice versa.

6.6.2 Sentence Column

The Sentence Column shows the sentence numbers the steps belong to. For NY3D, It could be 64 or 128 (1 to 64 or 128) sentences that depends on the OKY1 Sentence of Options page. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / Import / Export a step or sentence, right-clicking on the desired Step or Sentence Column, then select the actions in the pop-up menu.



6.6.3 Order Column

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, step 1 will be played first, followed by step 2 and step 3. *Q-Speech* will automatically generate the sequence numbers for all the steps in a sentence in ascending order.

6.6.4 Section Column

Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

6.6.5 Play Speed

Play Speed means the speed (samples per second) that IC plays a section here. There are 28 kinds of Play Speed available, and each section can be given a unique Play Speed. Please see **6.5.4 Speed Play Column** for details of the 28 kinds of Play Speed.

6.6.6 O1 / O2 / O3 / O4 / O5 / Invert Column

When O1, O2, O3, O4 and O5 are set as output on Options page, the O1 / O2 / O3 / O4 / O5 steps in step table must be specified to implement IC's output function. There are 9 kinds of output options available in NY3D, which includes 8 kinds of regular options (see **Table 6.4.28** for details) and 1 user-defined output signal, whereas Q1 (Q2 to Q7) is available only when the voice is in *Quick-IO* format (.nyq), but O5 couldn't be set as QIO signal of *Quick-IO* signal.

When using *Quick-IO* format (.nyq), Q1, Q2 and Q3 are in the same group, Q4, Q5 and Q6 are in another group, Q7 corresponds to O4 independently. In other words, one sentence occupies one group, when user selects O1 to correspond Q1, O2 and O3 only could be set as Q2 and Q3. Similarly, when user selects O2 to correspond Q5, O1 and O3 couldn't be set as Q1 and Q3.

The flashing rate for LED 1.5 Hz, LED 3 Hz and LED 6 Hz option is positive relative to the Play Speed selected on the Options page. Only when the Play Speed is 6 KHz, is its flashing rate equal to the option.

When Invert is selected in step, the Retrigger/Irretrigger mode will be inverted. User can insert Invert in suitable steps to change trigger mode according to application requirement.

6.6.7 OKY1 / OKY2 Sequential (or Random) Range

When the OKY1 / OKY2 Trigger Function is sequential, the Sequential Range means it will loop sentences in the range by triggering OKY1 / OKY2. For example, if this range is 4, triggering OKY1 / OKY2 repeatedly will play sentences 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, and so on. When the OKY1 / OKY2 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 OKY1 / OKY2 trigger will lead to the execution of a random sentence in the range from sentence 1 to sentence 4.

6.6.8 IO1 / IO2 / IO3 / POP Sentence

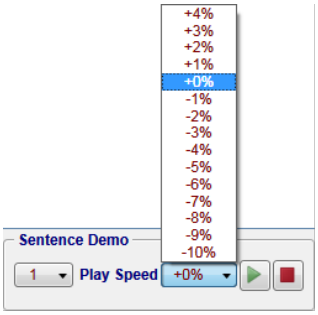
IO1 / IO2 / IO3 Sentence or POP Sentence is available only when IO1 / IO2 / IO3 is set as input or POP is enabled on Options page.

When user executes IO / POP Sentence by selecting 128 sentences of OKY1 Step Table, and the sentences are under 124, IO1 / IO2 / IO3 / POP Sentence could be specified to play any sentence. If the sum of sentences exceeds 124, IO1 Sentence will be restricted as the 125th sentenc. If the sum of sentences exceeds 125, IO1 Sentence and IO2 Sentence will be restriced as the 125th and 126th sentence. But if the sum of sentences exceeds 127, IO1 Sentence, IO2 Sentence, IO3 Sentence and POP Sentence must be restrict to the 125th, 126th, 127th and 128th sentence respectively.

When user executes IO / POP Sentence by selecting sentences of OKY2 Step Table, and the sentences are under 60, IO1 / IO2 / IO3 / POP Sentence could be specified to play any sentence. If the sum of sentences exceeds 60, IO1 Sentence will be restriced as the 61st sentence. If the sum of sentences exceeds 61, IO1 Sentence and IO2 Sentence wil be restricted as the 61stand 62nd sentence. If the sum of sentences exceeds 62, IO1 Sentence, IO2 Sentence and IO3 Sentence wil be restricted as the 61^{s,} 62nd and 63rd sentence. But if the sum of sentences exceeds 63, IO1 Sentence, IO2 Sentence, IO3 Sentence and POP Sentence must be restrict to the 61st, 62nd, 63rd and 64th sentence respectively.

6.6.9 Sentence Demo

Select any Sentence, and it could be auditioned by using the Media Player ( ). Users also can adjust the Play Speed of sentence. However, the adjustment will not have any effect on BIN file and Demo Board. It's just a demonstration function on PC.



6.6.10 Right-click Menu

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

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

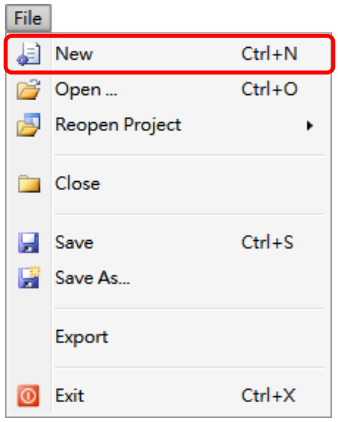
7 Using *Q-Speech* for NY3P(D) Series

In this chapter, the details of using *Q-Speech* for NY3P(D) will be presented step by step.

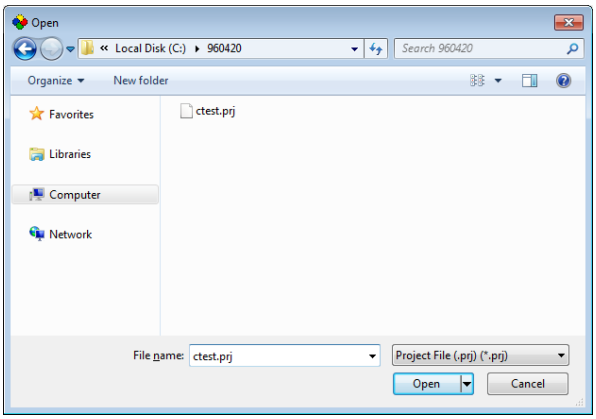
Contents:

7.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY3P(D), a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

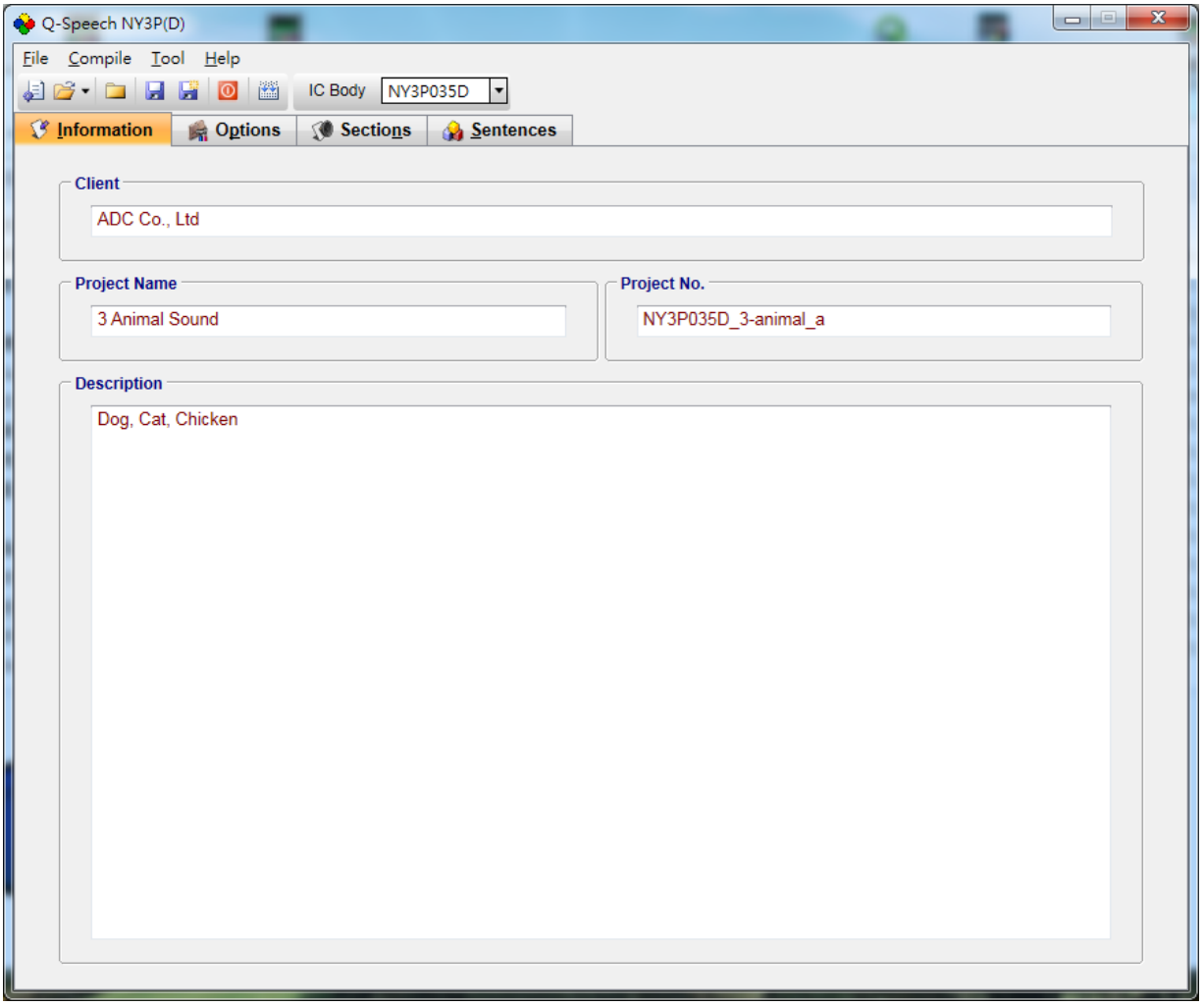


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



7.2 Filling in the Information

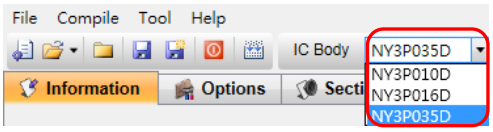
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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.

7.3 Selecting the IC Body

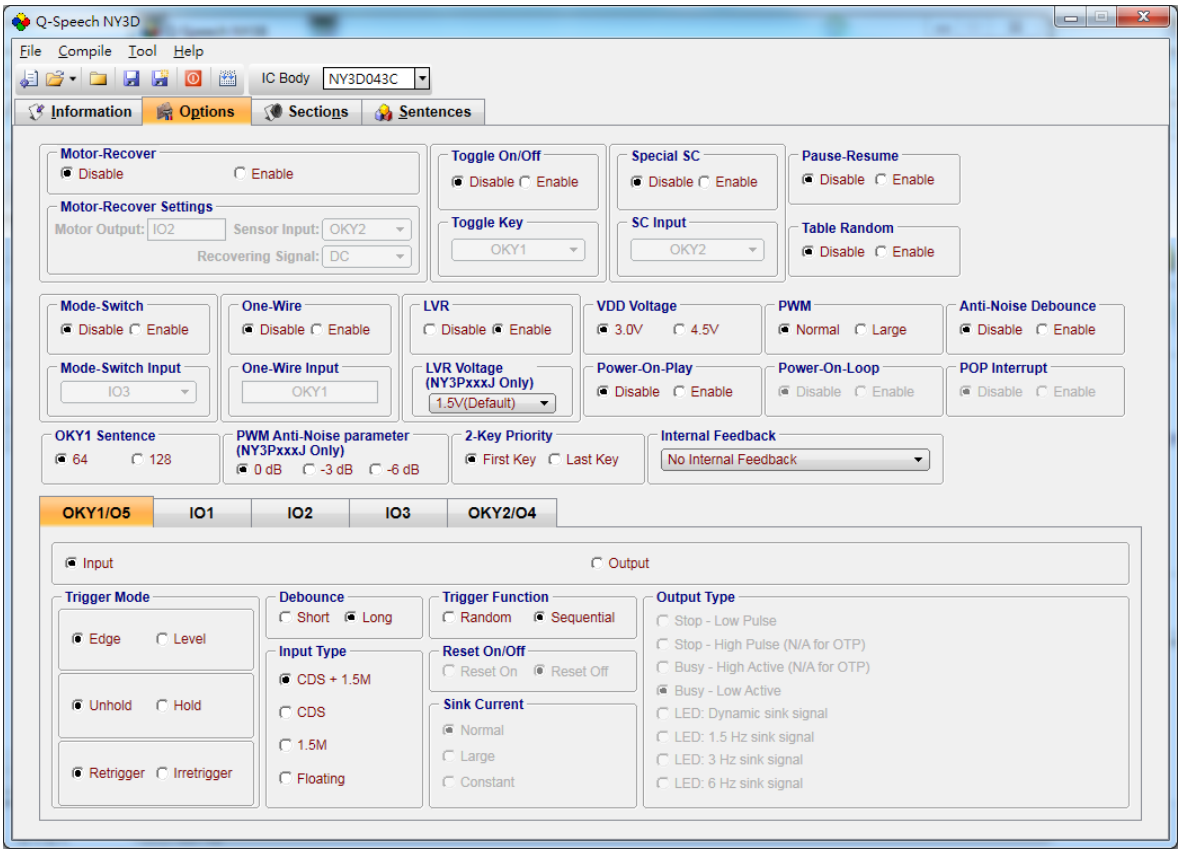
A drop-down list named [IC Body] can be found at the top of the window. By clicking the Down button of the drop-down list, all available IC bodies will be listed for selection. IC body



could be changed during editing a project, but an error message may display if the total ROM Size of current sections exceeds the capacity of selected IC body.

7.4 Selecting the Options

By selecting different options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Input Type, Trigger Mode, etc, could be set easily on this page.



7.4.1 Motor-Recover

Motor-Recover option allows user to enable (or disable) the special application for motor recovering.

7.4.2 Motor-Recover Settings

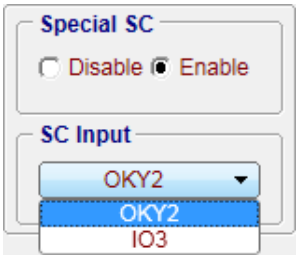
When Motor-Recover function is enabled, IO2 will be fixed as motor-recover output. When OKY2 is set as the detection pin of motor recove, it will detect whether the motor is reset to the initial position or not.

- Sensor Input: This option is to set an input pin as motor recovering sensor, which detects if the motor is back to initial status. User can specify OKY2 or IO3 as the sensor.
- Recovering Signal: There are 3 kinds of signal, which are DC, 6 Hz and 12 Hz, available for motor

recovering signal.

7.4.3 Setting Toggle On/Off

The Toggle On/Off function allows users to immediately stop the voice playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To use this function, the specific trigger must be set to Unhold and Retrigger. Then switched it to “Enable”, and specify the key in “Toggle Key” column. Please note there is only one key available for Toggle On/Off function, although all 5 keys could be set as input trigger.

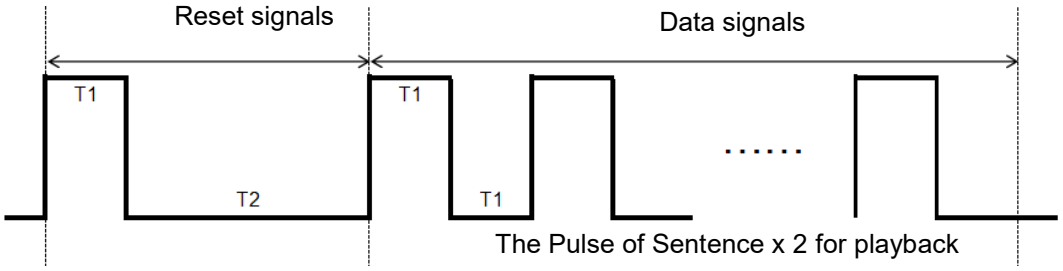


7.4.4 Selecting Special SC

The Special SC (Sound Control) function could play voice files by triggering OKY2 through sound-control input. And when using sound-control to trigger IC for playing voice, the voice would be interrupted if user triggers other keys. But when IC is playing voice, the sound-control input couldn’t be triggered to interrupt the voice playing. This function is used to achieve sound-control and key-control in one module, and then sound-control won’t interrupt the key switching.

7.4.5 One-Wire

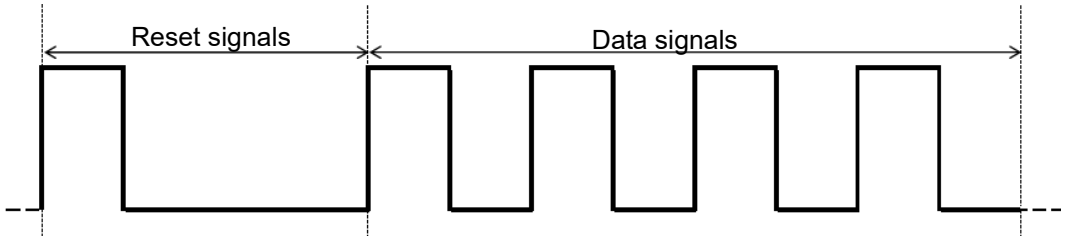
The One-Wire option provides the one-wire communication for the main control MCU and NY3 series. When NY3 receives the triggered signals, it will play the corresponding voice section. Please note that the available amount of Sentence will be halved. The coummnication protocol for controlling NY3 is shown below which can be divided into the reset signals and data signal.



The supported range for the trigger period.

Time	Min.	Typ.	Max.
T1	50us	100us	250us
T2	1,200us	1,500us	1,800us

Example. Play the voice of Sentence 2.



The Pulse of Sentence x 2 for playback

7.4.6 Selecting 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.

7.4.7 Setting PWM Output

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

7.4.8 Anti-Noise Debounce

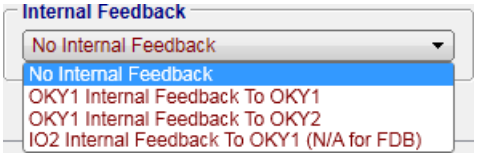
The setting of Anti-Noise Debounce can avoid triggering repeatedly or inadvertent trigger that are caused by noises. When the button is pressed and held, the noise will cause the input signals to be level low temporarily. But this setting will start counting Debounce time, and IC will ignore the variation of signals for achieving the purpose of filtering noise and avoiding unnecessary repeated trigger.

When the button is released, the input signals will present as level low. Only after the Debounce time can IC receive the next trigger.

Note: After activating Anti-Noise Debounce, Q-Speech will switch Debounce time on Long.

7.4.9 Selecting Internal Feedback

Internal Feedback is a particular application for OKY1/OKY2. When sentences end or stop, “Stop – High Pulse” would trigger Internal Feedback Path of OKY1/OKY2 automatically, and play the sentences again.



7.4.10 Setting Power-On-Play (POP)

“POP Sentence” would be played one time as the power is turned on.

If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won’t stop until user sets other options and play the specified sentence immediately.

Note: When POP is set as “Enable”, user could specify the sections on Sentence tab.

7.4.11 Setting Power-On-Loop

The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects “Enable” and IC is powered on, IC will play POP Sentence repeatedly.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

7.4.12 Power-On-Play Interrupt (POP Interrupt)

The settings of Power-On-Play Interrupt will decide whether interrupt POP. When user selects “Enable”, the Trigger key could interrupt POP Sentence immediately.

Note: This setting could be enabled only when user set Power-On-Play first.

7.4.13 2-Key Priority

The 2-Key Priority function could decide the priority of the pressed 2 keys, “First Key” means the first key has priority, “Last Key” means the later key has priority. But “Last Key” only supports OKY1 and OKY2.

7.4.14 Pause-Resume

When user enables the Pause-Resume function and triggers OKY1 to play sentence, the playing sentence would be paused as user presses OKY1; when user presses OKY1 again, the song would be continued to play the rest part.

7.4.15 Table Random

When user enables the Table Random function and triggers OKY1 to play sentence at the first time, one sentence would be played from OKY1 Step Table randomly. For the later triggers, the sentences after last triggered sentence will be played sequentially.

Note: If executes the Table Random and Mode-Switch function simultaneously, the OKY Random Range of Sentences and Sentences (2nd Mode) have to be the same setting.

7.4.16 Selecting OKY1 Sentence

The maximum of selected OKY1 voice sentences are up to 64 or 128. When selecting 128 sentences, OKY2 can only be output. With more sentences cooperating with Table Random function, the more random sequence combination can be arranged.

7.4.17 Selecting Low-Voltage-Reset (LVR)

When VDD voltage is lower than 1.7V in transient, IC would reset automatically. The default setting of LVR function is “Enable”. If users don’t use this function, please set as “Disable”.

Note: If user already sets POP function, the LVR would make IC replay POP Sentence. If user presses OKY and LVR is operating, IC would replay the first Sentence.

7.4.18 Setting LVR Voltage

When the VDD voltage is lower than the selected LVR voltage, IC will reset. The LVR voltage setting is only available for NY3PxxxJ series which provides 4 different kinds of LVR voltage, the default is 1.5V.

1	*2*	*3*	*4*
1.8V	1.7V	1.6V	1.5V

7.4.19 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.

For more details describing the trigger modes, please see NY3P(D) Data Sheet.

7.4.20 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

7.4.21 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY3P(D) series there are 4 input type options for different applications.

Option	Input Type Description
CDS + 1.5M	Normal selection for button trigger. 1.5MΩ pull-low resistance when button is pressed, and 300KΩ+1.5MΩ (parallel) pull-low resistance when button is released.
CDS	Internal 300KΩ pull-low resistance, usually for photo-resistor trigger. 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.

Option	Input Type Description
Floating	No internal resistor connection, and is usually connected to other output pin or connected to GND by an external resistor.

7.4.22 Selecting OKY1/OKY2 Trigger Function

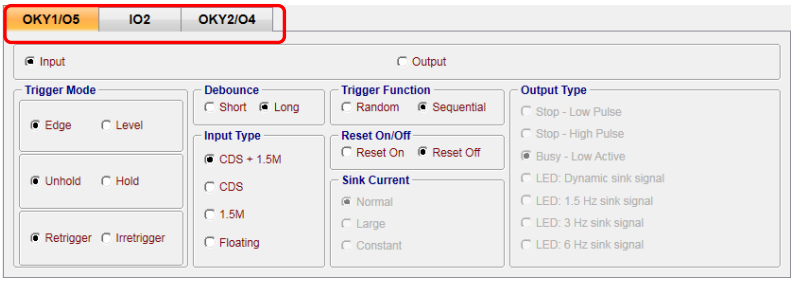
The OKY1 / OKY2 Trigger Function allows users to set the IC to play sentences in a sequential or random manner for two consecutive triggers applied to OKY1 / OKY2 pin. When sequential trigger function is selected, the IC will play the “next” sentence whereas a random sentence will be played when random trigger function is selected.

7.4.23 Selecting OKY1 / OKY2 Reset On/Off

This function is available only when the OKY1 (or OKY2) Trigger Function is sequential. When Reset is ON, the IC will reset the sentence sequential pointer once another input pin (OKY2, IO1, IO2, or IO3) is pressed. It means after another key is pressed, pressing OKY1 / OKY2 will lead to the playing of sentence 1. When Reset is OFF, the playing sequence of OKY1 /OKY2 will keep unaffected.

7.4.24 Setting Functions of IO2 and OKY2/O4

To set functions of IO2 and OKY2/O4, user must switch to their own setting page by selecting tabs around the OKY1/O5 tab.

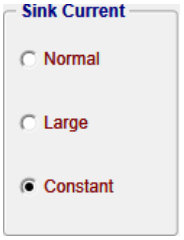


Input functions of IO2 is similar to which of OKY1 and OKY2, whereas OKY1 and OKY2 can be set as random mode but IO2 can’t be. Besides, when under sequential mode, OKY1 and OKY2 sequence can be reset by another trigger but IO2 can’t be.

7.4.25 Selecting Sink Current

When OKY1/O5, IO2 or OKY2/O4 is set as Sink output, user can specify one kind of Sink current. The following are the available Sink current type options:

1. Normal Sink Current.
2. Large Sink Current.
3. Constant Sink Current.



7.4.26 Selecting Output Type

When OKY1/O5, IO2 or OKY2/O4 is set as output, user can specify a status signal as the output signal. The following are the available output type options:

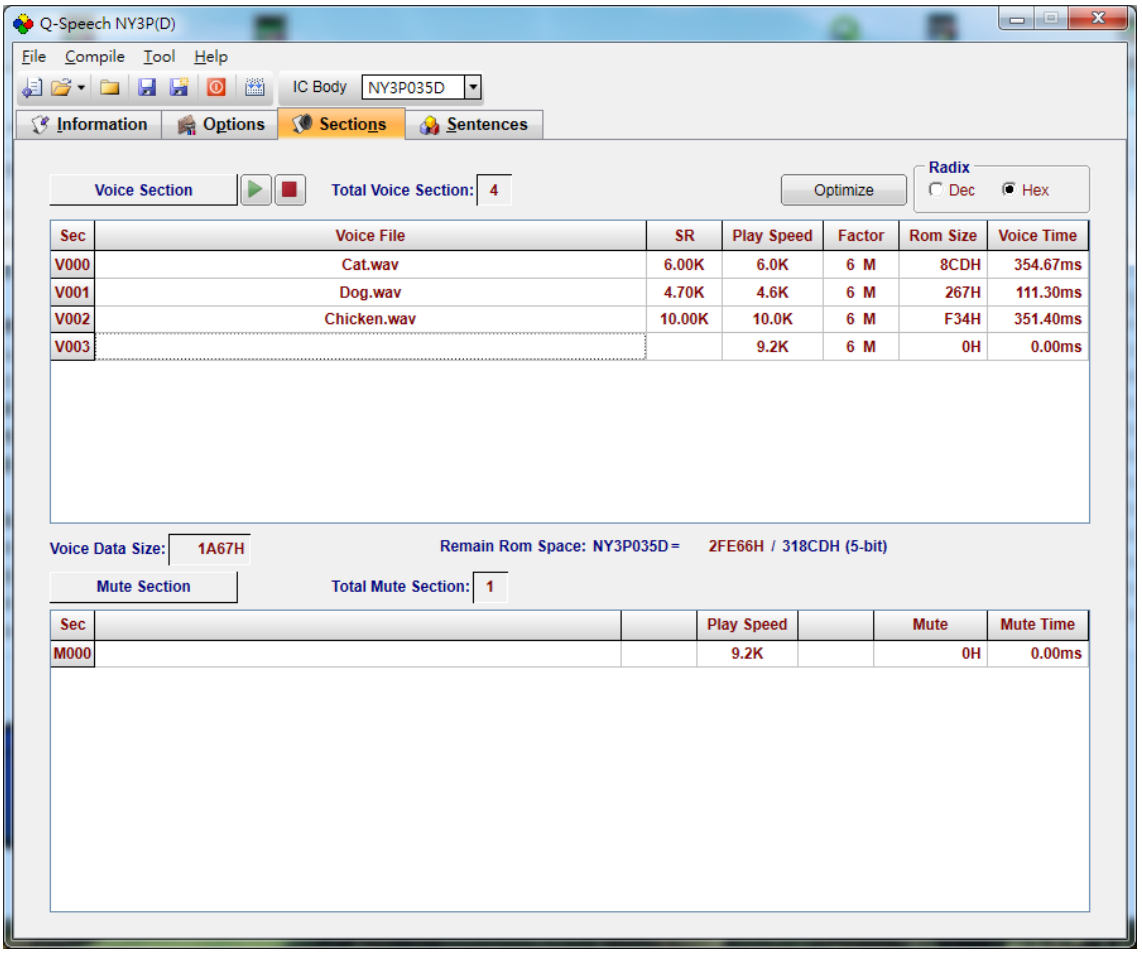
Table 7.4.26 – NY3P(D) Output Type

Option	Output Type Description
Stop – Low Pulse	Low pulse signal output when stop playing.
Stop – High Pulse	High pulse signal output when stop playing.
Busy – High Active	High active signal output during playing.
Busy – Low Active	Low active signal output during playing.
LED: Dynamic	Dynamic sink signal output for driving LED.
LED: 1.5 Hz	1.50Hz (@6 KHz) sink signal output for driving LED.
LED: 3 Hz	3.00Hz (@6 KHz) sink signal output for driving LED.
LED: 6 Hz	6.00Hz (@6 KHz) sink signal output for driving LED.

The flashing rates for LED 1.5 Hz, LED 3 Hz and LED 6 Hz options are positive relative to the Play Speed of sections. Only when the Play Speed is 6 KHz, are their flashing rates equal to the settings on Options page (1.5 Hz, 3 Hz and 6 Hz).

7.5 Managing the Sections

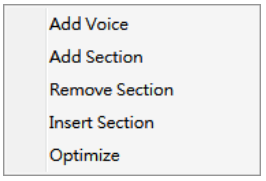
User can use the Sections page to include and manage the sections for a project. For NY3P(D), there are two kinds of sections: Voice Section and Mute Section. A section contains a voice file whereas a mute section contains only the mute length without voice file, and it allows total 1000 sections of section and mute section altogether. The upper part of the page is for editing sections whereas the lower part of the page is for editing mute sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.



7.5.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V499(totally 500 sections) while which of mute sections are from M000 to M499 for NY3P(D).

7.5.2 Voice File Column



Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY3P(D) only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting/optimizing Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

7.5.3 SR Column

SR stands for the sample rate of the voice file.

7.5.4 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a section here. There are 28 kinds of Play Speed available, and each section can be given a unique Play Speed.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
24.0 KHz	20.0 KHz	17.1 KHz	15.0 KHz	13.3 KHz	12.0 KHz	10.9 KHz	10.0 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
9.2 KHz	8.6 KHz	8.0 KHz	7.5 KHz	7.1 KHz	6.7 KHz	6.3 KHz	6.0 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
5.7 KHz	5.5 KHz	5.2 KHz	5.0 KHz	4.8 KHz	4.6 KHz	4.4 KHz	4.3 KHz
25	*26*	*27*	*28*				
4.1 KHz	4.0 KHz	3.9 KHz	3.8 KHz				

7.5.5 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 13 Factors, which from '1' to '12' are compressed while PCM is uncompressed. Normally, a bigger Factor will lead to bigger ROM Size but better quality after compression. The default Factor is '6'.

Factor	Comment
PCM	Ultra high sound quality, but largest ROM Size.
12 H	The best compressed sound quality.
…	…

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

7.5.6 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected not only by the quality factor, but also by the features of different IC series. For NY3P(D), the ROM Size for every section must be the multiple of 80H, when the data ROM size is less than the multiple of 80H, the voice encoder will automatically adjust the compressed data to fit the multiple of 80H.

Table 7.5.6 – The maximum limits imposed by NY3P(D) Series ICs

Body	MaxV	MaxM	Max Total
NY3P005D	E59AH	FFF80H	E59AH
NY3P010D	17F34H	FFF80H	17F34H
NY3P016D	318CDH	FFF80H	318CD H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section.
- **MaxM** column shows the maximum value of the mute data when the 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.

7.5.7 Voice Time Column

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

7.5.8 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY3P(D) must be the multiple of 80H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 80H whereas pressing the Down button makes the mute data decrease by 80H.

7.5.9 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

7.5.10 Radix

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

7.5.11 Total Voice Section & Total Mute Section

The Voice Section Count and Mute Section Count above section table and mute section table respectively show the total number of valid sections and mute sections.

7.5.12 Voice Data Size & Remain ROM Space

Voice Data Size shows the sum of all used voice length, while Remain ROM Space shows the remainder of total ROM Size, which is displayed to the right of slash (“/”). Please see Table 7.5.6 for more details.

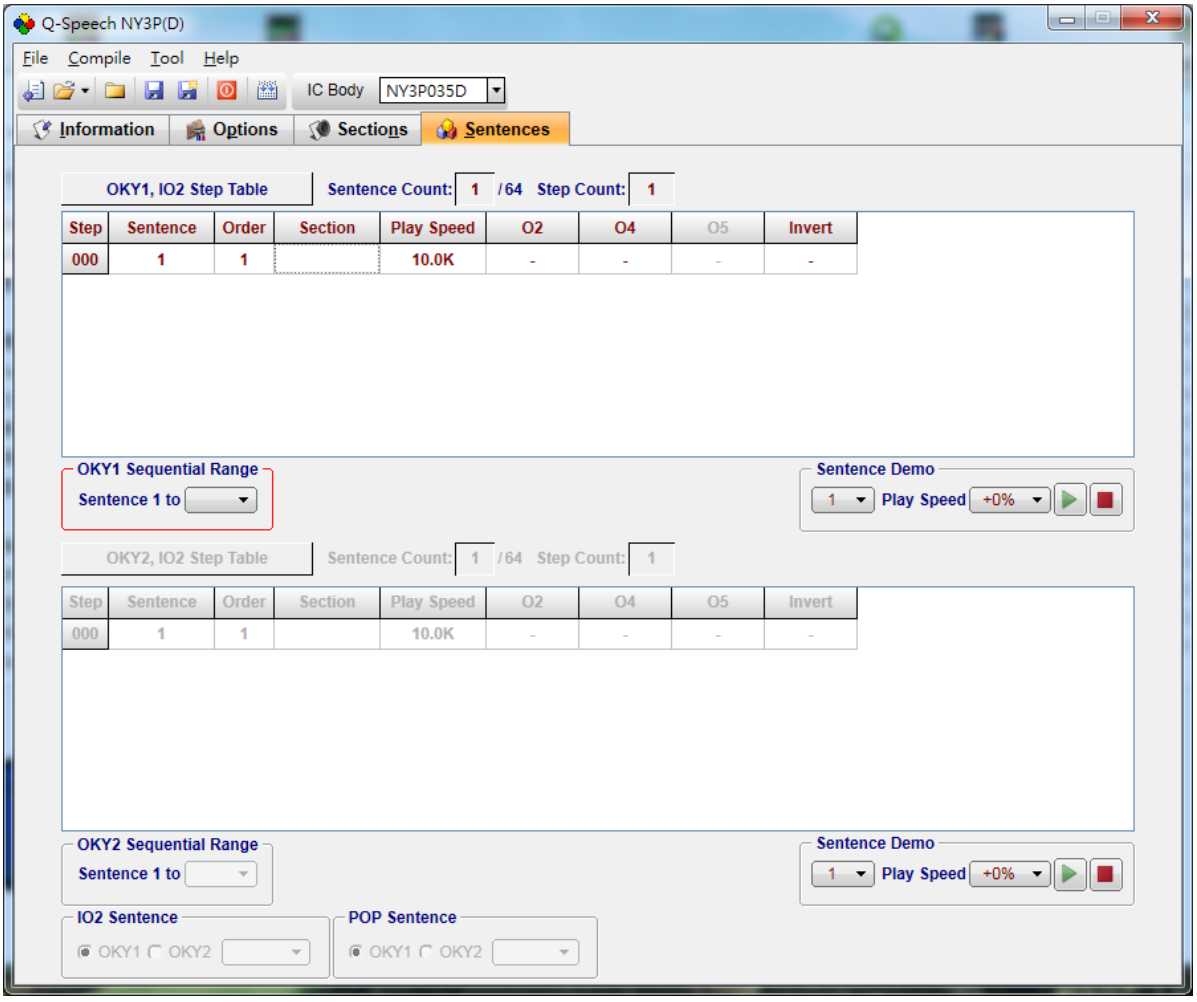
7.5.13 Right-click Menu

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

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections. **(This function doesn’t support mute sections.)**
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.
Optimize	Automatically adjust the compression ratio of the section with using the full capacity as objective.

7.6 Arranging the Sentences

A “sentence” means a combination of sections to be played when triggered. For NY3P(D), there are 64 or 128 sentences available under the limit of total 1530 steps.

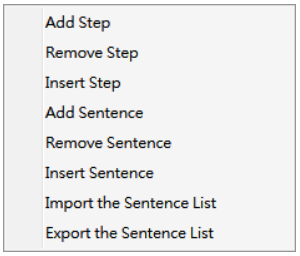


7.6.1 Step Column

For NY3P(D) there are totally 1530 (0 to 1529) steps that can be defined for the upper (OKY1) and the lower (OKY2 and others) step tables altogether. 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 each step table.

Note: For data ROM is shared by Voice Sections and Sentences, the steps available for arranging sentences may actually less than 1530. In other words, the more space occupied by sections the less space left for sentence steps, and vice versa.

7.6.2 Sentence Column



The Sentence Column shows the sentence numbers the steps belong to. For NY3P(D), It could be 64 or 128 (1 to 64 or 128) sentences that depends on the OKY1 Sentence of Options page. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / Import / Export a step or sentence, right-clicking on the desired Step or Sentence Column, then select the actions in the pop-up menu.

7.6.3 Order Column

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, step 1 will be played first, followed by step 2 and step 3. *Q-Speech* will automatically generate the sequence numbers for all the steps in a sentence in ascending order.

7.6.4 Section Column

Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

7.6.5 Play Speed

Play Speed means the speed (samples per second) that IC plays a section here. There are 28 kinds of Play Speed available, and each section can be given a unique Play Speed. Please see **7.5.4 Speed Play Column** for details of the 28 kinds of Play Speed.

7.6.6 O2 / O4 / O5 / Invert Column

When O2, O4 and O5 are set as output on Options page, the O2 / O4 / O5 steps in step table must be specified to implement IC's output function. There are 9 kinds of output options available in NY3P(D), which includes 8 kinds of regular options (see **Table 7.4.26** for details) and 1 user-defined output signal, whereas Q2 (Q5, Q7) is available only when the voice is in *Quick-IO* format (.nyq), but O5 couldn't be set as QIO signal of *Quick-IO* signal.

When using *Quick-IO* format (.nyq), O2 corresponds to Q2 or Q5. Q7 corresponds Q7 corresponds independently to Q4.

The flashing rate for LED 1.5 Hz, LED 3 Hz and LED 6 Hz option is positive relative to the Play Speed selected on the Options page. Only when the Play Speed is 6 KHz, is its flashing rate

equal to the option.

When Invert is selected in step, the Retrigger/Irretrigger mode will be inverted. User can insert Invert in suitable steps to change trigger mode according to application requirement.

7.6.7 OKY1 / OKY2 Sequential (or Random) Range

When the OKY1 / OKY2 Trigger Function is sequential, the Sequential Range means it will loop sentences in the range by triggering OKY1 / OKY2. For example, if this range is 4, triggering OKY1 / OKY2 repeatedly will play sentences 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, and so on. When the OKY1 / OKY2 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 OKY1 / OKY2 trigger will lead to the execution of a random sentence in the range from sentence 1 to sentence 4.

7.6.8 IO2 / POP Sentence

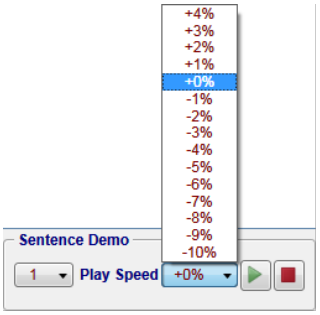
IO1 / IO2 / IO3 Sentence or POP Sentence is available only when IO1 / IO2 / IO3 is set as input or POP is enabled on Options page.

When user executes IO / POP Sentence by selecting 128 sentences of OKY1 Step Table, and the sentences are under 125, O2 / POP Sentence could be specified to play any sentence. If the sum of sentences exceeds 125, IO2 Sentence will be restricted as the 125th sentenc. If the sum of sentences exceeds 125, IO2 Sentence a will be restriced as the 126th sentence. But if the sum of sentences exceeds 127, IO2 Sentence and POP Sentence must be restrict to the 126thand 128th sentence respectively.

When user executes IO / POP Sentence by selecting sentences of OKY2 Step Table, and the sentences are under 61, IO2 / POP Sentence could be specified to play any sentence.uner the sum of 61. If the sum of sentences exceeds 61, IO2 Sentence will be restriced as the 62nd sentence. If the sum of sentences exceeds 61, IO1 Sentence and IO2 Sentence wil be restricted as the 61stand 62nd sentence. If the sum of sentences exceeds 63, IO2 Sentence wil be restricted as the 62nd sentence. But if the sum of sentences exceeds 63, IO2 Sentence and POP Sentence must be restrict to the 62nd and 64th sentence respectively.

7.6.9 Sentence Demo

Select any Sentence, and it could be auditioned by using the Media Player (). Users also can adjust the Play Speed of sentence. However, the adjustment will not have any effect on BIN file and Demo Board. It's just a demonstration function on PC.



7.6.10 Right-click Menu

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

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

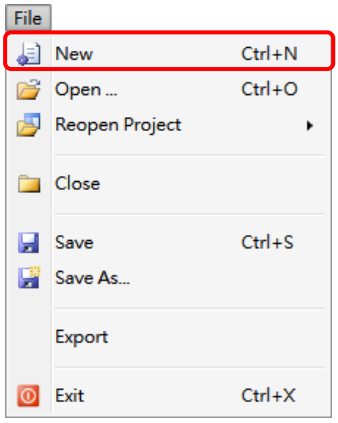
8 Using *Q-Speech* for NY3P(E) Series

In this chapter, the details of using *Q-Speech* for NY3P(E) will be presented step by step.

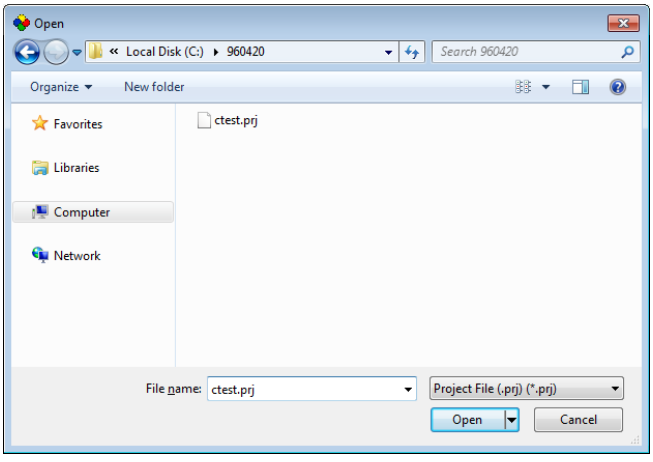
Contents:

8.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY3P(E), a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

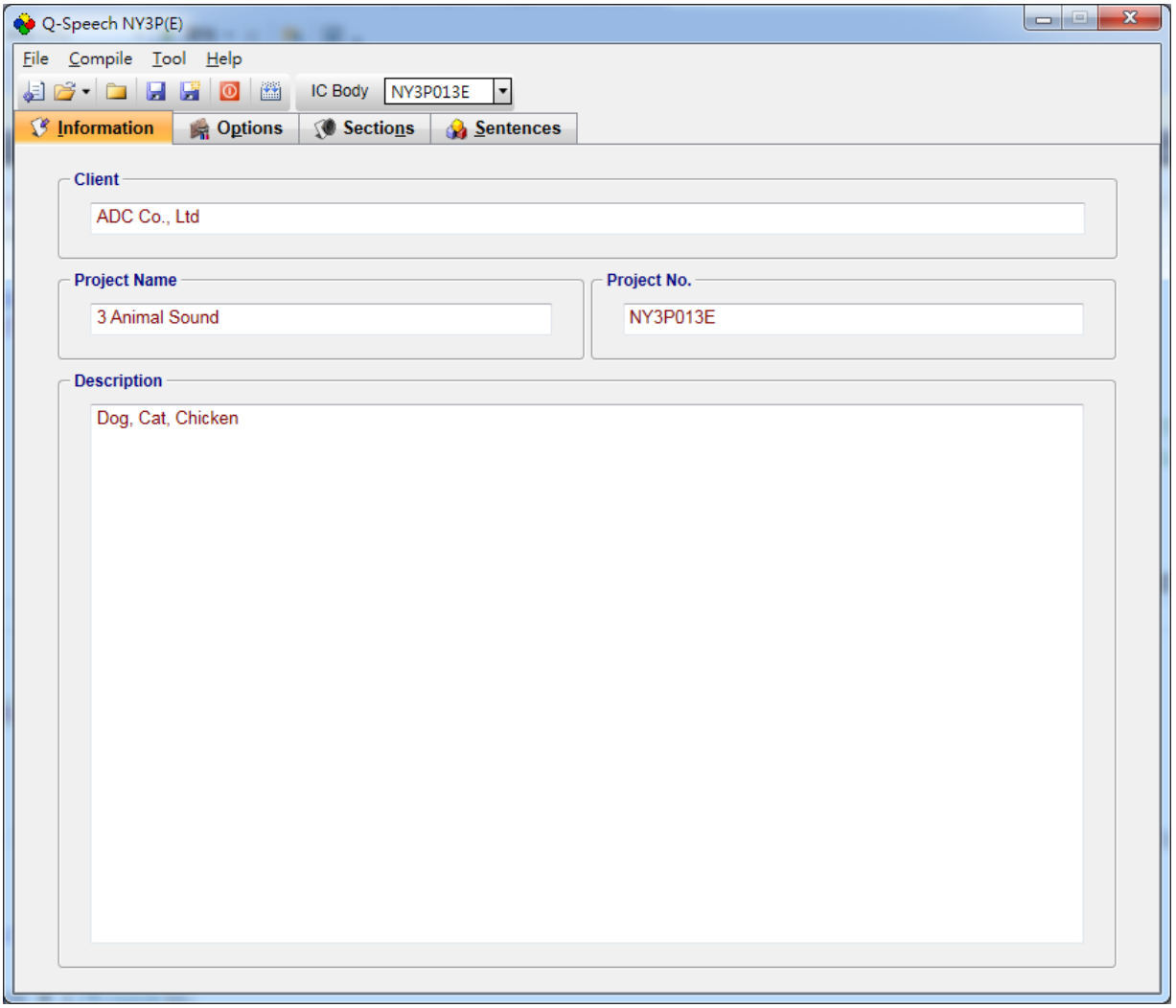


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



8.2 Filling in the Information

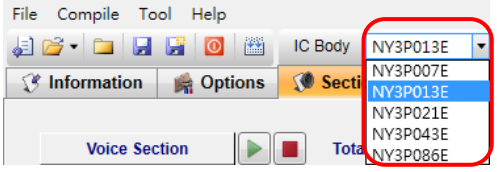
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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.

8.3 Selecting the IC Body

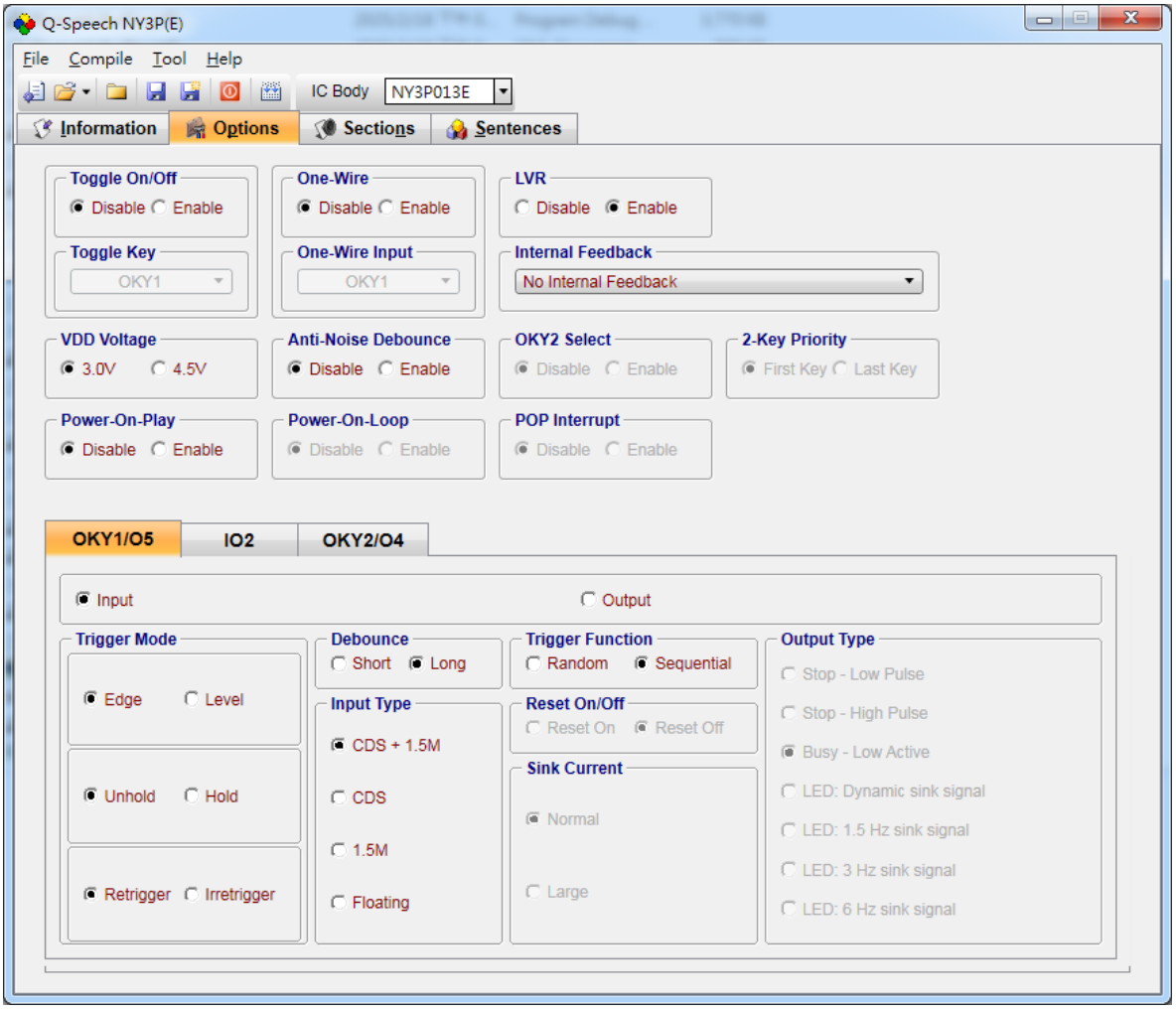
A drop-down list named [IC Body] can be found at the top of the window. By clicking the Down button of the drop-down list, all available IC bodies will be listed for selection. IC body could be changed during editing a project, but an error



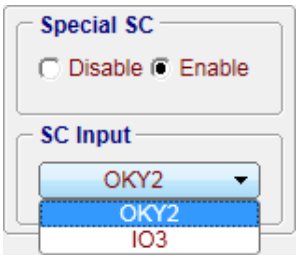
message may display if the total ROM Size of current sections exceeds the capacity of selected IC body.

8.4 Selecting the Options

By selecting different options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Input Type, Trigger Mode, etc, could be set easily on this page.



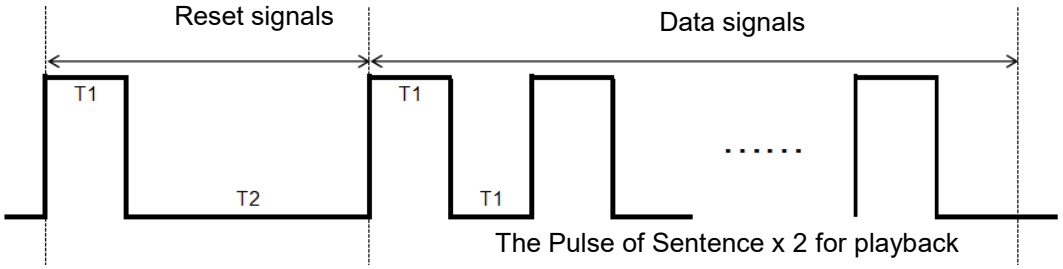
8.4.1 Setting Toggle On/Off



The Toggle On/Off function allows users to immediately stop the voice playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To use this function, the specific trigger must be set to Unhold and Retrigger. Then switched it to “Enable”, and specify the key in “Toggle Key” column. Please note there is only one key available for Toggle On/Off function, although all 5 keys could be set as input trigger.

8.4.2 One-Wire

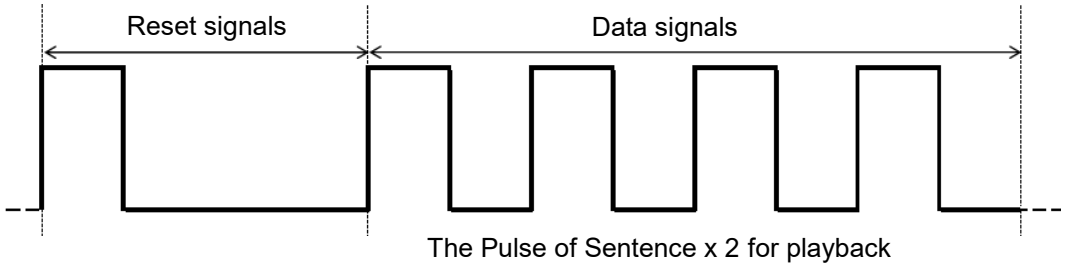
The One-Wire option provides the one-wire communication for the main control MCU and NY3 series. When NY3 receives the triggered signals, it will play the corresponding voice section. Please note that the available amount of Sentence will be halved. The coummnication protocol for controlling NY3 is shown below which can be divided into the reset signals and data signal.



The supported range for the trigger period.

Time	Min.	Typ.	Max.
T1	50us	100us	250us
T2	1,200us	1,500us	1,800us

Example. Play the voice of Sentence 2.



8.4.3 Selecting 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.

8.4.4 OKY2 Select

When the OKY2 Select option is enabled, user must set any pin as OKY pin. User can use OKY Trigger Function with OKY Reset On/Off to control the playback status of Sentences.

8.4.5 Anti-Noise Debounce

The setting of Anti-Noise Debounce can avoid triggering repeatedly or inadvertent trigger that are caused by noises. When the button is pressed and held, the noise will cause the input signals to be level low temporarily. But this setting will start counting Debounce time, and IC will ignore the variation of signals for achieving the purpose of filtering noise and avoiding unnecessary repeated

trigger.

When the button is released, the input signals will present as level low. Only after the Debounce time can IC receive the next trigger.

Note: After activating Anti-Noise Debounce, Q-Speech will switch Debounce time on Long.

8.4.6 Selecting Internal Feedback

Internal Feedback is a particular application for OKY1/OKY2/IO2. When sentences end or stop, “Stop – High Pulse” would trigger Internal Feedback Path of OKY1/OKY2/IO2 automatically, and play the sentences again.

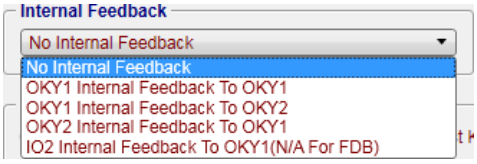
8.4.7 Setting Power-On-Play (POP)

“POP Sentence” would be played one time as the power is turned on.

If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won’t stop until user sets other options and play the specified sentence immediately.

Note: When POP is set as “Enable”, user could specify the sections on Sentence tab.

8.4.8 Setting Power-On-Loop



The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects “Enable” and IC is powered on, IC will play POP Sentence repeatedly.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

8.4.9 Power-On-Play Interrupt (POP Interrupt)

The settings of Power-On-Play Interrupt will decide whether interrupt POP. When user selects “Enable”, the Trigger key could interrupt POP Sentence immediately.

Note: This setting could be enabled only when user set Power-On-Play first.

8.4.10 2-Key Priority

The 2-Key Priority function could decide the priority of the pressed 2 keys, “First Key” means the first key has priority, “Last Key” means the later key has priority. But “Last Key” only supports OKY1 and OKY2.

8.4.11 Selecting Low-Voltage-Reset (LVR)

When VDD voltage is lower than 1.7V in transient, IC would reset automatically. The default setting of LVR function is “Enable”. If users don’t use this function, please set as “Disable”.

Note: If user already sets POP function, the LVR would make IC replay POP Sentence. If user

presses OKY and LVR is operating, IC would replay the first Sentence.

8.4.12 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.

For more details describing the trigger modes, please see NY3P(E) Data Sheet.

8.4.13 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

8.4.14 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY3P(E) series there are 4 input type options for different applications.

Option	Input Type Description
CDS + 1.5M	Normal selection for button trigger. 1.5MΩ pull-low resistance when button is pressed, and 300KΩ+1.5MΩ (parallel) pull-low resistance when button is released.
CDS	Internal 300KΩ pull-low resistance, usually for photo-resistor trigger. 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.

8.4.15 Selecting OKY1/OKY2 Trigger Function

The OKY1 / OKY2 Trigger Function allows users to set the IC to play sentences in a sequential or random manner for two consecutive triggers applied to OKY1 / OKY2 pin. When sequential trigger

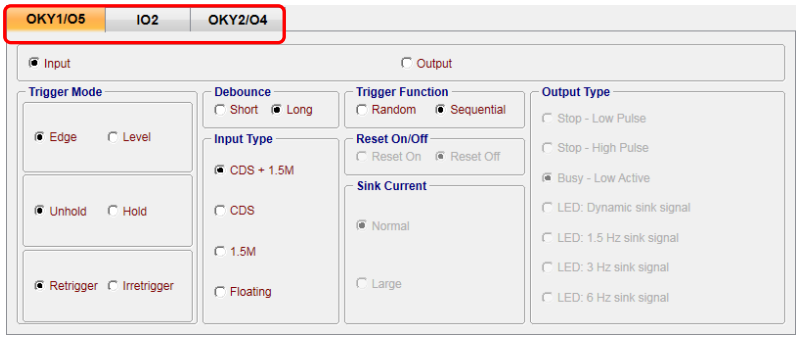
function is selected, the IC will play the “next” sentence whereas a random sentence will be played when random trigger function is selected.

8.4.16 Selecting OKY1 / OKY2 Reset On/Off

This function is available only when the OKY1 (or OKY2) Trigger Function is sequential. When Reset is ON, the IC will reset the sentence sequential pointer once another input pin (OKY2, IO1, IO2, or IO3) is pressed. It means after another key is pressed, pressing OKY1 / OKY2 will lead to the playing of sentence 1. When Reset is OFF, the playing sequence of OKY1 /OKY2 will keep unaffected.

8.4.17 Setting Functions of IO2 and OKY2/O4

To set functions of IO2 and OKY2/O4, user must switch to their own setting page by selecting tabs around the OKY1/O5 tab.



Input functions of IO2 is similar to which of OKY1 and OKY2, whereas OKY1 and OKY2 can be set as random mode but IO2 can’t be. Besides, when under sequential mode, OKY1 and OKY2 sequence can be reset by another trigger but IO2 can’t be.

8.4.18 Selecting Sink Current

When OKY1/O5, IO2 or OKY2/O4 is set as Sink output, user can specify one kind of Sink current. The following are the available Sink current type options:

1. Normal Sink Current.
2. Large Sink Current.

8.4.19 Selecting Output Type

When OKY1/O5, IO2 or OKY2/O4 is set as output, user can specify a status signal as the output signal. The following are the available output type options:

Table 8.4.19 – NY3P(E) Output Type

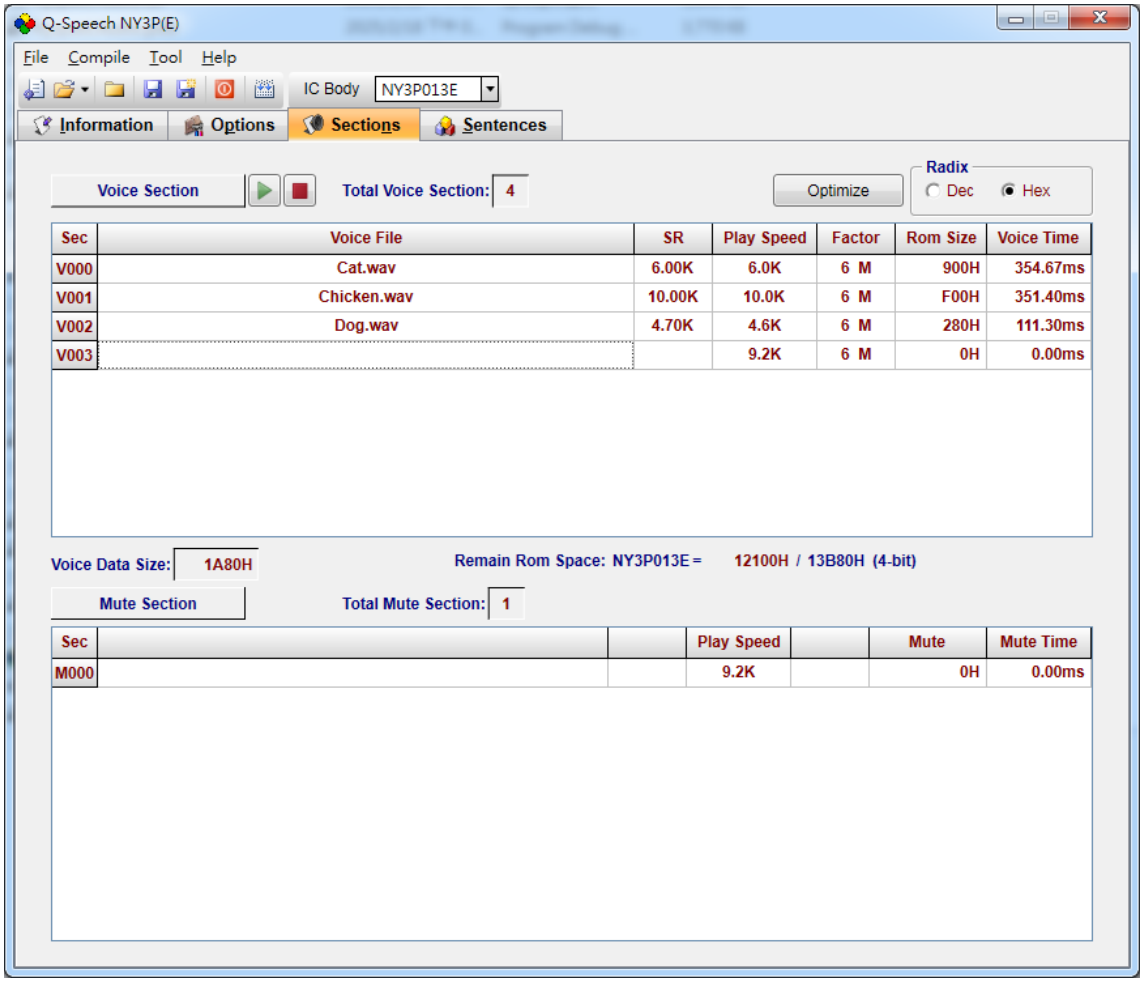
Option	Output Type Description
Stop – Low Pulse	Low pulse signal output when stop playing.
Stop – High Pulse	High pulse signal output when stop playing.
Busy – High Active	High active signal output during playing.

Option	Output Type Description
Busy – Low Active	Low active signal output during playing.
LED: Dynamic	Dynamic sink signal output for driving LED.
LED: 1.5 Hz	1.50Hz (@6 KHz) sink signal output for driving LED.
LED: 3 Hz	3.00Hz (@6 KHz) sink signal output for driving LED.
LED: 6 Hz	6.00Hz (@6 KHz) sink signal output for driving LED.

The flashing rates for LED 1.5 Hz, LED 3 Hz and LED 6 Hz options are positive relative to the Play Speed of sections. Only when the Play Speed is 6 KHz, are their flashing rates equal to the settings on Options page (1.5 Hz, 3 Hz and 6 Hz).

8.5 Managing the Sections

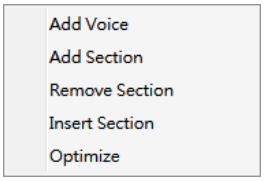
User can use the Sections page to include and manage the sections for a project. NY3P(E) Series contain 32 sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.



8.5.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V499(totally 500 sections) while which of mute sections are from M000 to M499 for NY3P(E).

8.5.2 Voice File Column



Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY3P(E) only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting/optimizing Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

8.5.3 SR Column

SR stands for the sample rate of the voice file.

8.5.4 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a section here. There are 28 kinds of Play Speed available, and each section can be given a unique Play Speed.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
24.0 KHz	20.0 KHz	17.1 KHz	15.0 KHz	13.3 KHz	12.0 KHz	10.9 KHz	10.0 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
9.2 KHz	8.6 KHz	8.0 KHz	7.5 KHz	7.1 KHz	6.7 KHz	6.3 KHz	6.0 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
5.7 KHz	5.5 KHz	5.2 KHz	5.0 KHz	4.8 KHz	4.6 KHz	4.4 KHz	4.3 KHz
25	*26*	*27*	*28*				
4.1 KHz	4.0 KHz	3.9 KHz	3.8 KHz				

8.5.5 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 13 Factors, which from '1' to '12' are compressed while PCM is uncompressed. Normally, a bigger Factor will lead to bigger ROM Size but better

quality after compression. The default Factor is '6'.

Factor	Comment
PCM	Ultra high sound quality, but largest ROM Size.
12 H	The best compressed sound quality.
…	…
6 M	Middle sound quality (default).
…	…
1 L	Very low sound quality, but smallest ROM Size.

8.5.6 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected not only by the quality factor, but also by the features of different IC series. For NY3P(E), the ROM Size for every section must be the multiple of 80H, when the data ROM size is less than the multiple of 80H, the voice encoder will automatically adjust the compressed data to fit the multiple of 80H.

Table 8.5.6 – The maximum limits imposed by NY3P(E) Series ICs

Body	MaxV	MaxM	Max Total
NY3P007E	BC00H	FFF80H	BC00H
NY3P013E	13B80H	FFF80H	13B80H
NY3P021E	1FB80H	FFF80H	1FB80H
NY3P043E	3FB80H	FFF80H	3FB80H
NY3P086E	7FB80H	FFF80H	7FB80H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section.
- **MaxM** column shows the maximum value of the mute data when the 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.

8.5.7 Voice Time Column

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

8.5.8 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY3P(E) must be the multiple of 80H. Mute data can be keyed in after double clicking on the column

or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 80H whereas pressing the Down button makes the mute data decrease by 80H.

8.5.9 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

8.5.10 Radix

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

8.5.11 Total Voice Section & Total Mute Section

The Voice Section Count and Mute Section Count above section table and mute section table respectively show the total number of valid sections and mute sections.

8.5.12 Voice Data Size & Remain ROM Space

Voice Data Size shows the sum of all used voice length, while Remain ROM Space shows the remainder of total ROM Size, which is displayed to the right of slash (“/”). Please see **Table 8.5.6** for more details.

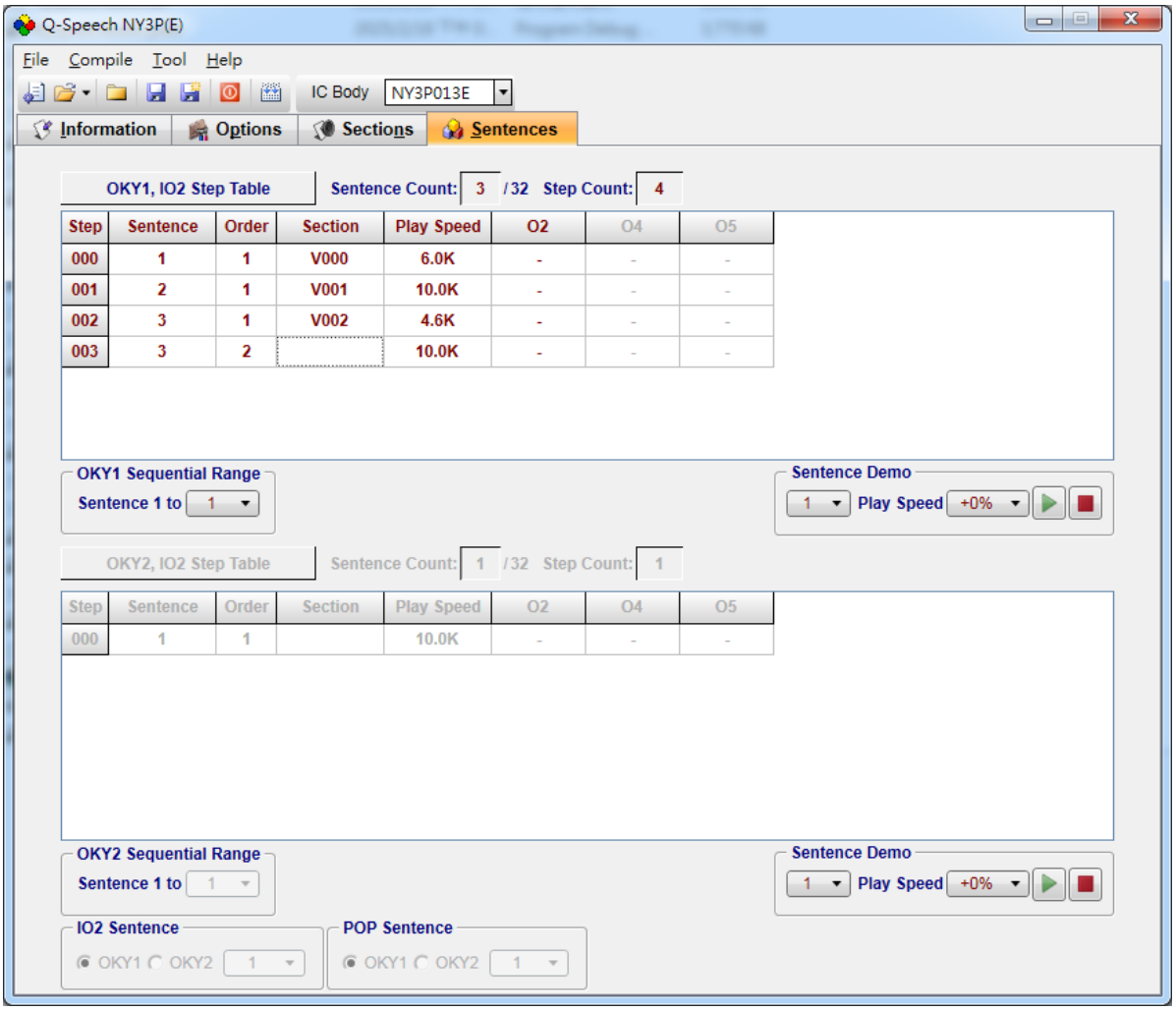
8.5.13 Right-click Menu

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

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections. **(This function doesn’t support mute sections.)**
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.
Optimize	Automatically adjust the compression ratio of the section with using the full capacity as objective.

8.6 Arranging the Sentences

A “sentence” means a combination of sections to be played when triggered. For NY3P(E), there are 64 or 128 sentences available under the limit of total 1530 steps.



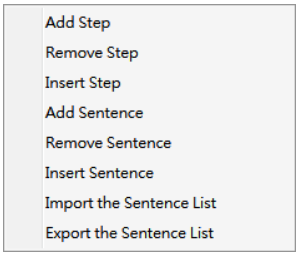
8.6.1 Step Column

For NY3P(E) there are totally 892 (0 to 891) steps that can be defined for the upper (OKY1) and the lower (OKY2 and others) step tables altogether. 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 each step table.

Note: For data ROM is shared by Voice Sections and Sentences, the steps available for arranging sentences may actually less than 1530. In other words, the more space occupied by sections the less space left for sentence steps, and vice versa.

8.6.2 Sentence Column

The Sentence Column shows the sentence numbers the steps belong to. For NY3P(E), It could be 64 (1 to 64) sentences that depends on the OKY1 Sentence of Options page. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / Import / Export a step or sentence, right-clicking on the desired Step or Sentence Column, then select the actions in the pop-up menu.



8.6.3 Order Column

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, step 1 will be played first, followed by step 2 and step 3. *Q-Speech* will automatically generate the sequence numbers for all the steps in a sentence in ascending order.

8.6.4 Section Column

Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

8.6.5 Play Speed

Play Speed means the speed (samples per second) that IC plays a section here. There are 28 kinds of Play Speed available, and each section can be given a unique Play Speed. Please see **8.5.4 Speed Play Column** for details of the 28 kinds of Play Speed.

8.6.6 O2 / O4 / O5 / Invert Column

When O2, O4 and O5 are set as output on Options page, the O2 / O4 / O5 steps in step table must be specified to implement IC's output function. There are 9 kinds of output options available in NY3P(E), which includes 8 kinds of regular options (see **Table 8.4.19** for details) and 1 user-defined output signal, whereas Q1 (Q2) is available only when the voice is in *Quick-IO* format (.nyq), but O3 couldn't be set as QIO signal of *Quick-IO* signal.

The flashing rate for LED 1.5 Hz, LED 3 Hz and LED 6 Hz option is positive relative to the Play Speed selected on the Options page. Only when the Play Speed is 6 KHz, is its flashing rate equal to the option.

8.6.7 OKY1 / OKY2 Sequential (or Random) Range

When the OKY1 / OKY2 Trigger Function is sequential, the Sequential Range means it will loop sentences in the range by triggering OKY1 / OKY2. For example, if this range is 4, triggering OKY1 / OKY2 repeatedly will play sentences 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, and so on. When the OKY1 / OKY2 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 OKY1 / OKY2 trigger will lead to the execution of a random sentence in the range from sentence 1 to sentence 4.

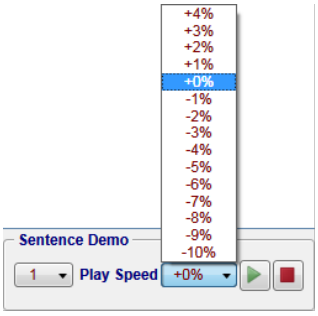
8.6.8 IO2 / POP Sentence

IO2 Sentence or POP Sentence is available only when IO2 is set as input or POP is enabled on Options page.

When user executes IO2 / POP Sentence by selecting 30 sentences of OKY1 Step Table, and the sentences are under 30, O2 / POP Sentence could be specified to play any sentence. If the sum of sentences exceeds 30, IO2 Sentence will be restricted as the 30th sentence. If the sum of sentences exceeds 30, IO2 Sentence will be restriced to the 31st sentence. But if the sum of sentences exceeds 32, IO2 Sentence and POP Sentence must be restricted to the 31st and 32nd sentence respectively.

8.6.9 Sentence Demo

Select any Sentence, and it could be auditioned by using the Media Player (). Users also can adjust the Play Speed of sentence. However, the adjustment will not have any effect on BIN file and Demo Board. It's just a demonstration function on PC.



8.6.10 Right-click Menu

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

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

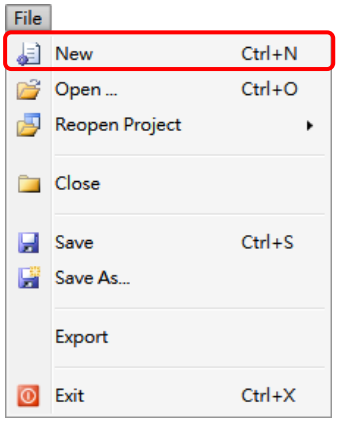
9 Using *Q-Speech* for NY3L Series

In this chapter, the details of using *Q-Speech* for NY3L will be presented step by step.

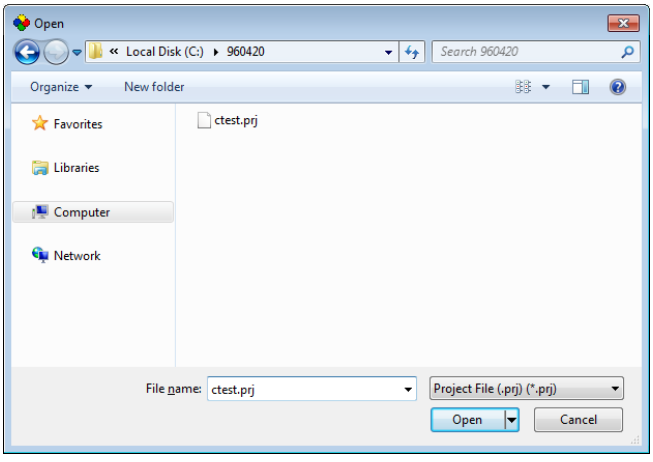
Contents:

9.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY3L, a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

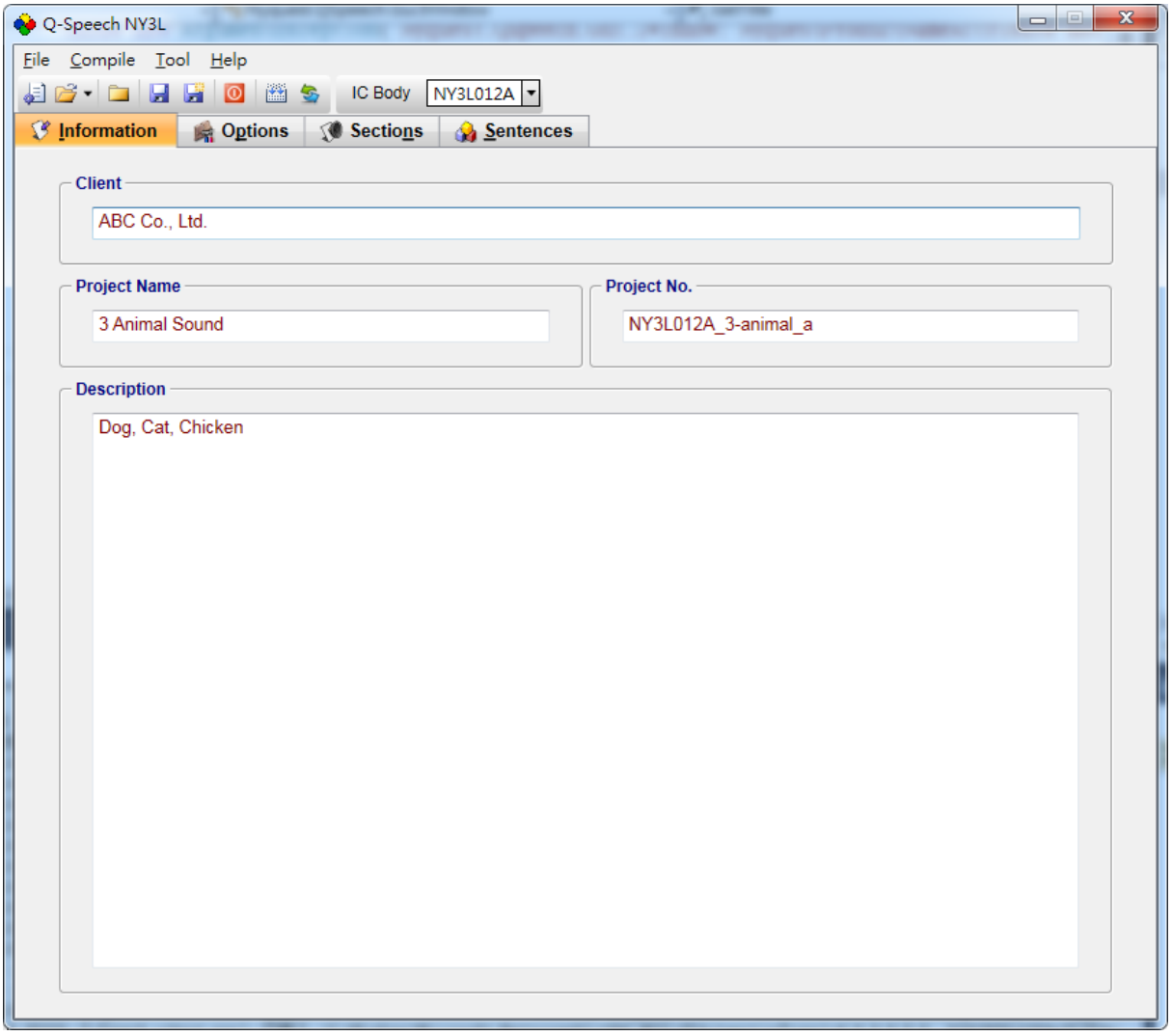


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



9.2 Filling in the Information

The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or included in the .bin file except the client name.

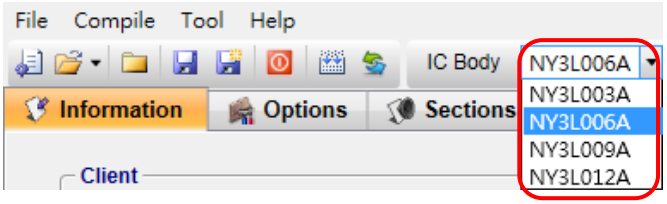


Note: The client name on this page will be included in the Checking List and Confirm Table after compiling. This is to protect the copyright of the programmer. The client name is the only "required" on this page, a warning message will display when compiling if this column is blank.

9.3 Selecting the IC Body

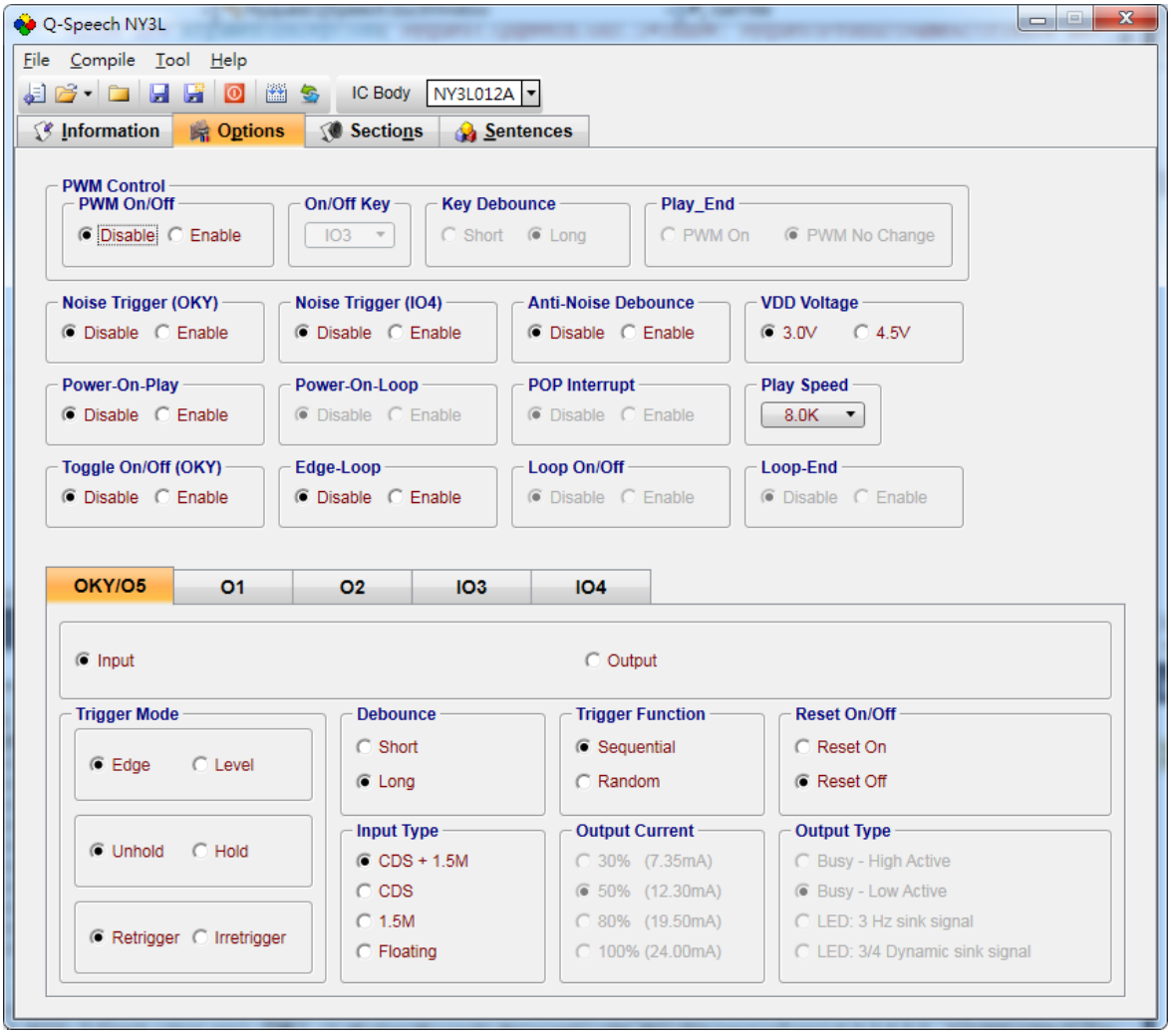
A drop-down list named [IC Body] can be found at the top of the window. By clicking the Down button of the drop-down list, all available IC bodies will be listed for selection. IC body could be changed during editing a project, but an error message may display if the total ROM Size of current sections exceeds

the capacity of selected IC body.



9.4 Selecting the Options

By selecting different mask options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Play Speed, Trigger Mode, etc, could be set easily on this page.



9.4.1 PWM On/Off

The PWM On/Off function allows users to open or limit the voice output through pressing the same button again. “PWM On/Off” option default is Disable. To use this function, the option must be set as

Enable. Please note there is only one key available for PWM On/Off function, although all 2 keys could be set as input trigger. About Debounce time please refer to 9.4.16 Selecting Debounce Time.

Note: Due to the Build(NY4) function cannot execute PWM On/Off, the default is Disable.

9.4.2 Play_End

The Play_End function can set the on or off status of PWM when each playing Sentence ends. If PWM output is disabled and Play_End option is *PWM On*, after IC enter Sleep mode, PWM output will be enabled to play sound if key is triggered to play the next sentence. If PWM output is disabled and Play_End option is *PWM No Change*, after IC enter Sleep mode, PWM output will remain disabled and no sound output when OKY/O5 is triggered to play the next sentence. User must trigger *PWM On/Off* switch to enable PWM output.

9.4.3 Noise Trigger OKY/IO4

By antenna effect, it takes place an input signal when larger noise happens outside.

9.4.4 Anti-Noise Debounce

he setting of Anti-Noise Debounce can avoid triggering repeatedly or inadvertent trigger that is caused by noises. When the button is pressed and held, the noise will cause the input signals to be level low temporarily. But this setting will start counting Debounce time, and IC will ignore the variation of signals for achieving the purpose of filtering noise and avoiding unnecessary repeated trigger.

When the button is released, the input signals will present as level low. Only after the Debounce time can IC receive the next trigger.

Note: After activating Anti-Noise Debounce, Q-Speech will switch Debounce time on Long.

9.4.5 Selecting 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.

9.4.6 Setting Power-On-Play (POP)

“POP Sentence” would be played one time as the power is turned on. If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won’t stop until user sets other options and play the specified sentence immediately.

9.4.7 Setting Power-On-Loop

The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects “Enable” and IC is powered on, IC will play POP Sentence repeatedly. The trigger mode is fixed in Edge / Unhold / Retrigger.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

9.4.8 Setting Power-On-Play Interrupt (POP Interrupt)

The settings of Power-On-Play Interrupt will decide whether interrupt POP. When user selects “Enable”, the Trigger key could interrupt POP Sentence immediately.

Note: This setting could be enabled only when user set Power-On-Play first.

9.4.9 Selecting Play Speed

Play Speed determines the built-in oscillation circuitry. It is the first function that should be specified since some other functions such as debounce time, LED flashing rate and mute time depend on it.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
20.0 KHz	17.1 KHz	15.0 KHz	13.3 KHz	12.0 KHz	10.9 KHz	10.0 KHz	9.2 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
8.6 KHz	8.0 KHz	7.5 KHz	7.1 KHz	6.7 KHz	6.3 KHz	6.0 KHz	5.7 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
5.5 KHz	5.2 KHz	5.0 KHz	4.8 KHz	4.6 KHz	4.4 KHz	4.3 KHz	4.1 KHz
25	*26*	*27*					
4.0 KHz	3.9 KHz	3.8 KHz					

Note: The Build(NY4) function could not support 3.9 KHz and 3.8 KHz, the default is 4.0 KHz.

9.4.10 Toggle On/Off (OKY)

The Toggle On/Off function allows users to immediately stop the voice playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To use this function, switch the option to “Enable”, and the input type must be set to Unhold and Retrigger. Please note OKY is the only one key available for Toggle On/Off in NY3L series.

9.4.11 Edge-Loop

When Edge-Loop option is enabled, then it will play the assigned sentence in loop while the key is triggered.

9.4.12 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 in loop, and stops playing if triggered again during playing, and so on.

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

9.4.13 Loop-End

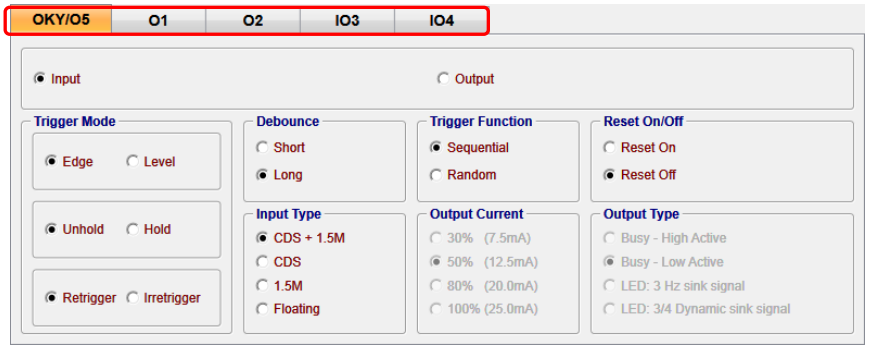
Loop-End will stop playing when triggering at the playing of the last OKY Edge-Loop sentence. Triggering again after stop, it will start from the first OKY sentence and play it in loop again (Sentence 1→ Sentence 2→ Sentence 3 → Stop → Sentence 1).

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

9.4.14 Setting Functions of O1, O2, IO3 and IO4

To set functions of O1, O2, IO3 and IO4, user must switch to their own setting page by selecting tabs around the OKY/O5 tab.

Input functions of IO3 and IO4 are similar to OKY, whereas OKY can be set as random mode but IO3 and IO4 can't be. Besides, when under sequential mode, OKY sequence can be reset by another trigger but IO3 and IO4 can't be.



9.4.15 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.

9.4.16 Selecting Debounce Time

Debounce is a Play-speed-dependent function, which determines the debouncing period for OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

9.4.17 Selecting Input Type

The Input Type usually represents the Pull-Low setting of an input. For NY3L series there are 4 input type options for different applications.

Option	Input Type Description
CDS + 1.5M	Normal selection for button trigger. 1.5MΩ pull-low resistance when button is pressed, and 300KΩ+1.5MΩ (parallel) pull-low resistance when button is released.
CDS	Internal 300KΩ pull-low resistance, usually for photo-resistor trigger. 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.

Note: Due to the Build(NY4) function cannot select Input type, the default is Pull High.

9.4.18 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.

9.4.19 Selecting Output Current

When OKY is set as output, user could specify an output current which offers available options corresponding to different connected type.

Note: The Build(NY4) function could not support this function.

9.4.20 Setting 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 another input pin (IO3 or IO4) is pressed. It means after IO3 or IO4 is pressed, pressing OKY will lead to the playing of sentence 1. When Reset is OFF, the playing sequence of OKY will keep unaffected.

9.4.21 Selecting Output Type

When OKY/ IO3/ IO4 is set as output, user can specify a status signal as the output signal. The following are the available output type options:

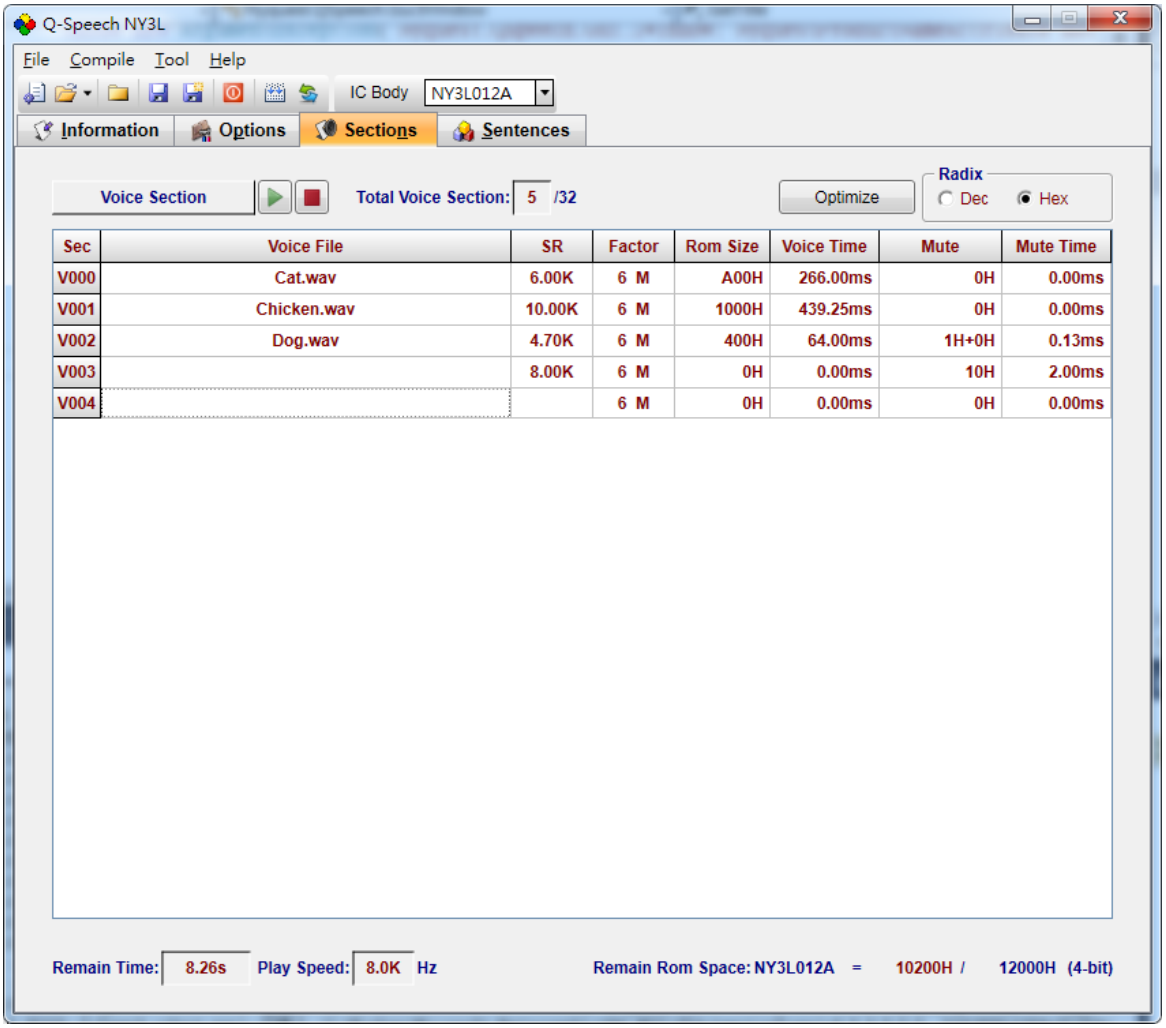
Table 9.4.21 – NY3L Output Type

Option	Output Type Description
Busy – Low Active	Low active signal output during playing.
Busy – High Active	High active signal output during playing.
LED: 3 Hz	3.00Hz (@6 KHz) sink signal output for driving LED.
LED: 3/4 Dynamic	3/4 active signal output during playing.

The actual flashing rate for LED 3 Hz option is positive relative to the Play Speed of sections. Only when the Play Speed is 6 KHz, are their flashing rates equal to the settings on Options page (3 Hz).

9.5 Managing the Sections

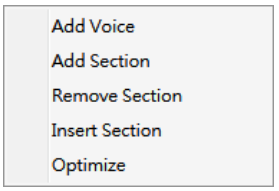
User can use the Sections page to include and manage the sections for a project. NY3L Series contain 32 sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.



9.5.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V031 (totally 32 sections) in NY3L.

9.5.2 Voice File Column



Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY3L only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting/optimizing Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

9.5.3 SR Column

SR stands for the sample rate of the voice file.

9.5.4 Factor Column

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

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

9.5.5 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected by the features of different IC series. For NY3L003A and NY3L006A, the ROM Size for every section must be the multiple of 80H whereas 100H for the other NY3L bodies. For NY3L, the ROM Size for every section must be the multiple of 100H, when the ROM Size of section is less than the multiple of 100H, the voice encoder will automatically adjust the compressed data o fit the multiple of 100H. The minimum unit of NY3L section is 4H. If the ROM size is less than 4H, the voice encoder will adjust the section by using mute signal to fill in the gap between the actual voice file. Such mute signal will be shown in the Mute Column and will be played

following the voice file.

Please note that every NY3L Series IC actually imposes a maximum limit on each type of section including pure section, voice+mute section and pure mute section. The maximum limits imposed on all the NY3BL Series ICs are tabulated below.

Table 9.5.5 – The maximum limits imposed by NY3L Series ICs

Body	MaxV	Max(V+M)	MaxM	Max Total
NY3L003A	4800H	1FFF0H	1FFF0H	4800H
NY3L006A	9000H	1FFF0H	1FFF0H	9000H
NY3L009A	D800H	1FFF0H	1FFF0H	D800H
NY3L012A	12000H	1FFF0H	1FFF0H	12000H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section (section with a voice file only) or a voice+mute section (section with a voice file and mute data).
- **Max(V+M)** column shows the maximum sum of the ROM Size taken up by the voice file and the mute data when the section is a voice+mute section.
- **MaxM** column shows the maximum value of the mute data when the 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 NY3L012A as an example. For this body the ROM Size taken up by the voice file of each section must not exceed 12000H. If the ROM Size taken up by the voice file is F800H, then this file can be followed by a maximum of 107F0H mute data (1FFF0H - F800H = 107F0H). If this section doesn't contain a voice file, then it can have a maximum of 1FFF0H mute data. If a section exceeds maximum size, it has to be separated in sections and every size is less than 1FFF0H.

9.5.6 Voice Time Column

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

9.5.7 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY3L must be the multiple of 4H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 4H whereas pressing the Down button makes mute data decrease by 4H.

9.5.8 Remain Time

Remain Time column shows the available remaining time of sections.

9.5.9 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

9.5.10 Radix

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

9.5.11 Total Voice Section & Remain ROM Space

The total number of valid sections is displayed at the top of the page and the remain ROM space is displayed at the bottom of the page. The total used ROM Size must not exceed the available total ROM Size displayed to the right of slash (“/”). Please see **Table 9.5.5** for more details.

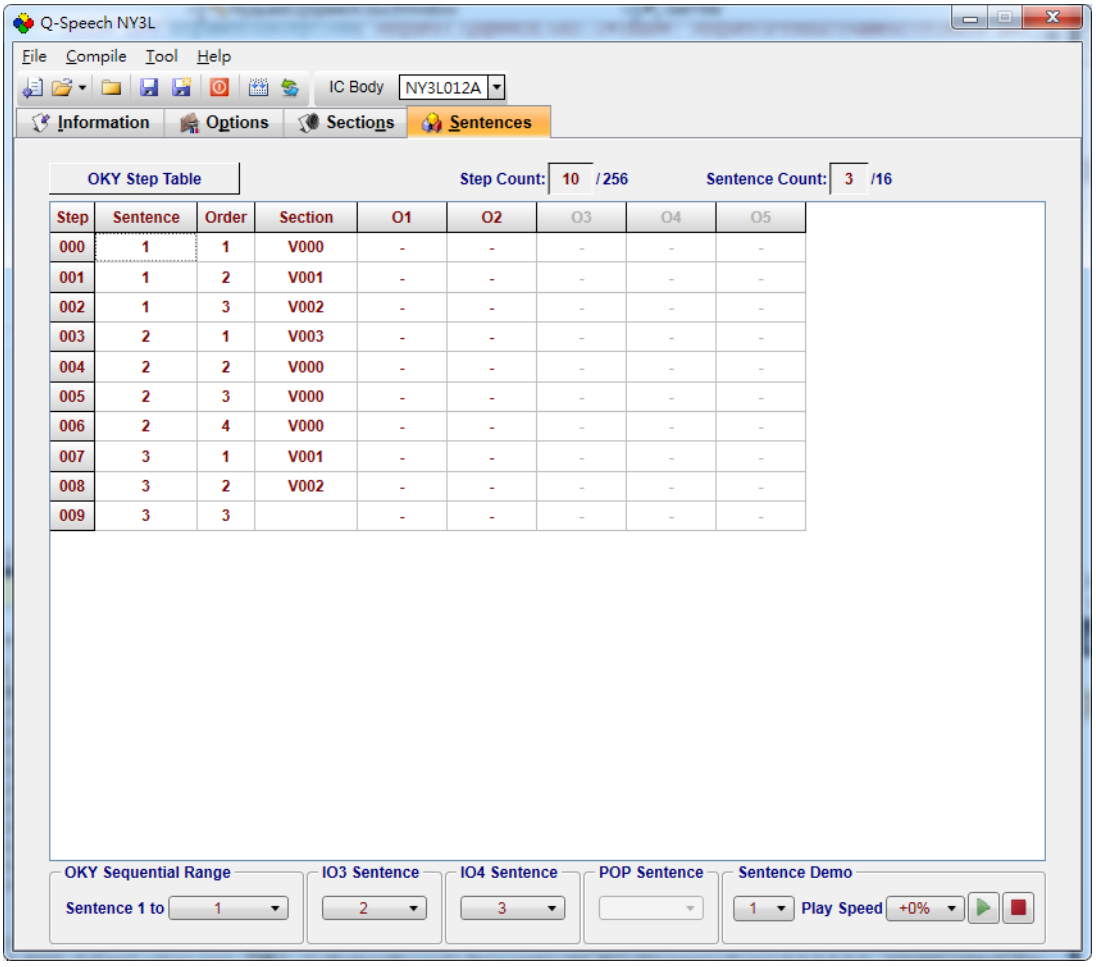
9.5.12 Right-click Menu

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

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections.’
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.
Optimize	Automatically adjust the compression ratio of the section with using the full capacity as objective.

9.6 Arranging the Sentences

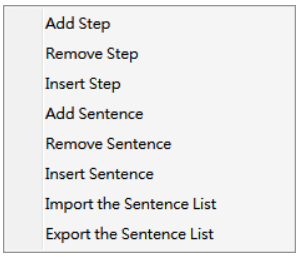
A “sentence” means a combination of sections to be played when triggered. For NY3L, there are 16 sentences, and the steps maximum is 256 steps.



9.6.1 Step Column

For NY3L, there are totally 256 (0 to 255) steps that can be defined for each step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. There mustn’t be any undefined steps between defined steps. The total number of defined steps is shown above the step table.

9.6.2 Sentence Column



The Sentence Column shows the sentence numbers the steps belong to. For NY3L, there are total 16 (1 to 16) sentences available. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / Import / Export a step or sentence, right-clicking on the desired Step or Sentence Column, then select the

actions in the pop-up menu.

9.6.3 Order Column

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, steps will be played sequentially. *Q-Speech* will automatically generate the numbers of all the steps according with order in a sentence.

9.6.4 Section Column

Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

9.6.5 O1 / O2 / O3 / O4 / O5 Column

When O1(O2, IO3, IO4, O5) is set as output on Options page, the O1(O2, O3, O4, O5) 2 steps in step table must be specified to implement IC's output functional. There are 9 kinds of output options available in NY3L, which includes 4 kinds of regular options (see **Table 9.4.21** for details) and 1 user-defined output Q1 (Q2 ~ Q5) signal, whereas it is available only when the voice is in *Quick-IO* format (.nyq), but not support O4 and O5.

When using *Quick-IO*, Q1 and Q4 are the same set that corresponds to O1, Q2 and Q5 are the other set that corresponds to O2, and Q3 corresponds to O3 independently.

The flashing rate for LED 3 Hz option is positive relative to the Play Speed selected on the Options page. Only when the Play Speed is 6 KHz, is its flashing rate equal to the option.

9.6.6 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.

9.6.7 IO3 / IO4 / POP Sentence

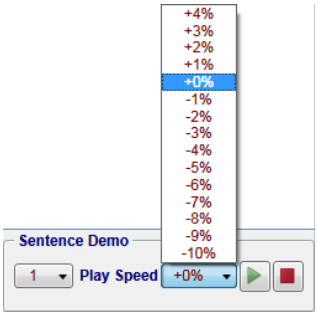
IO3 / IO4 / POP Sentence or POP Sentence is available only when IO3 / IO4 is set as input or POP is enabled on Options page.

When user executes IO / POP Sentence by selecting 13 sentences of OKY Step Table, and the

sentences are under 13, IO3 / IO4 / POP Sentence could be specified to play any sentence. But if the sum of sentences exceeds 13, IO3 Sentence must be restricted to the 14th Sentence. If the sum of sentences exceeds 14, IO3 / IO4 Sentence will be restricted to the 14th and 15th Sentence. If the sum of sentences exceeds 16, IO3 Sentence, IO4 Sentence and POP Sentence must be restrict to 14th, 15th and 16th sentence respectively.

9.6.8 Sentence Demo

Select any Sentence, and it could be auditioned by using the Media Player (). Users also can adjust the Play Speed file sentence. However, the adjustment will not have any effect in BIN file and Demo Board. It's just a demonstration function on PC.



9.6.9 Right-click Menu

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

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

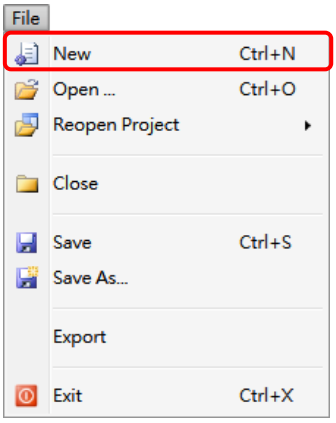
10 Using *Q-Speech* for NY4A Series

In this chapter, the details of using *Q-Speech* for NY4A will be presented step by step.

Contents:

10.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY4A, a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.



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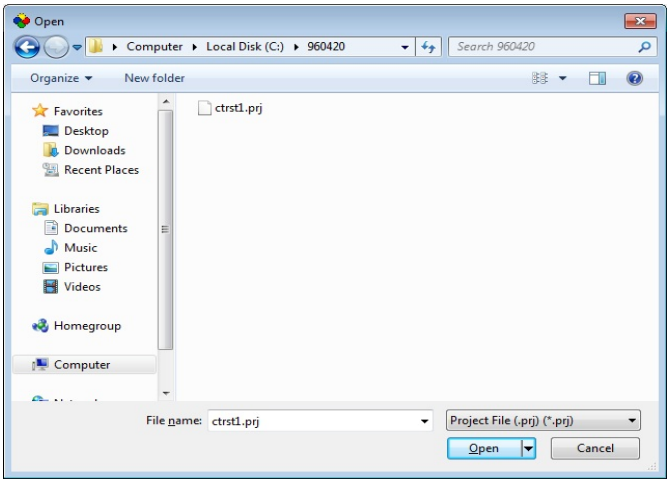
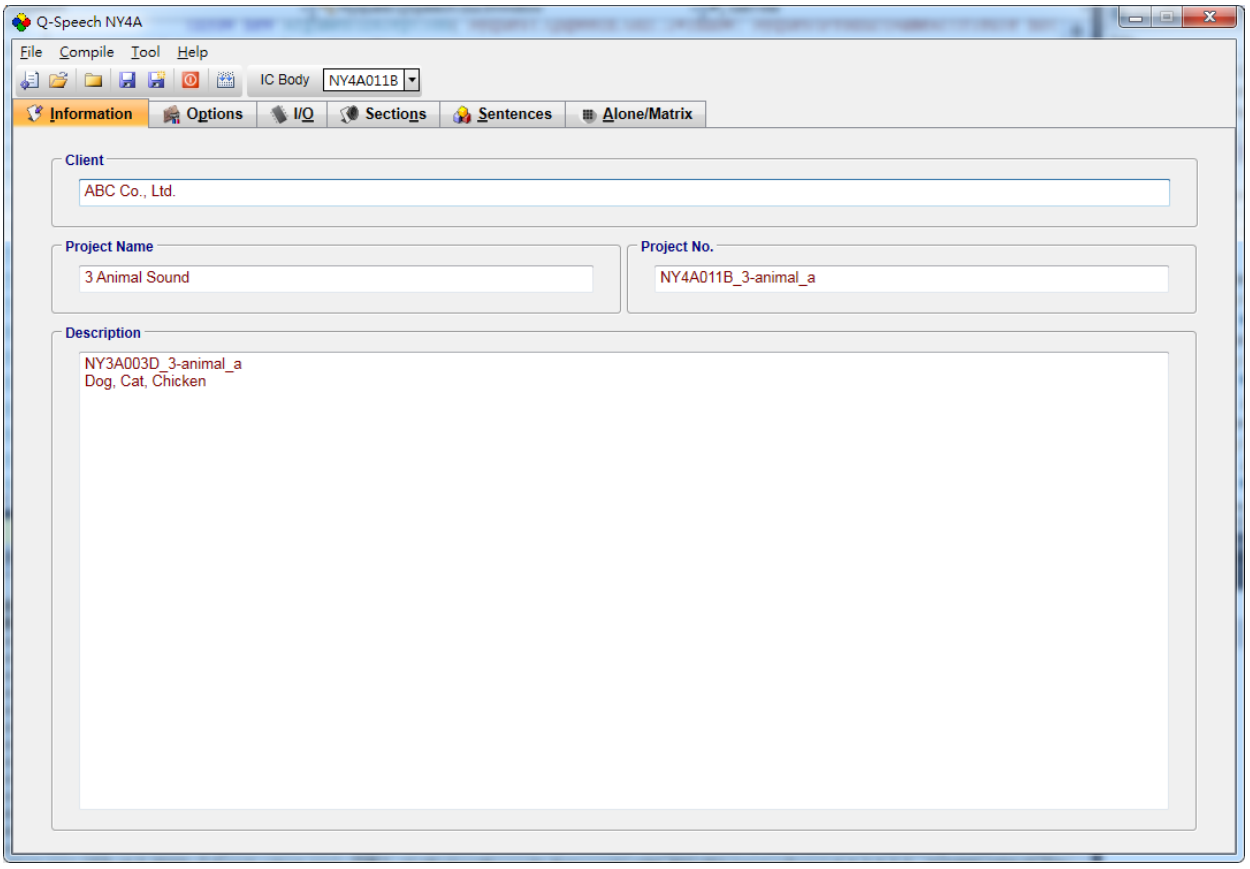


10.2 Filling in the Information

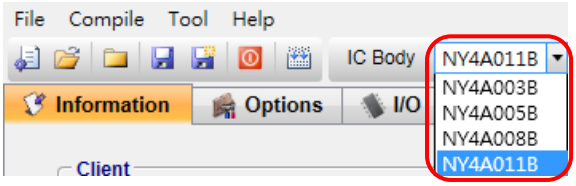
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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.

10.3 Selecting the IC Body

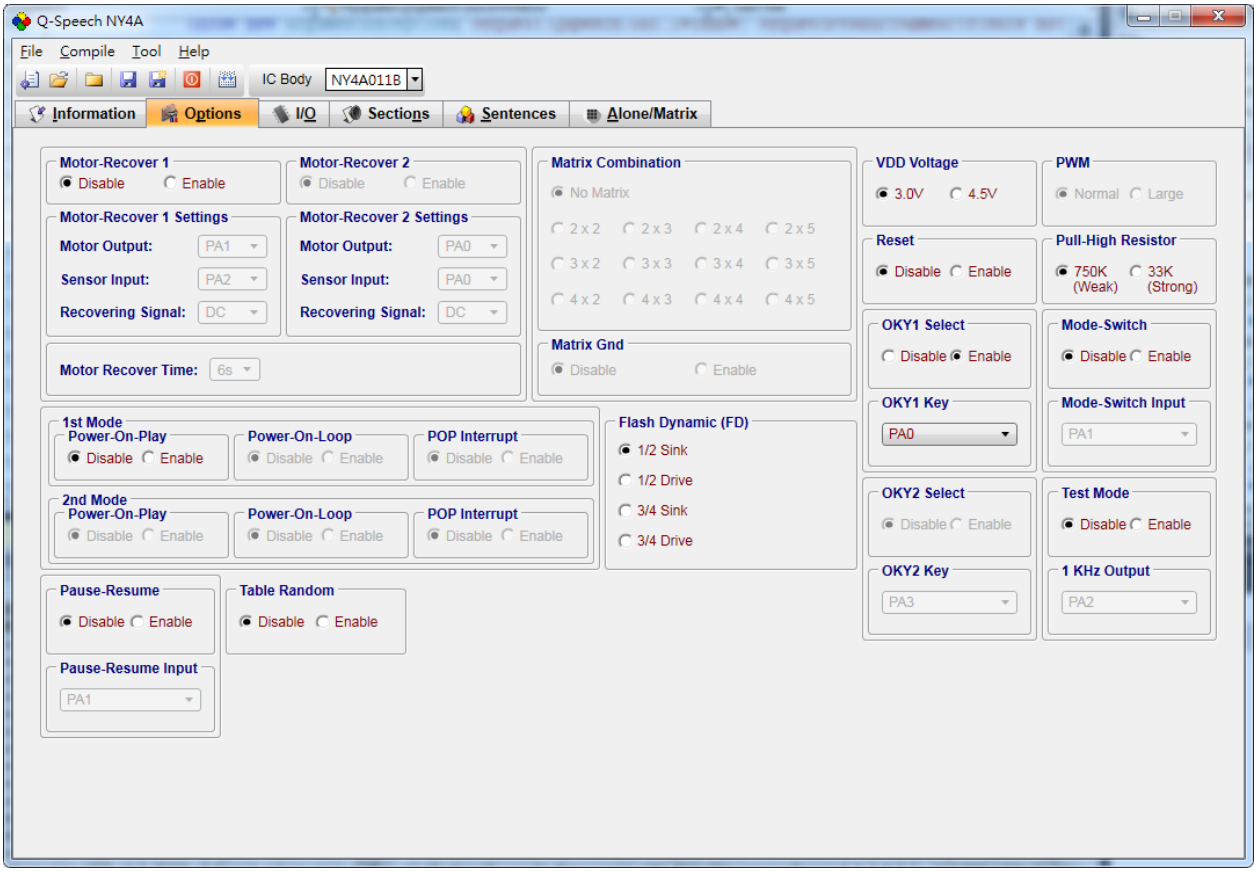
A drop-down list named [IC Body] can be found at the top of the window. By clicking the Down button of the drop-down list, all available IC bodies will be listed for selection. IC body could be changed during editing a project, but an error message may display if the total ROM Size of current sections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



10.4 Selecting the Options

By selecting different mask options on the Options page, the functions desired could be accomplished

quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Power-On-Play, Power-On-Loop, POP Interrupt, etc, could be set easily on this page.



10.4.1 Setting Motor-Recover

Motor-Recover option allows user to enable (or disable) the special application for motor recovering (default is “Disable’).

Note: NY4A series only can set Motor-Recover 1.

10.4.2 Motor-Recover Settings

- Motor output: This option is to set a specific pin as motor output and connect to motor-recover. User also can specify any pin as the motor output.
- Sensor Input: This option is to set an input pin as motor recovering sensor, which detects if the motor is back to initial status. User can specify any pin as the sensor.
- Recovering Signal: There are 3 kinds of signal, which are DC, 6 Hz and 12 Hz, available for motor recovering signal.

10.4.3 Motor-Recover Time

User can set the maximum motor-recover time. If motor-recover isn’t triggered in the set time, it will

stop motor output automatically and be regarded as recovery finished.

10.4.4 Selecting 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.

10.4.5 Setting Reset

When the Reset option is enabled, user can reset IC by using IC external signals to recover pin.

10.4.6 Setting Pull-High Resistor

The Pull-High Resistor function can set the input mode of resistor.

10.4.7 OKY1 / OKY2 Select

When the OKY1 / OKY2 Select option is enabled, user must set any pin as OKY pin. User can use OKY Trigger Function with OKY Reset On/Off to control the playback status of sentences.

10.4.8 Selecting Mode-Switch

Mode-Switch enables inputs to have 2 kinds of functions with the same key. Any pin can be set as Switch Pin, and then PIN connecting can be switched between VDD (the 1st Mode) and GND (the 2nd Mode) to realize Mode-Switching. Although input functions can be different between modes, the output functions (current & connected type) must be the same between modes.

Note: If the Input type of the Mode-Switch pin is Pull-High, it will cause additional consumption when the pin is connected with Low while entering sleep mode. If the Mode-Switch pin is Floating, it must be set as High or Low level.

10.4.9 Test Mode

When the option of Test Mode is enabled, user must set any pin as test pin. When users press and hold the test pin then power on the IC, the IC will enter Test Mode, and the test pin will output 1 KHz square wave continuously.

Note: In Test Mode, the test pin cannot be the same pin of Reset, Mode Switch and Sensor Input, but can be set as other functional pin.

10.4.10 Setting Power-On-Play (POP)

“POP Sentence” would be played one time as the power is turned on.

If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won’t stop until user sets other options and play the specified

sentence immediately.

Note: When POP is set as "Enable", user could specify the sections on Sentence tab.

10.4.11 Setting Power-On-Loop

The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects "Enable" and IC is powered on, IC will play POP Sentence repeatedly.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

10.4.12 Setting Power-On-Play Interrupt (POP Interrupt)

The settings of Power-On-Play Interrupt will decide whether interrupt POP. When user selects "Enable", the Trigger button could interrupt POP Sentence immediately.

Note: This setting could be enabled only when user set Power-On-Play first.

10.4.13 Pause-Resume

When user enables the Pause-Resume function, the playing sentence would be paused as user presses pause pin; when user presses pause again, the song would be continued to play the rest part.

10.4.14 Table Random

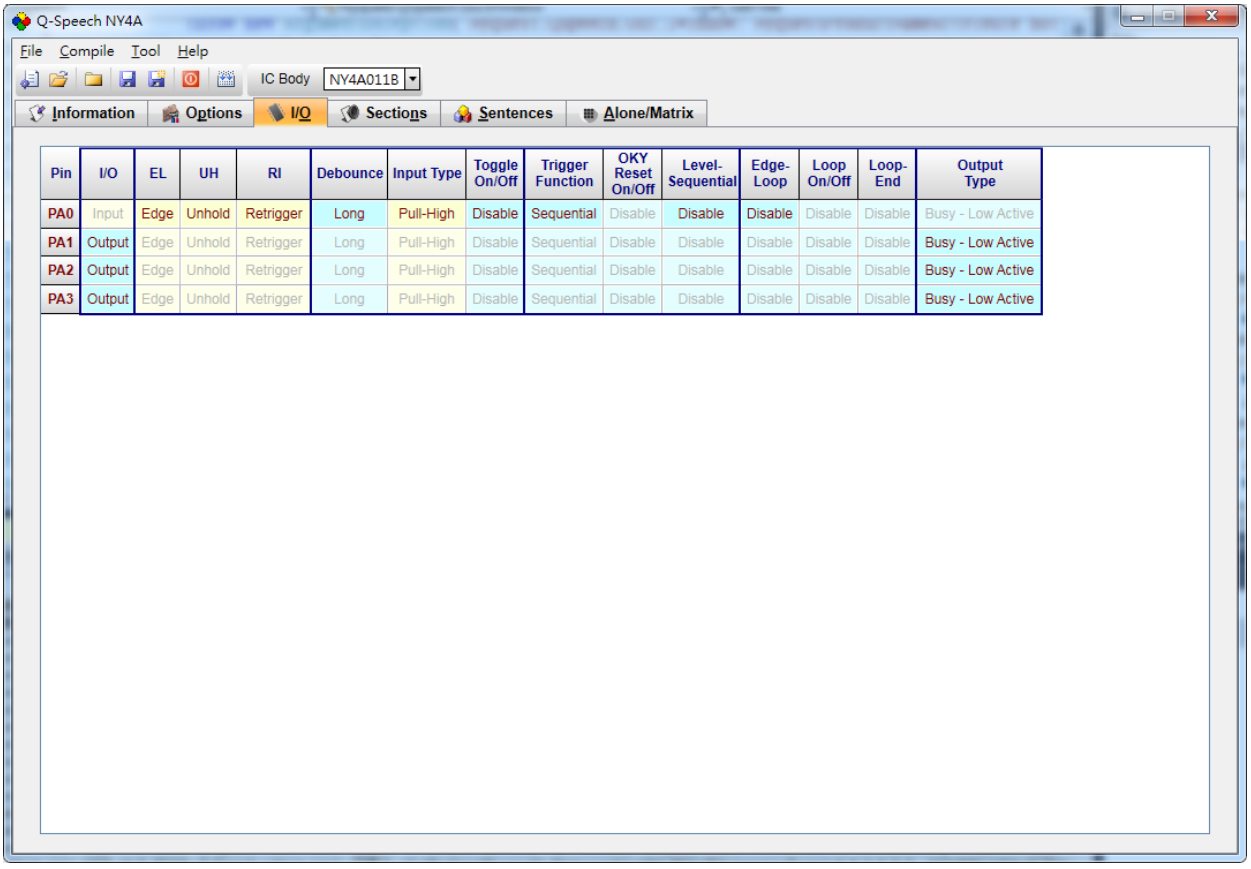
When user enables the Table Random function and triggers OKY1 to play sentence at the first time, one sentence would be played from OKY1 Step Table randomly. For the later triggers, the sentences after last triggered sentence will be played sequentially.

10.4.15 Selecting Flash Dynamic

The Flash Dynamic function can set LED flash with the intensity of volume. User can select flash with 1/2 or 3/4 volume and set the output type as Drive or Sink.

10.5 Setting I/O

By selecting different options on the I/O page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Input Type, Trigger Mode, etc, could be set easily on this page.



Pin	I/O	EL	UH	RI	Debounce	Input Type	Toggle On/Off	Trigger Function	OKY Reset On/Off	Level-Sequential	Edge-Loop	Loop On/Off	Loop-End	Output Type
PA0	Input	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PA1	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PA2	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PA3	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active

10.5.1 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.

For the timing diagrams describing the trigger modes, please see NY4A Data Sheet.

10.5.2 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for

OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

10.5.3 Selecting Input Type

The Input Type usually represents the different applications of an input. For NY4A series there are 2 input type options for different applications.

Option	Input Type Description
Pull-High	Internal 750KΩ or 33KΩ pull-high, 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.

10.5.4 Setting Toggle On/Off

The Toggle On/Off function allows users to immediately stop the voice playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To use this function, the specific trigger must be set to Unhold and Retrigger.

10.5.5 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.

10.5.6 Selecting OKY Reset On/Off

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

10.5.7 Level-Sequential

When key 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 both Edge-Loop and Loop On/Off

function, it plays the assigned sentences sequentially in loop (S1, S2, S3, S1, S2, S3, …) 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.

10.5.8 Edge-Loop

When Edge-Loop option is enabled, then it will play the assigned sentence in loop while the key is triggered.

10.5.9 Setting 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 in loop, and stops playing if triggered again during playing, and so on.

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

10.5.10 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 (Sentence 1→ Sentence 2→ Sentence 3 → Stop → Sentence 1).

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

10.5.11 Selecting Output Type

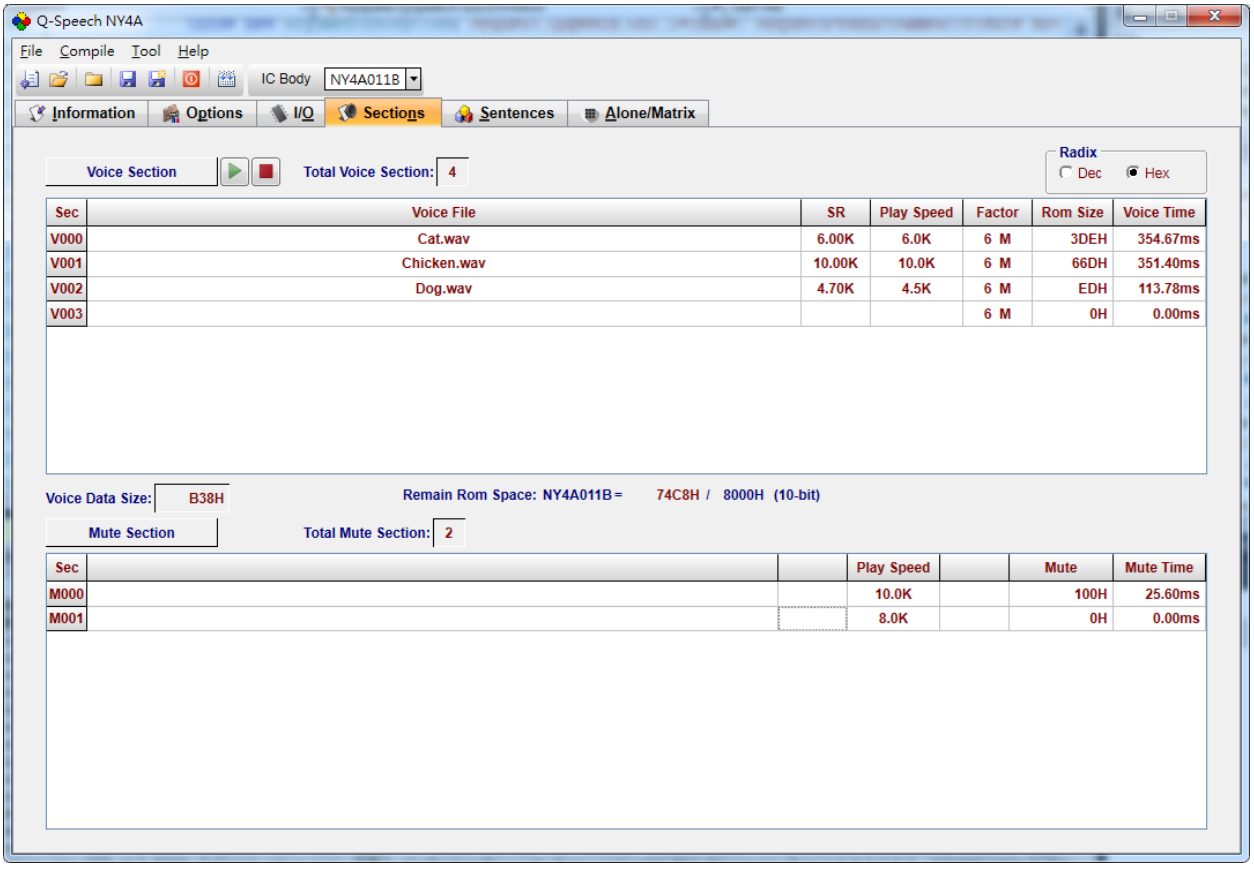
When a pin is set as output, user can specify a status signal as the output signal. The following are the available output type options:

Table 10.5.11 – NY4A Output Type

Option	Output Type Description
Busy – Low Active	Low active signal output during playing.
Busy – High Active	High active signal output during playing.

10.6 Managing the Sections

User can use the Sections page to include and manage the sections for a project. For NY4A, there are two kinds of sections: Voice Section and Mute Section. A section contains a voice file whereas a mute section contains only the mute length without voice file, and it allows total 512 sections of section and mute section altogether. The upper part of the page is for editing sections whereas the lower part of the page is for editing mute sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.

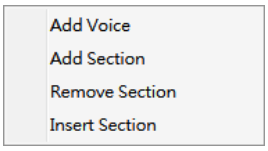


10.6.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V255 (totally 256 sections), mute sections are from M000 to M255 (totally 256 mute sections) in NY4A.

10.6.2 Voice File Column

Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY4A only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double



left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

10.6.3 SR Column

SR stands for the sample rate of the voice file.

10.6.4 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a section here. There are 41 kinds of Play Speed available, and each section can be given a unique Play Speed.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
24.0 KHz	23.5 KHz	23.0 KHz	22.5 KHz	22.0 KHz	21.5 KHz	21.0 KHz	20.5 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
20.0 KHz	19.5 KHz	19.0 KHz	18.5 KHz	18.0 KHz	17.5 KHz	17.0 KHz	16.5 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
16.0 KHz	15.5 KHz	15.0 KHz	14.5 KHz	14.0 KHz	13.5 KHz	13.0 KHz	12.5 KHz
25	*26*	*27*	*28*	*29*	*30*	*31*	*32*
12.0 KHz	11.5 KHz	11.0 KHz	10.5 KHz	10.0 KHz	9.5 KHz	9.0 KHz	8.5 KHz
33	*34*	*35*	*36*	*37*	*38*	*39*	*40*
8.0 KHz	7.5 KHz	7.0 KHz	6.5 KHz	6.0 KHz	5.5 KHz	5.0 KHz	4.5 KHz
41							
4.0 KHz							

10.6.5 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 13 Factors, which from ‘1’ to ‘12’ are compressed while PCM is uncompressed. Normally, a bigger Factor will lead to bigger ROM Size but better quality after compression. The default Factor is ‘6’.

Factor	Comment
PCM	Ultra high sound quality, but largest ROM Size.
12 H	The best compressed sound quality.
…	…
6 M	Middle sound quality (default).
…	…
1 L	Very low sound quality, but smallest ROM Size.

10.6.6 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected by the features of different IC series. Please note that every NY4A Series IC actually imposes a maximum limit on each type of section including pure section and pure mute section. The maximum limits imposed on all the NY4A Series ICs are tabulated below.

Table 10.6.6 – The maximum limits imposed by NY4A Series ICs

Body	MaxV	MaxM	Max Total
NY4A003B	3000H	64000H	3000H
NY4A005B	4000H	64000H	4000H
NY4A008B	6000H	64000H	6000H
NY4A011B	8000H	64000H	8000H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section (section with a voice file only).
- **MaxM** column shows the maximum value of the mute data when the 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.

10.6.7 Voice Time Column

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

10.6.8 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY4A must be the multiple of 1H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 1H whereas pressing the Down button makes mute data decrease by 1H.

10.6.9 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

10.6.10 Radix

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

10.6.11 Total Voice Section & Total Mute Section

Total Voice Section and Total Mute Section are displayed at the top of the section and mute section. Total Voice Section counts the used sections, and Total Mute Section counts the used mute sections.

10.6.12 Voice Data Size & Remain ROM Space

Voice Data Size shows the total current used ROM size, Remain ROM Space shows the available total ROM size. The total used ROM Size must not exceed the available total ROM Size displayed to the right of slash (“/”). Please see Table 10.6.6.

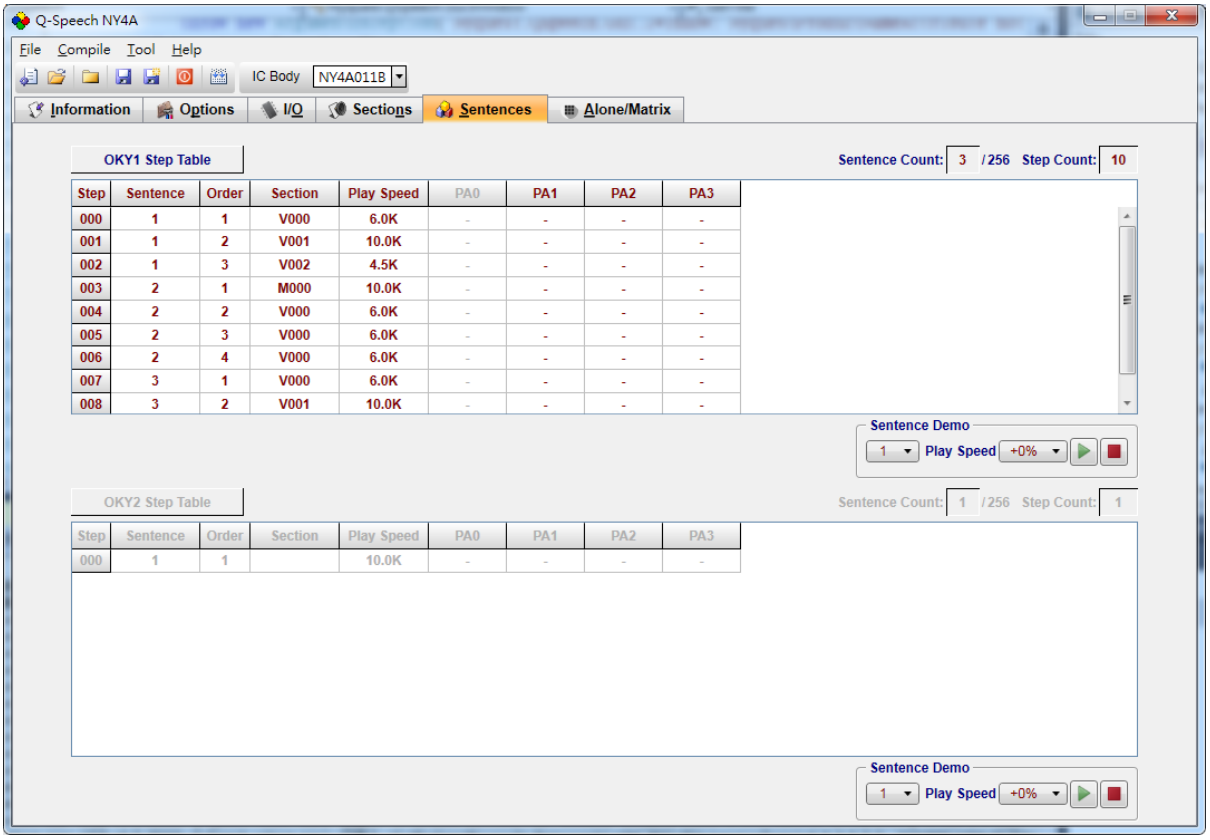
10.6.13 Right-click Menu

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

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections. **(This function doesn’t support mute sections.)**
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.

10.7 Arranging the Sentences

A “sentence” means a combination of sections to be played when triggered. For NY4A, there are 16 sentences, and the steps maximum is 256 steps.

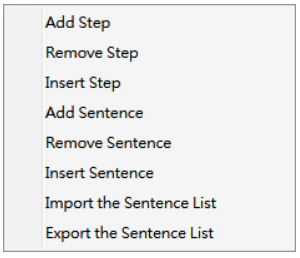


10.7.1 Step Column

For NY4A, there are totally 5000 (000 to 4999) steps that can be defined for each step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. There mustn’t be any undefined steps between defined steps. The total number of defined steps is shown above the step table.

10.7.2 Sentence Column

The Sentence Column shows the sentence numbers the steps belong to. For NY4A, there are total 256 (1 to 256) sentences available. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / import / export a step or sentence, right-clicking on the desired Step or Sentence Column, then select the actions in the pop-up menu.



10.7.3 Order Column

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, steps will be played sequentially. *Q-Speech* will automatically generate the numbers of all the steps according with order in a sentence.

10.7.4 Section Column

Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

10.7.5 Play Speed

Play Speed means the speed (samples per second) that IC plays a section here. There are 41 kinds of Play Speed available, and each section can be given a unique Play Speed. Please see **10.6.4 Play Speed Column** for more details.

10.7.6 PAx Column

When PAx is set as output on I/O page, user must set the corresponding steps with PAx output signals on Sentence page to achieve PAx output. There are 7 available output types of NY4A that include 6 regular types (please see **Table 10.7.6**) and 1 user-defined output 8ignal Q1 (Q2, Q3, Q4), whereas Q1 (Q2, Q3, Q4,) are available only when the voice is in *Quick-IO* format (.nyq). The following are the available output signal options:

Table 10.7.6 – NY4A Output Signals

Option	Output Signals Description
Busy – High Active	High active signal output during playing.
Busy – Low Active	Low active signal output during playing.
Flash Dynamic	LED signals flash with the intensity of volume.
LED: 1.5 Hz	1.50Hz sink signal output for driving LED.
LED: 3 Hz	3 Hz sink signal output for driving LED.
LED: 6 Hz	6 Hz sink signal output for driving LED.

10.7.7 Right-click Menu

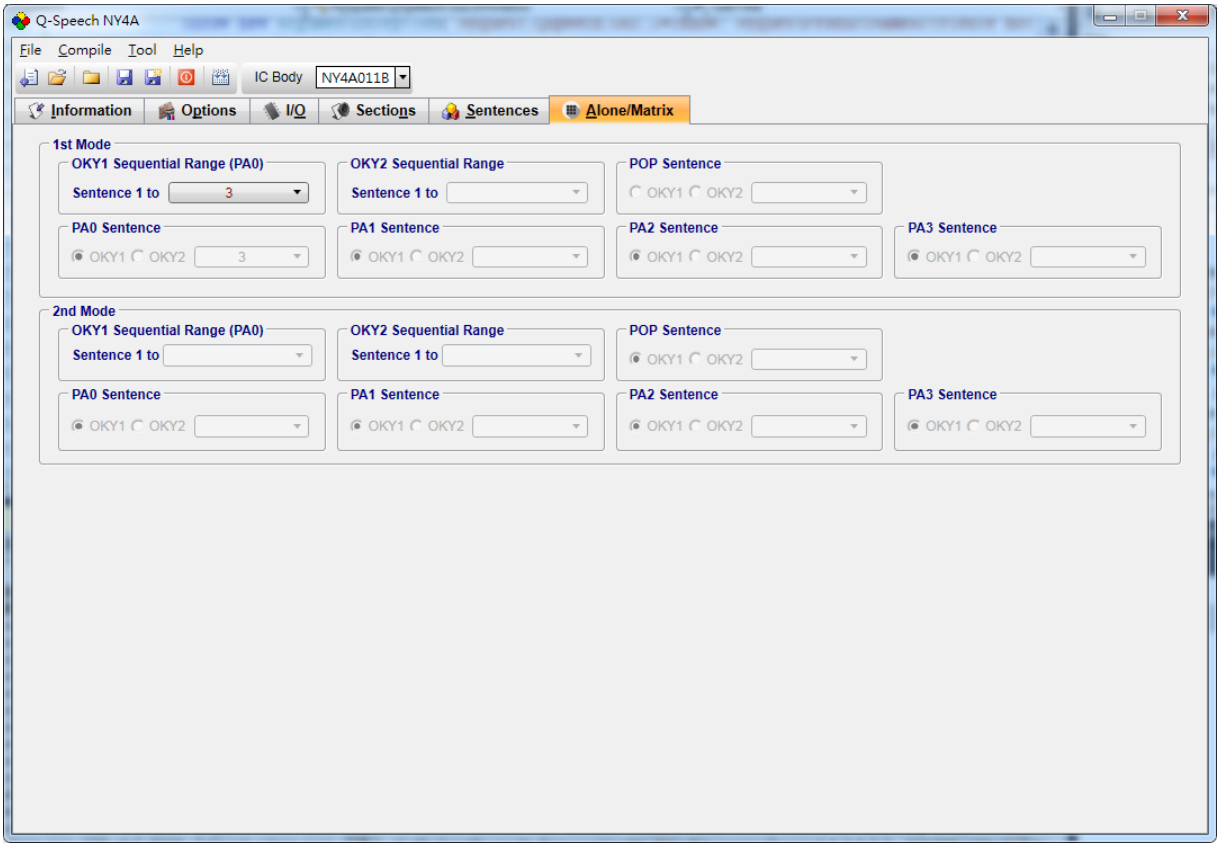
A right-click menu will show on the right by right clicking on the sentence table. The functions of the menu items are as follows:

Option	Function
Add Step	Add a new step at the end of the sentence.

Option	Function
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

10.8 Alone/Matrix

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



10.8.1 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.

10.8.2 PAx / POP Sentence

When the PAx input or POP is enabled on the Option page, user can specify which sentence will be executed when PAx / POP is triggered.

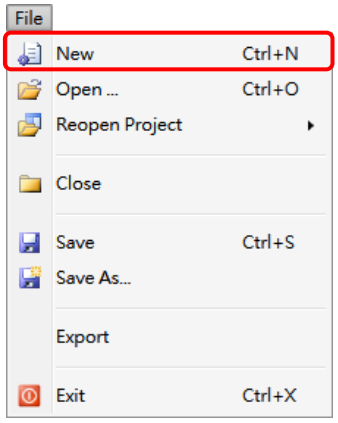
11 Using *Q-Speech* for NY4B Series

In this chapter, the details of using *Q-Speech* for NY4B will be presented step by step.

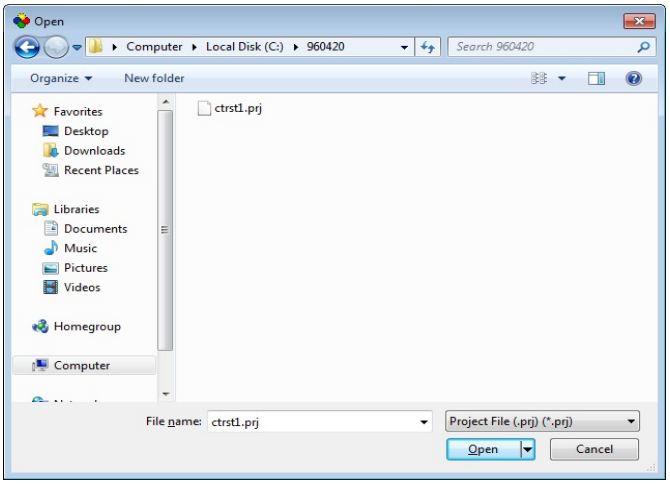
Contents:

11.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY4B, a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

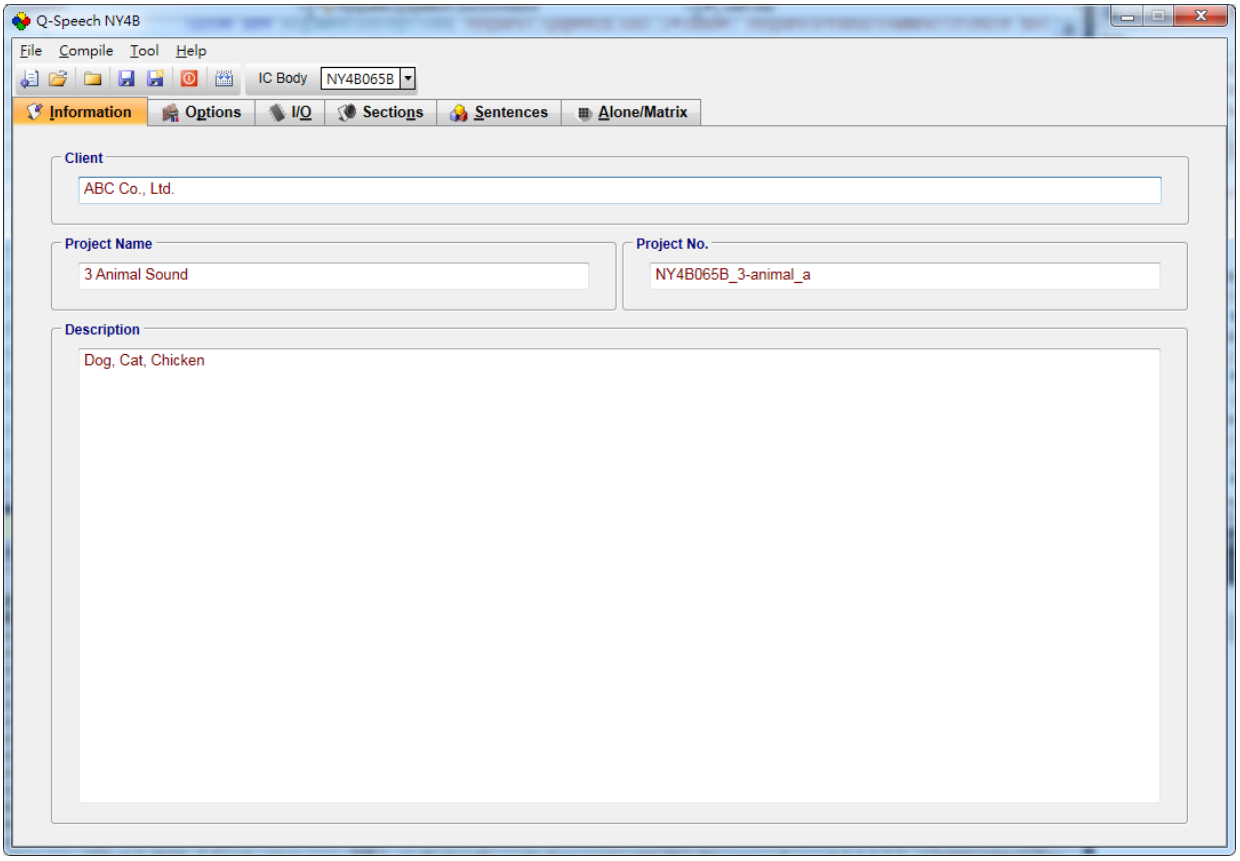


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



11.2 Filling in the Information

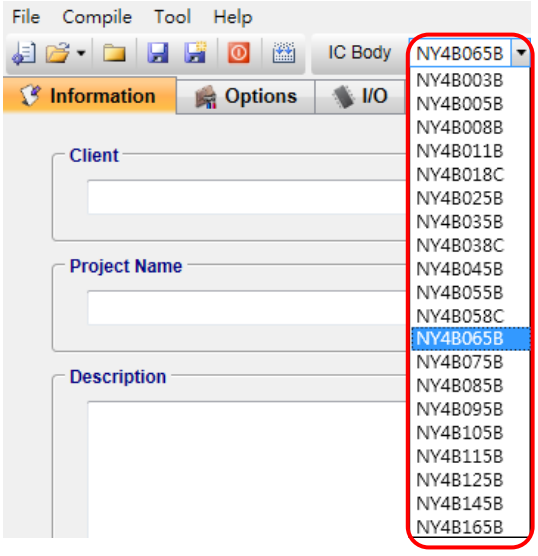
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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.

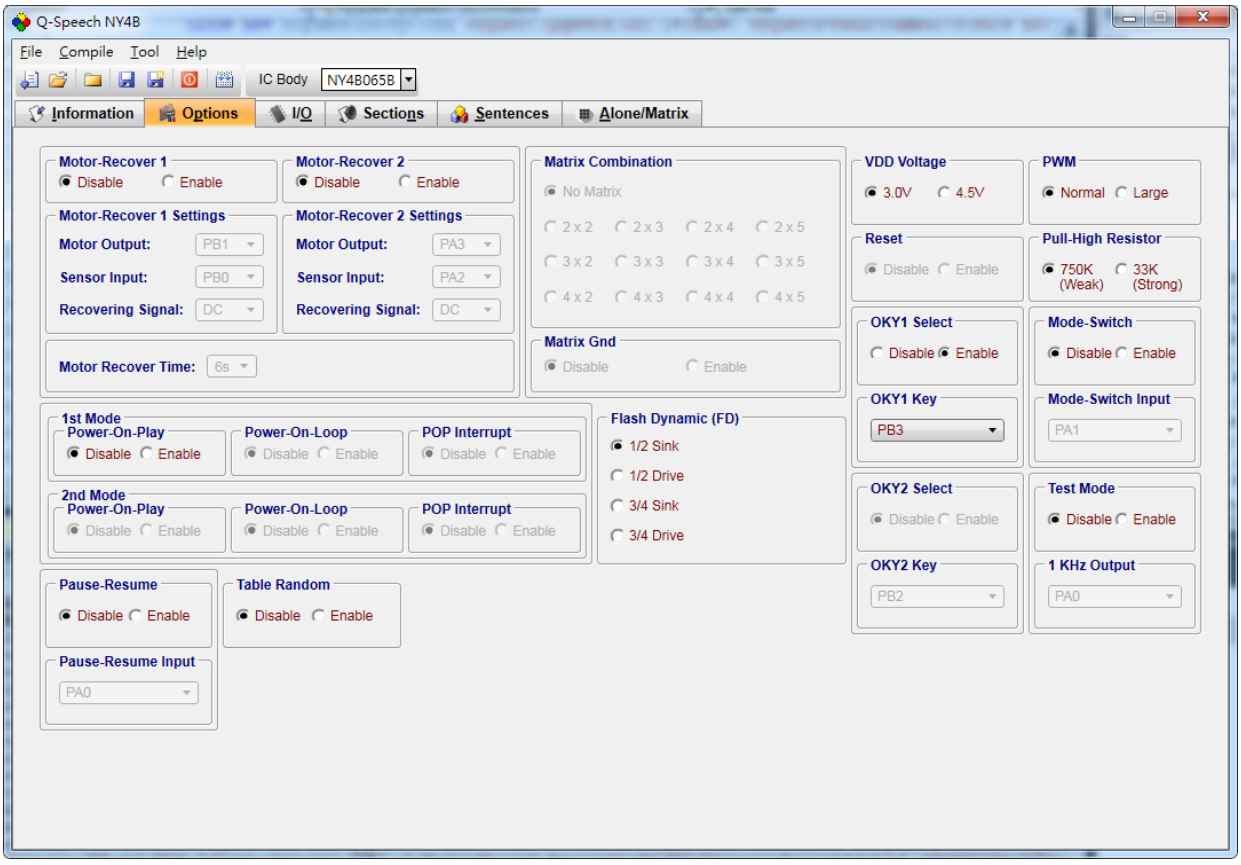
11.3 Selecting the IC Body

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



11.4 Selecting the Options

By selecting different mask options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Power-On-Play, Power-On-Loop, POP Interrupt, etc, could be set easily on this page.



11.4.1 Setting Motor-Recover

Motor-Recover option allows user to enable (or disable) the special application for motor recovering (default is “Disable’).

11.4.2 Motor-Recover Settings

- Motor output: This option is to set a specific pin as motor output and connect to motor-recover. User also can specify any pin as the motor output pin.
- Sensor Input: This option is to set an input pin as motor recovering sensor, which detects if the motor is back to initial status. User can specify any pin as the sensor.
- Recovering Signal: There are 3 kinds of signal, which are DC, 6 Hz and 12 Hz, available for motor recovering signal.

11.4.3 Motor-Recover Time

User can set the maximum motor-recover time. If motor-recover isn't triggered in the set time, it will stop motor output automatically and be regarded as recovery finished.

11.4.4 Selecting 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.

11.4.5 Setting PWM Output

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

11.4.6 Setting Reset

When the Reset option is enabled, user can reset IC by using IC external signals to recover pin.

11.4.7 Setting Pull-High Resistor

The Pull-High Resistor function can set the input mode of resistor.

11.4.8 OKY1 / OKY2 Select

When the OKY1 / OKY2 Select option is enabled, user must set any pin as OKY pin. User can use OKY Trigger Function with OKY Reset On/Off to control the playback status of Sentences.

11.4.9 Selecting Mode-Switch

Mode-Switch enables inputs to have 2 kinds of functions with the same key. Any pin can be set as Switch Pin, and then PIN connecting can be switched between VDD (the 1st Mode) and GND (the 2nd Mode) to realize Mode-Switching. Although input functions can be different between modes, the output functions (current & connected type) must be the same between modes.

Note: If the Input type of the Mode-Switch pin is Pull-High, it will cause additional consumption when the pin is connected with Low while entering sleep mode. If the Mode-Switch pin is Floating, it must be set as High or Low level.

11.4.10 Test Mode

When the option of Test Mode is enabled, user must set any pin as test pin. When users press and hold the test pin then power on the IC, the IC will enter Test Mode, and the test pin will output 1 KHz square wave continuously.

Note: In Test Mode, the test pin cannot be the same pin of Reset, Mode Switch and Sensor Input, but can be set as other functional pin.

11.4.11 Setting Power-On-Play (POP)

"POP Sentence" would be played one time as the power is turned on.

If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won't stop until user sets other options and play the specified sentence immediately.

Note: When POP is set as "Enable", user could specify the sections on Sentence tab.

11.4.12 Setting Power-On-Loop

The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects "Enable" and IC is powered on, IC will play POP Sentence repeatedly.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

11.4.13 Setting Power-On-Play Interrupt (POP Interrupt)

The settings of Power-On-Play Interrupt will decide whether interrupt POP. When user selects "Enable", the Trigger button could interrupt POP Sentence immediately.

Note: This setting could be enabled only when user set Power-On-Play first.

11.4.14 Pause-Resume

When user enables the Pause-Resume function, the playing sentence would be paused as user presses pause pin; when user presses pause again, the song would be continued to play the rest part.

11.4.15 Table Random

When user enables the Table Random function and triggers OKY1 to play sentence at the first time, one sentence would be played from OKY1 Step Table randomly. For the later triggers, the sentences after last triggered sentence will be played sequentially.

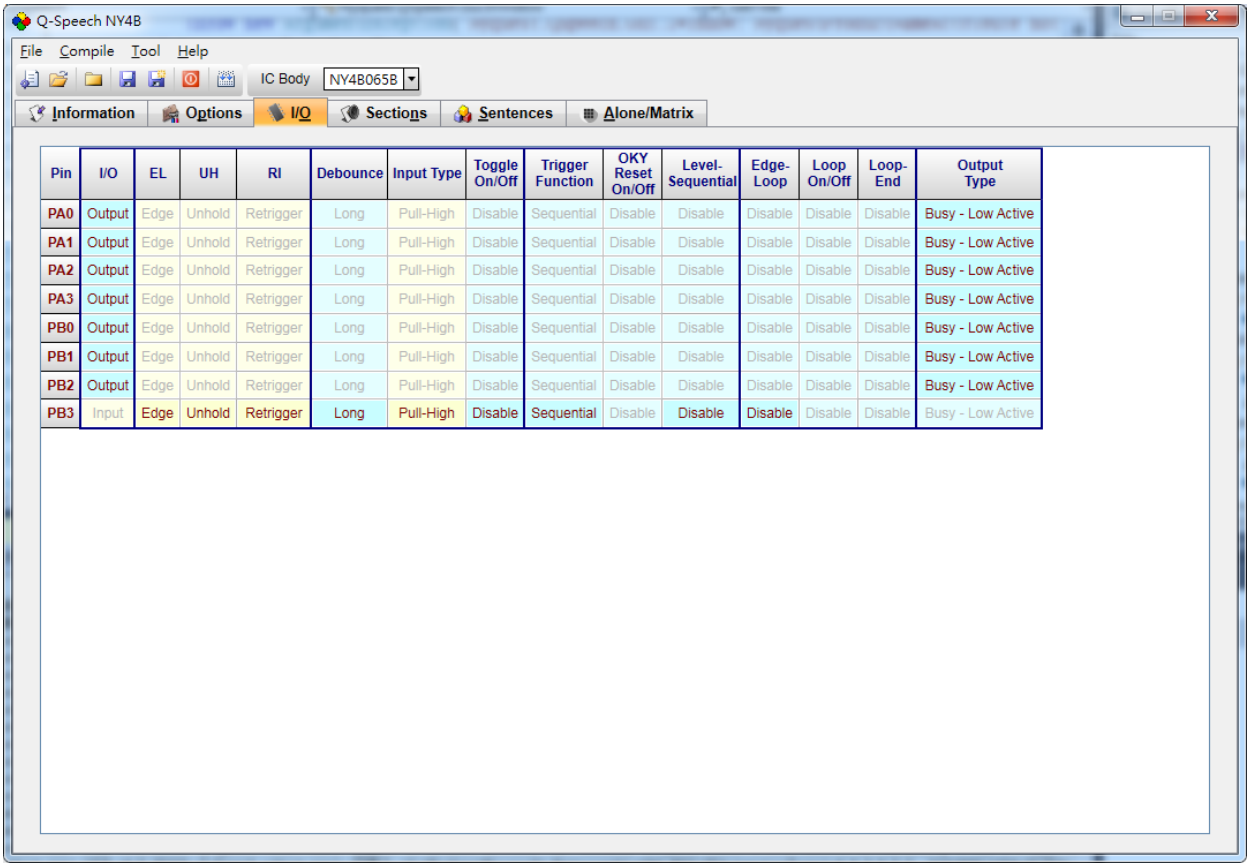
11.4.16 Selecting Flash Dynamic

The Flash Dynamic function can set LED flash with the intensity of volume. User can select flash with 1/2 or 3/4 volume and set the output type as Drive or Sink.

11.5 Setting I/O

By selecting different options on the I/O page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in

Options page. Functions of the IC, such as Debounce Time, Input Type, Trigger Mode, etc, could be set easily on this page.



Pin	I/O	EL	UH	RI	Debounce	Input Type	Toggle On/Off	Trigger Function	OKY Reset On/Off	Level-Sequential	Edge-Loop	Loop On/Off	Loop-End	Output Type
PA0	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PA1	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PA2	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PA3	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PB0	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PB1	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PB2	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PB3	Input	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active

11.5.1 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.

For the timing diagrams describing the trigger modes, please see NY4B Data Sheet.

11.5.2 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted

double triggers by the bouncing of trigger button.

11.5.3 Selecting Input Type

The Input Type usually represents the different applications of an input. For NY4B series there are 2 input type options for different applications.

Option	Input Type Description
Pull-High	Internal 750KΩ or 33KΩ pull-high, 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.

11.5.4 Setting Toggle On/Off

The Toggle On/Off function allows users to immediately stop the voice playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To use this function, the specific trigger must be set to Unhold and Retrigger.

11.5.5 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.

11.5.6 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 another 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.

11.5.7 Level-Sequential

When key 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 both Edge-Loop and Loop On/Off function, it plays the assigned sentences sequentially in loop (S1, S2, S3, S1, S2, S3, …) 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.

11.5.8 Edge-Loop

When Edge-Loop option is enabled, then it will play the assigned sentence in loop while the key is triggered.

11.5.9 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 in loop, and stops playing if triggered again during playing, and so on.

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

11.5.10 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 (Sentence 1→ Sentence 2→ Sentence 3 → Stop → Sentence 1).

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

11.5.11 Selecting Output Type

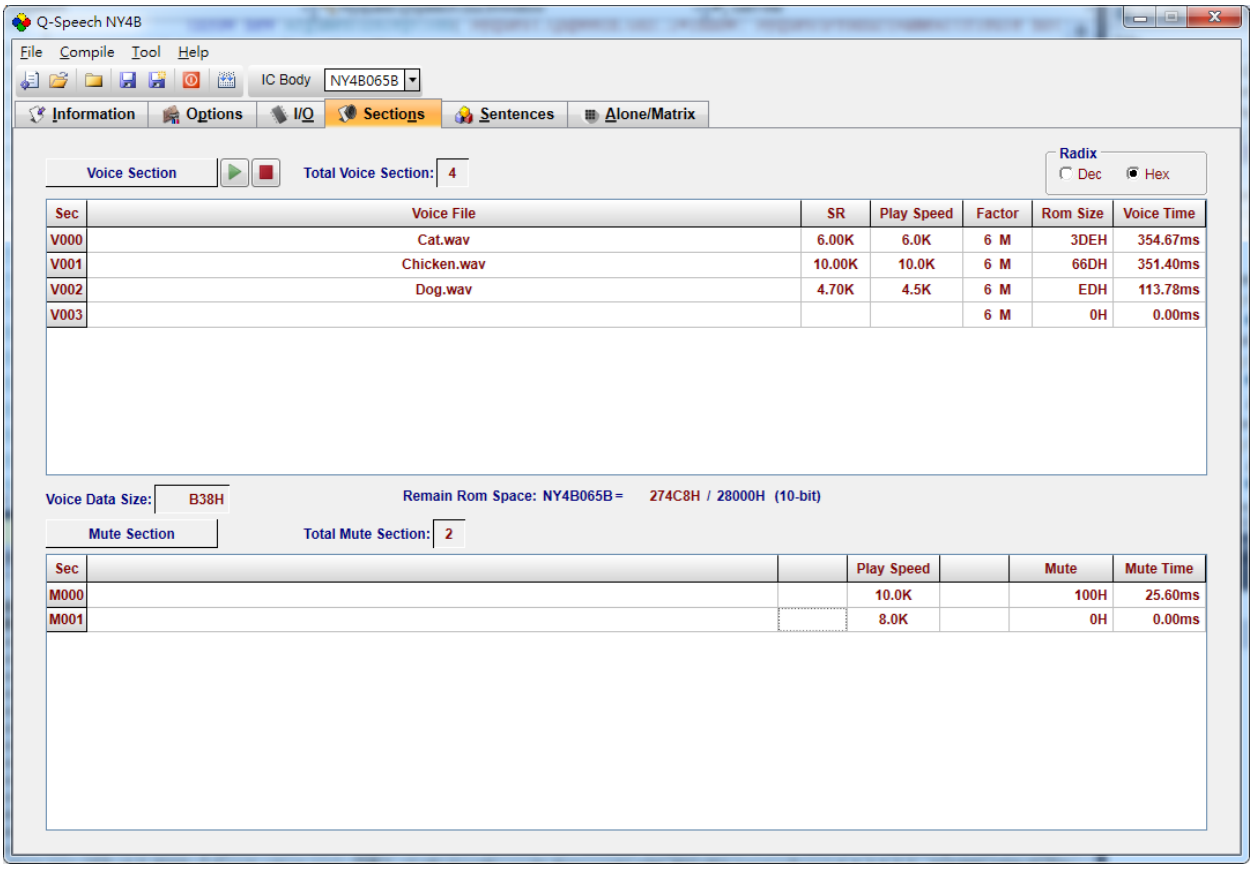
When a pin is set as output, user can specify a status signal as the output signal. The following are the available output type options:

Table 11.5.11 – NY4B Output Type

Option	Output Type Description
Busy – Low Active	Low active signal output during playing.
Busy – High Active	High active signal output during playing.

11.6 Managing the Sections

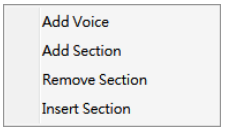
User can use the Sections page to include and manage the sections for a project. For NY4B, there are two kinds of sections: Voice Section and Mute Section. A section contains a voice file whereas a mute section contains only the mute length without voice file, and it allows total 512 sections of section and mute section altogether. The upper part of the page is for editing sections whereas the lower part of the page is for editing mute sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.



11.6.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V00 to V255 (totally 256 sections), mute sections are from M00 to M255 (totally 256 mute sections) in NY4B.

11.6.2 Voice File Column



Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY4B only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on the selected section, a pop-up menu will

be shown for adding Voice/Section or removing/inserting Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

11.6.3 SR Column

SR stands for the sample rate of the voice file.

11.6.4 Play Speed Column

Play Speed means the speed (samples per second) that IC plays a section here. There are 41 kinds of Play Speed available, and each section can be given a unique Play Speed.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
24.0 KHz	23.5 KHz	23.0 KHz	22.5 KHz	22.0 KHz	21.5 KHz	21.0 KHz	20.5 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
20.0 KHz	19.5 KHz	19.0 KHz	18.5 KHz	18.0 KHz	17.5 KHz	17.0 KHz	16.5 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
16.0 KHz	15.5 KHz	15.0 KHz	14.5 KHz	14.0 KHz	13.5 KHz	13.0 KHz	12.5 KHz
25	*26*	*27*	*28*	*29*	*30*	*31*	*32*
12.0 KHz	11.5 KHz	11.0 KHz	10.5 KHz	10.0 KHz	9.5 KHz	9.0 KHz	8.5 KHz
33	*34*	*35*	*36*	*37*	*38*	*39*	*40*
8.0 KHz	7.5 KHz	7.0 KHz	6.5 KHz	6.0 KHz	5.5 KHz	5.0 KHz	4.5 KHz
41							
4.0 KHz							

11.6.5 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 13 Factors, which from ‘1’ to ‘12’ are compressed while PCM is uncompressed. Normally, a bigger Factor will lead to bigger ROM Size but better quality after compression. The default Factor is ‘6’.

Factor	Comment
PCM	Ultra high sound quality, but largest ROM Size.
12 H	The best compressed sound quality.
…	…
6 M	Middle sound quality (default).
…	…
1 L	Very low sound quality, but smallest ROM Size.

11.6.6 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected by the features of different IC series. Please note that every NY4B Series IC actually imposes a maximum limit on each type of section including pure section and pure mute section. The maximum limits imposed on all the NY4B Series ICs are tabulated below.

Table 11.6.6 – The maximum limits imposed by NY4B Series ICs

Body	MaxV	MaxM	Max Total
NY4B003B	3000H	64000H	3000H
NY4B005B	4000H	64000H	4000H
NY4B008B	6000H	64000H	6000H
NY4B011B	8000H	64000H	8000H
NY4B018C	C000H	64000H	C000H
NY4B025B	10000H	64000H	10000H
NY4B035B	16000H	64000H	16000H
NY4B038C	18000H	64000H	18000H
NY4B045B	1C000H	64000H	1C000H
NY4B055B	22000H	64000H	22000H
NY4B058C	24000H	64000H	24000H
NY4B065B	28000H	64000H	28000H
NY4B075B	2E000H	64000H	2E000H
NY4B085B	34000H	64000H	34000H
NY4B095B	3A000H	64000H	3A000H
NY4B105B	40000H	64000H	40000H
NY4B115B	46000H	64000H	46000H
NY4B125B	4C000H	64000H	4C000H
NY4B145B	58000H	64000H	58000H
NY4B165B	64000H	64000H	64000H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section (section with a voice file only).
- **MaxM** column shows the maximum value of the mute data when the 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.

11.6.7 Voice Time Column

The Voice Time Column shows the voice playing time estimated by Q-Speech. Voice time varies depending on Play Speed, so changing the Play Speed on Options page may lead to change of voice time.

11.6.8 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY4B must be the multiple of 1H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 1H whereas pressing the Down button makes mute data decrease by 1H.

11.6.9 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

11.6.10 Radix

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

11.6.11 Total Voice Section & Total Mute Section

Total Voice Section and Total Mute Section are displayed at the top of the section and mute section. Total Voice Section counts the used sections, and Total Mute Section counts the used mute sections.

11.6.12 Voice Data Size & Remain ROM Space

Voice Data Size shows the total current used ROM size, Remain ROM Space shows the available total ROM size. The total used ROM Size must not exceed the available total ROM Size displayed to the right of slash (“/”). Please see **Table 11.6.6**.

11.6.13 Right-click Menu

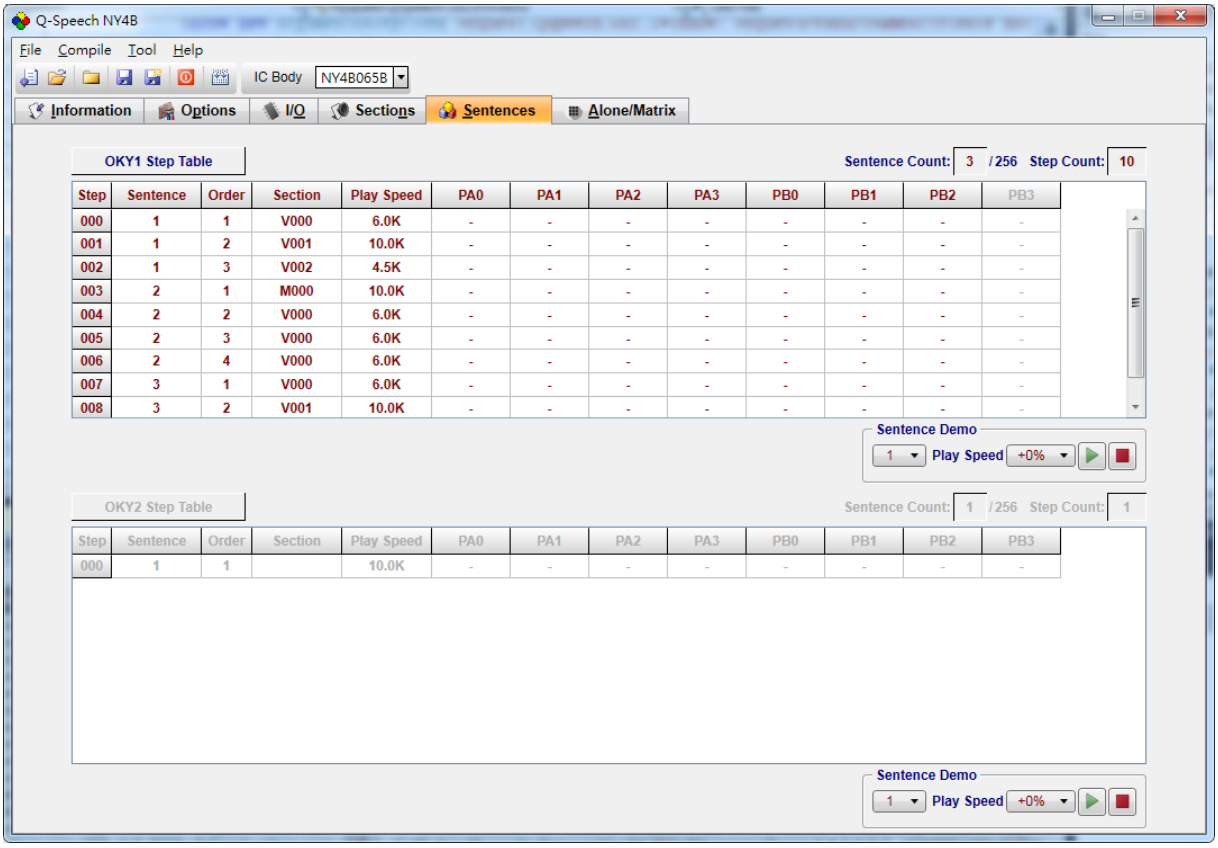
A right-click menu will show on the right by right clicking on the section table. The functions of the menu items are as follows:

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections. **(This function doesn’t support mute sections.)**

Menu Item	Function
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.

11.7 Arranging the Sentences

A “sentence” means a combination of sections to be played when triggered. For NY4B, there are 16 sentences, and the steps maximum is 256 steps.

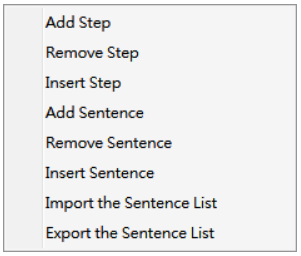


11.7.1 Step Column

For NY4B, there are totally 5000 (000 to 4999) steps that can be defined for each step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. There mustn’t be any undefined steps between defined steps. The total number of defined steps is shown above the step table.

11.7.2 Sentence Column

The Sentence Column shows the sentence numbers the steps belong to. For NY4A, there are total 256 (1 to 256) sentences available. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / import / expoert a step or sentence, right-clicking on the desired Step or Sentence Column, then select the actions in the pop-up menu.



11.7.3 Order Column

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, steps will be played sequentially. *Q-Speech* will automatically generate the numbers of all the steps according with order in a sentence.

11.7.4 Section Column

Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

11.7.5 Play Speed

Play Speed means the speed (samples per second) that IC plays a section here. There are 41 kinds of Play Speed available, and each section can be given a unique Play Speed. Please see **11.6.4 Play Speed Column** for more details.

11.7.6 PAx / PBx Column

When PAx/PBx is set as output on I/O page, user must set the corresponding steps with PAx output signals on Sentence page to achieve PAx output. There are 7 available output types of NY4A that include 6 regular types (please see**Table 11.7.6**) and 1 user-defined output signal Q1 (Q2, Q3, Q4, Q5, Q6, Q7, Q8), whereas Q1 (Q2, Q3, Q4, Q5, Q6, Q7, Q8) are available only when the voice is in *Quick-IO* format (.nyq).

The flashing rate for LED 1.5 Hz, LED 3 Hz and LED 6 Hz option is positive relative to the Play Speed selected on the Options page. Only when the Play Speed is 6 KHz, is its flashing rate equal to the option.

Table 11.7.6 – NY4B Output Signals

Option	Output Signals Description
Busy – High Active	High active signal output during playing.
Busy – Low Active	Low active signal output during playing.
Flash Dynamic	Dynamic signals flash with the intensity of volume.
LED: 1.5 Hz	1.5 Hz sink signal output for driving LED.
LED: 3 Hz	3 Hz sink signal output for driving LED.
LED: 6 Hz	6 Hz sink signal output for driving LED.

11.7.7 Right-click Menu

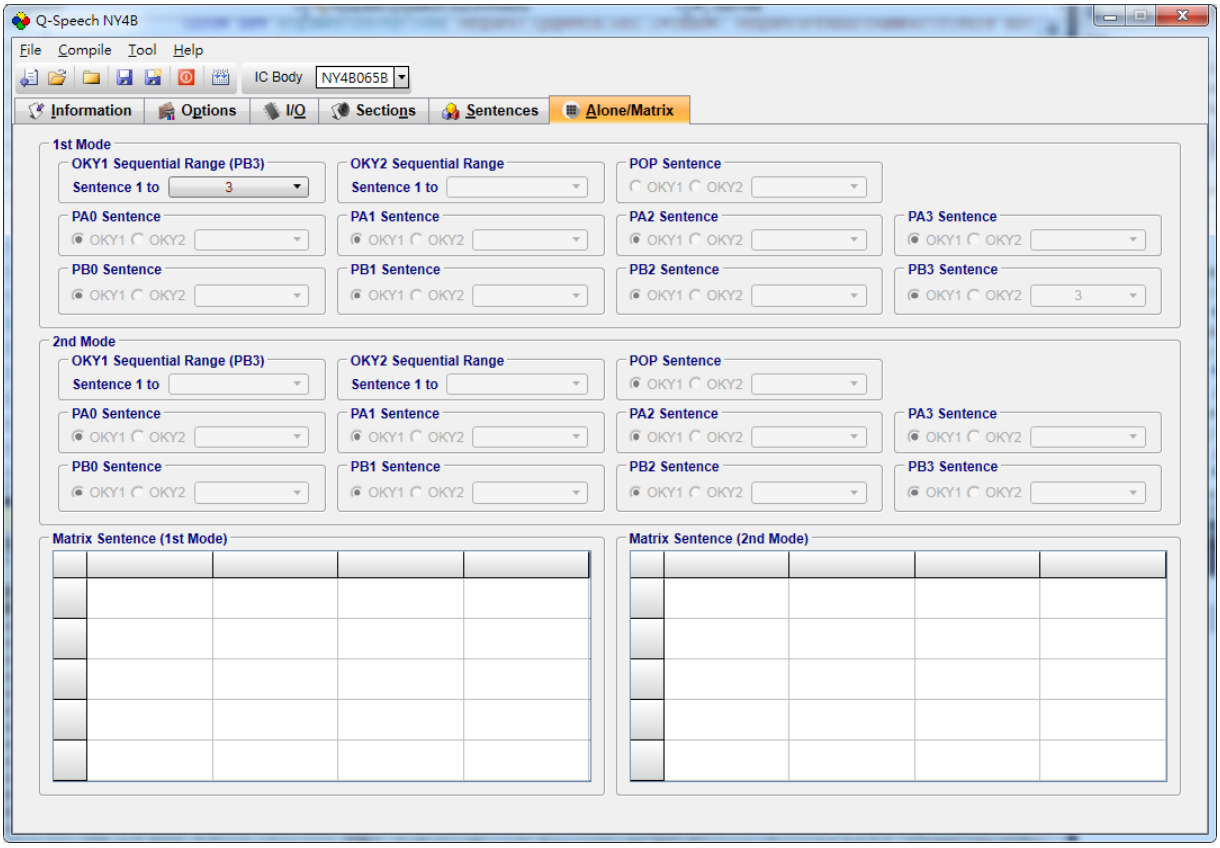
A right-click menu will show on the right by right clicking on the sentence table. The functions of the

menu items are as follows:

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

11.8 Alone/Matrix

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



11.8.1 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.

11.8.2 PAx / PBx / POP Sentence

When the PAx / PBx input or POP is enabled on the Option page, users must specify the playback sentences (PAx / PBx Sentence and POP Sentence) at the bottom of Sentences page after triggering.

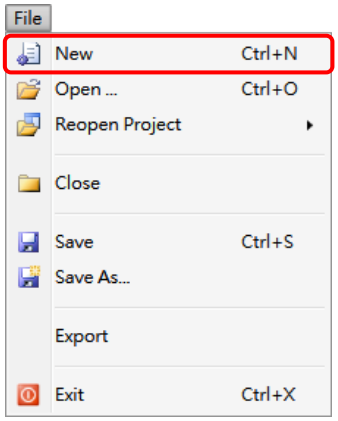
12 Using *Q-Speech* for NY5Q Series

In this chapter, the details of using *Q-Speech* for NY5Q will be presented step by step

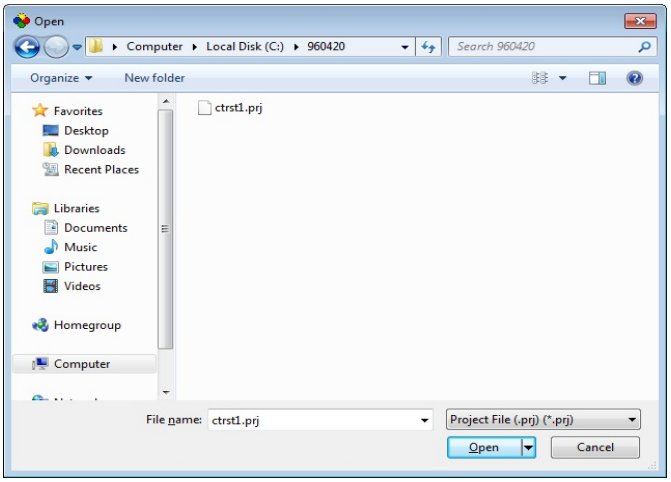
Contain:

12.1 Creating a *Q-Speech* Project

After starting *Q-Speech* for NY5Q, a new *Q-Speech* project can be created by selecting [New] from the [File] menu, or by clicking the [New] button on the toolbar.

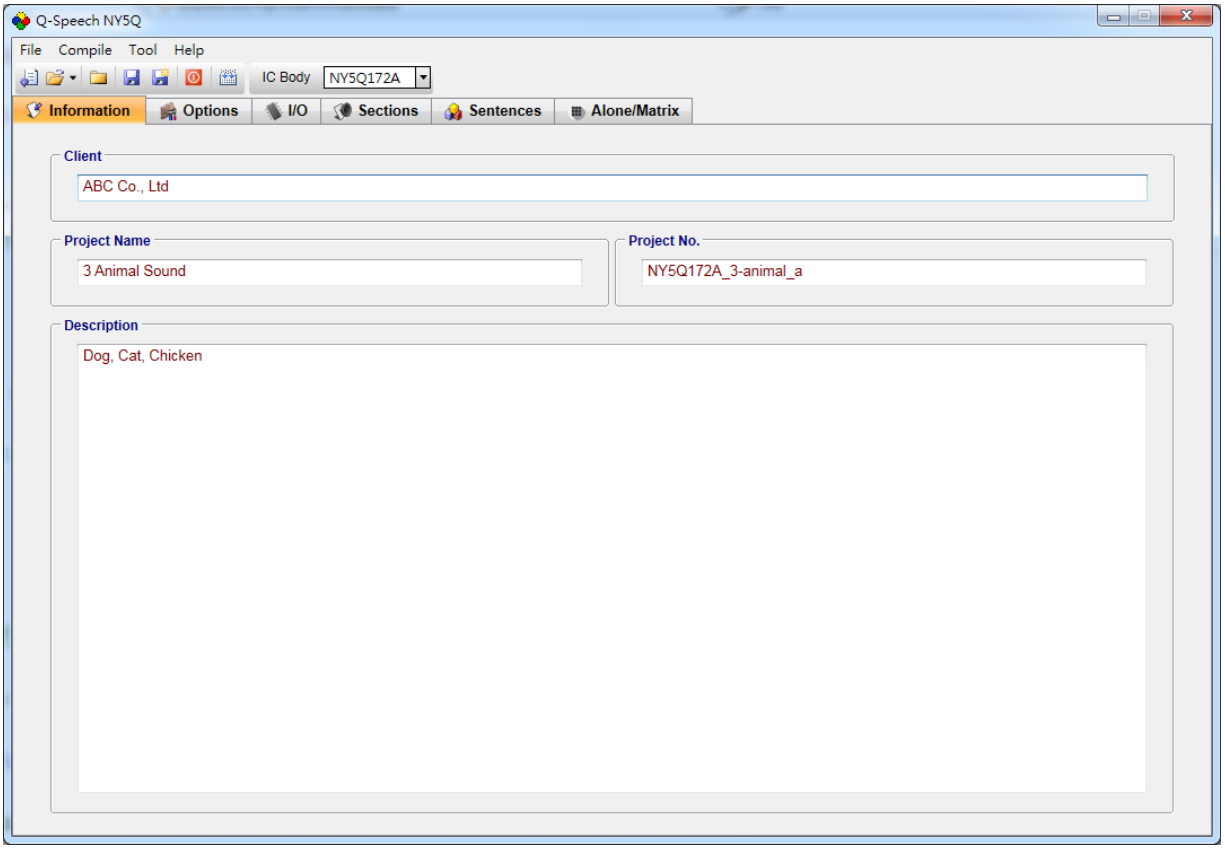


To modify an existing project, users can select [Open] from the [File] menu. A dialog box for opening file will display after selecting [Open], and then double click the project or press the [Open] button. If the project to be modified has been opened recently, it might be found on the list of [Reopen] option and could be opened directly.



12.2 Filling in the Information

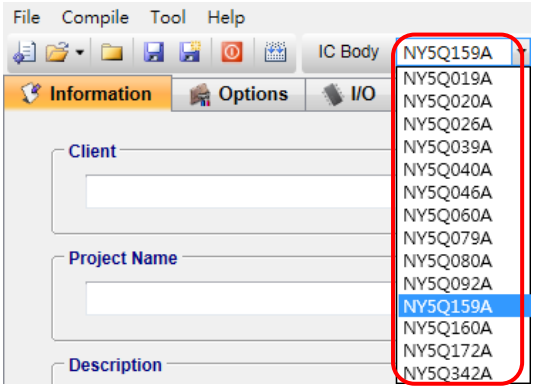
The Information page will be shown immediately after the project is created or opened. Any words can be typed in the blanks of this page, e.g. client name, project number, project name, description, etc. This page is just for user's information and no error checking will be performed. The information on this page will ONLY be saved in the .prj file. It will not be checked, compiled or 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.

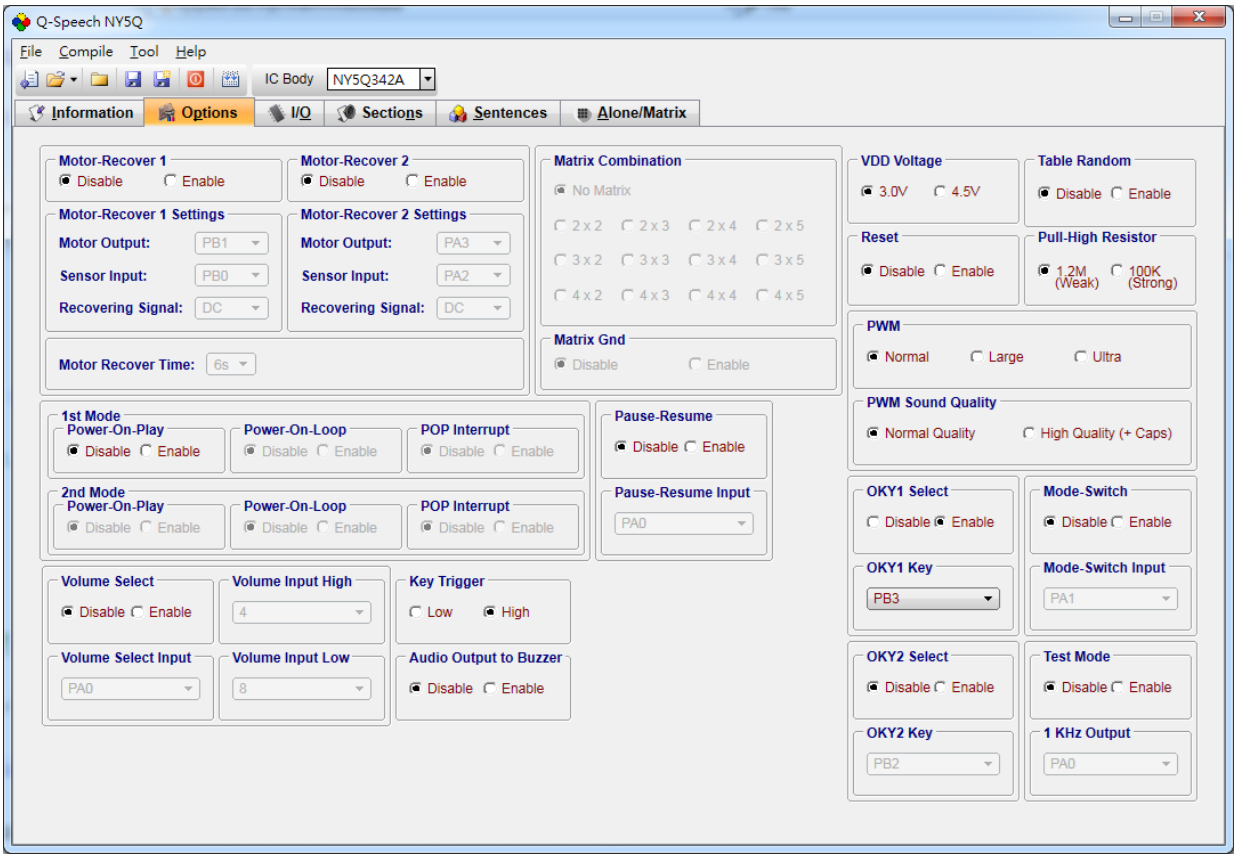
12.3 Select IC Body

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



12.4 Selecting the Options

By selecting different mask options on the Options page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Power-On-Play, Power-On-Loop, POP Interrupt, etc, could be set easily on this page.



12.4.1 Setting Motor-Recover

Motor-Recover option allows user to enable (or disable) the special application for motor recovering (default is “Disable’).

12.4.2 Motor-Recover Settings

- Motor output: This option is to set a specific pin as motor output and connect to motor-recover. User also can specify any pin as the motor output.
- Sensor Input: This option is to set an input pin as motor recovering sensor, which detects if the motor is back to initial status. User can specify any pin as the sensor.
- Recovering Signal: There are 3 kinds of signal, which are DC, 6 Hz and 12 Hz, available for motor recovering signal.

12.4.3 Motor-Recover Time

User can set the maximum motor-recover time. If motor-recover isn't triggered in the set time, it will stop motor output automatically and be regarded as recovery finished.

12.4.4 Selecting 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.

12.4.5 Setting PWM Output

The PWN Current function provides 3 options: Norma, Large and Ultra volume. User could decide the PWM output based on practical applications.

12.4.6 Setting PWM Sound Quality

The PWM Sound Quality provides 2 options: Normal Quality and High Quality. User can set the option by the actual applications.

Note: The PWM Sound Quality setting is only effective obviously for NY5QxxxA OTP, whereas not effective for FDB demonstration.

12.4.7 Setting Reset

When the Reset option is enabled, user can reset IC by using IC external signals to recover pin.

12.4.8 Setting Pull-High Resistor

The Pull-High Resistor function can set the input mode of resistor.

12.4.9 OKY1 / OKY2 Select

When the OKY1 / OKY2 Select option is enabled, user must set any pin as OKY pin. User can use OKY Trigger Function with OKY Reset On/Off to control the playback status of sentences.

12.4.10 Selecting Mode-Switch

Mode-Switch enables inputs to have 2 kinds of functions with the same key. Any pin can be set as Switch Pin, and then PIN connecting can be switched between VDD (the 1st Mode) and GND (the 2nd Mode) to realize Mode-Switching. Although input functions can be different between modes, the output functions (current & connected type) must be the same between modes.

Note: If the Input type of the Mode-Switch pin is Pull-High, it will cause additional consumption when the pin is connected with Low while entering sleep mode. If the

Mode-Switch pin is Floating, it must be set as High or Low level.

12.4.11 Test Mode

When the option of Test Mode is enabled, user must set any pin as test pin. When users press and hold the test pin then power on the IC, the IC will enter Test Mode, and the test pin will output 1 KHz square wave continuously.

Note: In Test Mode, the test pin cannot be the same pin of Reset, Mode Switch and Sensor Input, but can be set as other functional pin.

12.4.12 Power-On-Play, POP

"POP Sentence" would be played one time as the power is turned on.

If Power-On-Play combines with the function of Power-On-Loop, it will result in the sentence playing repeatedly. And the sentence won't stop until user sets other options and play the specified sentence immediately.

Note: When POP is set as "Enable", user could specify the sections on Sentence tab.

12.4.13 Power-On-Loop

The settings of Power-On-Loop will decide the action of Power-On-Play. When user selects "Enable" and IC is powered on, IC will play POP Sentence repeatedly.

Note: Power-On-Loop option is available only when Power-On-Play is enabled.

12.4.14 Power-On-Play Interrupt, POP Interrupt

The settings of Power-On-Play Interrupt will decide whether interrupt POP. When user selects "Enable", the Trigger button could interrupt POP Sentence immediately.

Note: This setting could be enabled only when user set Power-On-Play first.

12.4.15 Pause-Resume

When user enables the Pause-Resume function, the playing sentence would be paused as user presses pause pin; when user presses pause again, the song would be continued to play the rest part.

12.4.16 Table Random

When user enables the Table Random function and triggers OKY1 to play sentence at the first time, one sentence would be played from OKY1 Step Table randomly. For the later triggers, the sentences after last triggered sentence will be played sequentially.

12.4.17 Flash Dynamic

The Flash Dynamic function can set LED flash with the intensity of volume. User can select flash with 1/2 or 3/4 volume and set the output type as Drive or Sink.

12.4.18 Volume Select

User can select the volume according to the high or low level of the set pin. There are 16 levels from mute to 15 to select.

Note: If the Input type of the Volume Select pin is Pull-High, it will cause additional consumption when the pin is connected with Low while entering sleep mode. If the Mode-Switch pin is Floating, it must be set as High or Low level.

12.4.19 Key Trigger

The Key Trigger provides 2 options: High and Low Trigger. User can set the option by the actual applications.

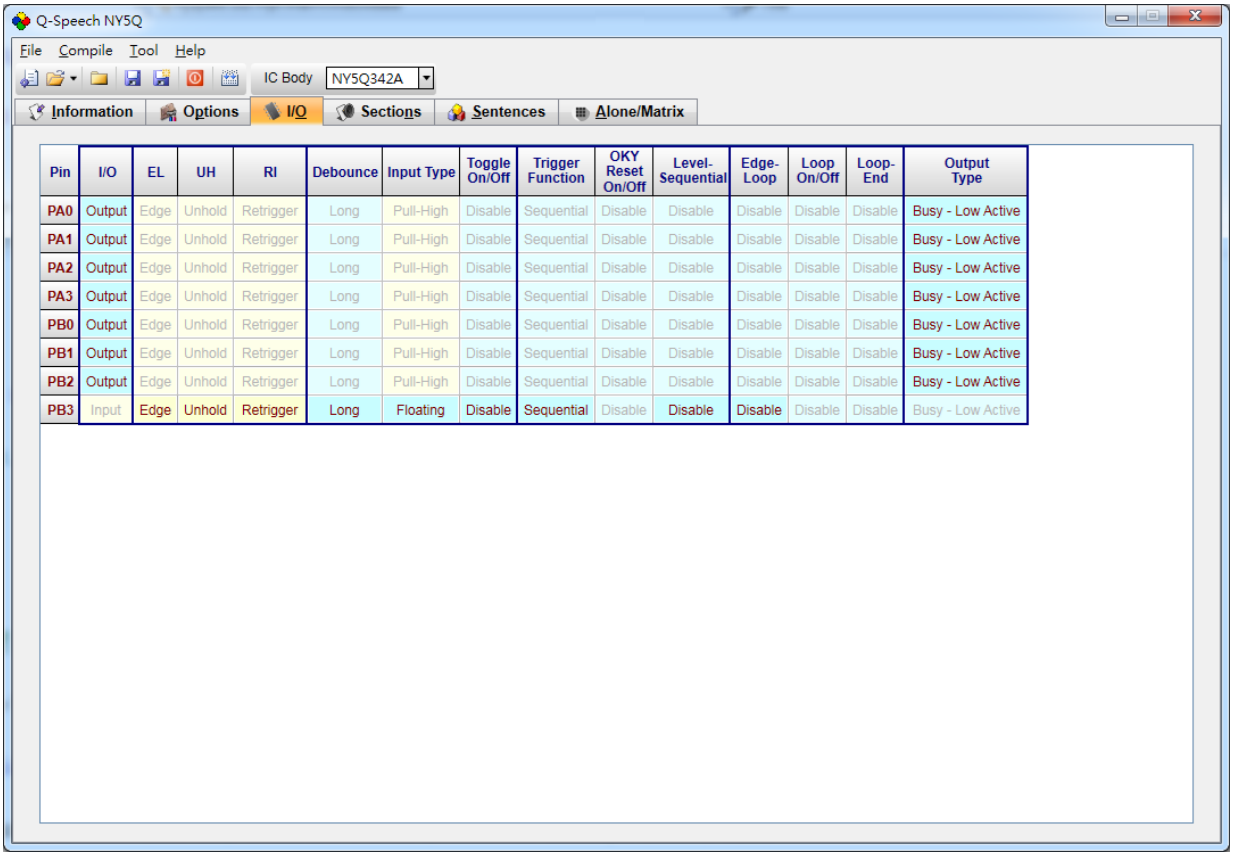
Note: When the Key Trigger is set as High, the Input Types of OKY1, OKY2, and other general input pins will be default as Floating. If the Key Trigger doesn't connect with other output pins, it must be ground by the external resistor. If the Input Type option from IO setting page is set as Pull-High, It will cause an unexpected trigger.

12.4.20 Audio output to Buzzer

User should enable this option when sound output to Buzzer.

12.5 Setting I/O

By selecting different options on the I/O page, the functions desired could be accomplished quickly. Although different ICs may have different functional features, there are usually similar contents in Options page. Functions of the IC, such as Debounce Time, Input Type, Trigger Mode, etc, could be set easily on this page.



Pin	I/O	EL	UH	RI	Debounce	Input Type	Toggle On/Off	Trigger Function	OKY Reset On/Off	Level-Sequential	Edge-Loop	Loop On/Off	Loop-End	Output Type
PA0	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PA1	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PA2	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PA3	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PB0	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PB1	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PB2	Output	Edge	Unhold	Retrigger	Long	Pull-High	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active
PB3	Input	Edge	Unhold	Retrigger	Long	Floating	Disable	Sequential	Disable	Disable	Disable	Disable	Disable	Busy - Low Active

12.5.1 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 the timing diagrams describing the trigger modes, please see NY5Q Data Sheet.

- 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.

12.5.2 Selecting Debounce Time

Debounce time is a Play-speed-dependent function, which determines the debouncing period for

OKY. 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 MCU input. Selecting the right debounce time can avoid unwanted double triggers by the bouncing of trigger button.

12.5.3 Selecting Input Type

The Input Type usually represents the different applications of an input. For NY5Q series there are 2 input type options for different applications.

Option	Input Type Description
Pull-High	Internal 1.2MΩ or 100KΩ pull-high, 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.

12.5.4 Setting Toggle On/Off

The Toggle On/Off function allows users to immediately stop the voice playing by pressing the same input button again. “Toggle On/Off” option is default as Disable. To use this function, the specific trigger must be set to Unhold and Retrigger.

12.5.5 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.

12.5.6 Selecting OKY Reset On/Off

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

12.5.7 Level-Sequential

When key 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 both Edge-Loop and Loop On/Off

function, it plays the assigned sentences sequentially in loop (S1, S2, S3, S1, S2, S3, …) 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.

12.5.8 Edge-Loop

When Edge-Loop option is enabled, then it will play the assigned sentence in loop while the key is triggered.

12.5.9 Setting 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 in loop, and stops playing if triggered again during playing, and so on.

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

12.5.10 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 (Sentence 1→ Sentence 2→ Sentence 3 → Stop → Sentence 1).

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

12.5.11 Selecting Output Type

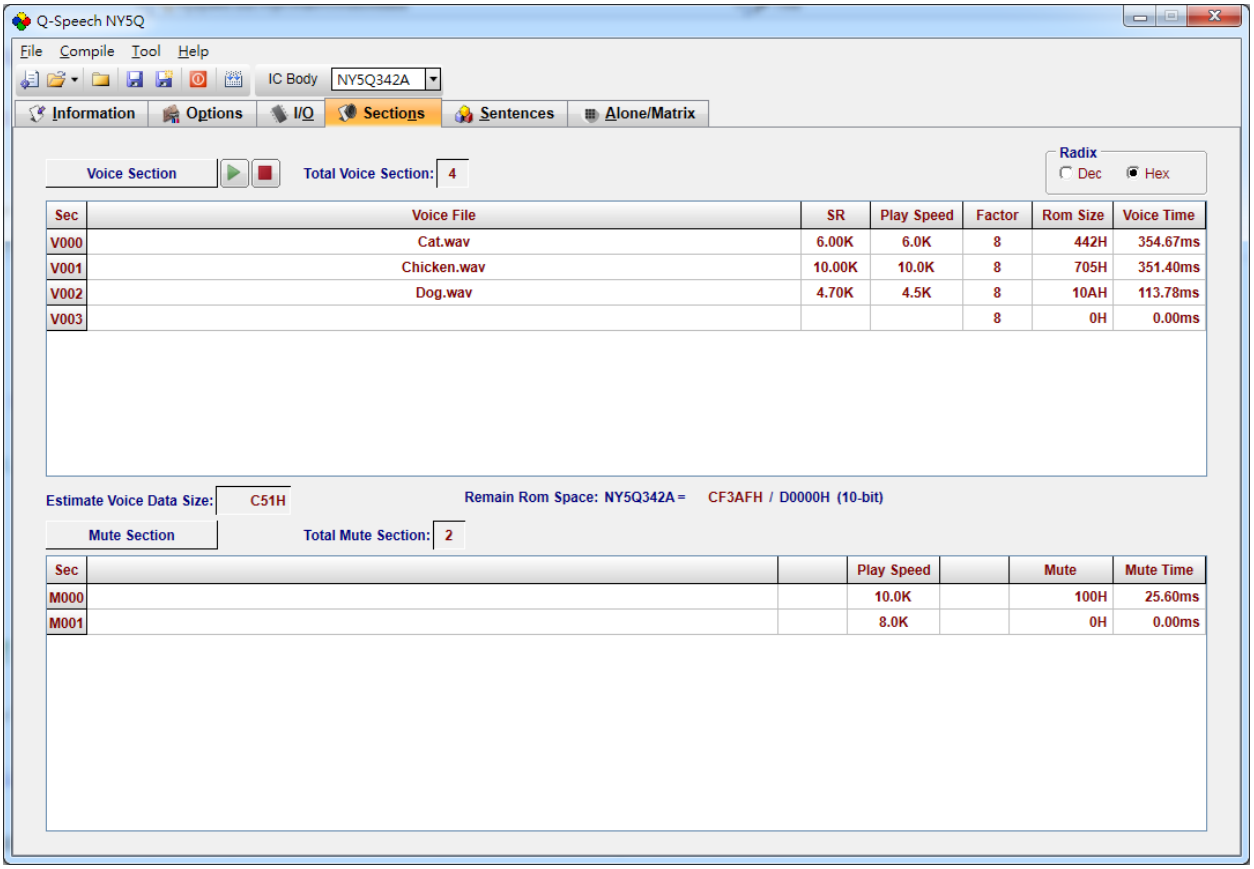
When a pin is set as output, user can specify a status signal as the output signal. The following are the available output type options:

Table 12.5.11 – NY5Q Output Type

Option	Output Type Description
Busy – Low Active	Low active signal output during playing.
Busy – High Active	High active signal output during playing.

12.6 Managing the Section

User can use the Sections page to include and manage the sections for a project. For NY5Q there are two kinds of sections: Voice Section and Mute Section. A section contains a voice file whereas a mute section contains only the mute length without voice file, and it allows total 512 sections of section and mute section altogether. The upper part of the page is for editing sections whereas the lower part of the page is for editing mute sections. The Media Player function ( ) at the top of the page allows audio content of a selected section being rehearsed easily.

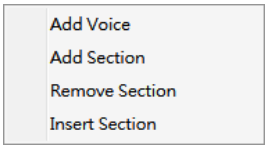


12.6.1 Sec Column

Sec Column shows the sequence numbers of sections. These sequence numbers will be used in the Sentences page to represent the corresponding sections or mute sections to be played. The sequence numbers of sections are from V000 to V255 (totally 256 sections), mute sections are from M000 to M255 (totally 256 mute sections) in NY5Q.

12.6.2 Voice File Column

Voice File Column shows the voice data files. The voice encoder of *Q-Speech* for NY5Q only accepts 16/24/32-bit mono and stereo wave files (.wav), *Quick-IO* files (.nyq) or *Q-Sound* files (.nyw). To include a voice file, double left-clicking on a field in this column. User can use cursor and right-click on



the selected section, a pop-up menu will be shown for adding Voice/Section or removing/inserting Section on demands. If user wants to modify the order of Sections sequence, please press and hold the left mouse button for dragging the desired Section to target column, then release button.

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

12.6.3 SR Column

SR stands for the sample rate of the voice file.

12.6.4 Play Speed

Play Speed means the speed (samples per second) that IC plays a section here. There are 41 kinds of Play Speed available, and each section can be given a unique Play Speed.

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
24.0 KHz	23.5 KHz	23.0 KHz	22.5 KHz	22.0 KHz	21.5 KHz	21.0 KHz	20.5 KHz
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*
20.0 KHz	19.5 KHz	19.0 KHz	18.5 KHz	18.0 KHz	17.5 KHz	17.0 KHz	16.5 KHz
17	*18*	*19*	*20*	*21*	*22*	*23*	*24*
16.0 KHz	15.5 KHz	15.0 KHz	14.5 KHz	14.0 KHz	13.5 KHz	13.0 KHz	12.5 KHz
25	*26*	*27*	*28*	*29*	*30*	*31*	*32*
12.0 KHz	11.5 KHz	11.0 KHz	10.5 KHz	10.0 KHz	9.5 KHz	9.0 KHz	8.5 KHz
33	*34*	*35*	*36*	*37*	*38*	*39*	*40*
8.0 KHz	7.5 KHz	7.0 KHz	6.5 KHz	6.0 KHz	5.5 KHz	5.0 KHz	4.5 KHz
41							
4.0 KHz							

12.6.5 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 13 Factors, which from ‘1’ to ‘12’ are compressed while PCM is uncompressed. Normally, a bigger Factor will lead to bigger ROM Size but better quality after compression. The default Factor is ‘6’.

Factor	Comment
PCM	Ultra high sound quality, but largest ROM Size.
12 H	The best compressed sound quality.
…	…
6 M	Middle sound quality (default).
…	…
1 L	Very low sound quality, but smallest ROM Size.

12.6.6 ROM Size Column

ROM Size Column shows the size of ROM that used by the voice data after compression. The ROM Size after compression will be affected by the features of different IC series. Please note that every NY5Q Series IC actually imposes a maximum limit on each type of section including pure section and pure mute section. The maximum limits imposed on all the NY5Q Series ICs are tabulated below.

Table 12.6.6 – The maximum limits imposed by NY5Q Series ICs

Body	MaxV	MaxM	Max Total
NY5Q019A	C000H	D0000H	C000H
NY5Q020A	C000H	D0000H	C000H
NY5Q026A	10000H	D0000H	10000H
NY5Q039A	18000H	D0000H	18000H
NY5Q040A	18000H	D0000H	18000H
NY5Q046A	1C000H	D0000H	1C000H
NY5Q060A	24000H	D0000H	24000H
NY5Q079A	30000H	D0000H	30000H
NY5Q080A	30000H	D0000H	30000H
NY5Q092A	38000H	D0000H	38000H
NY5Q159A	60000H	D0000H	60000H
NY5Q160A	60000H	D0000H	60000H
NY5Q172A	68000H	D0000H	68000H
NY5Q342A	D0000H	D0000H	D0000H

- **MaxV** column shows the maximum ROM Size that can be taken up by the voice file when the section is a pure section (section with a voice file only).
- **MaxM** column shows the maximum value of the mute data when the 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.

12.6.7 Voice Time Column

The Voice Time Column shows the voice playing time estimated by Q-Speech. Voice time varies depending on Play Speed, so changing the Play Speed on Options page may lead to change of voice time.

12.6.8 Mute Column

Mute Column shows the amount of mute duration. Mute data for NY5Q must be the multiple of 1H. Mute data can be keyed in after double clicking on the column or by pressing the Up and Down buttons at the right of the Mute Column (see the right picture). Pressing the Up button makes the mute data increase by 1H whereas pressing the Down button makes mute data decrease by 1H.

12.6.9 Mute Time Column

Mute Time Column shows the actual mute time, which is estimated by *Q-Speech*. Mute time varies depending on Play Speed, thus changing the Play Speed may lead to change of mute time.

12.6.10 Radix

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

12.6.11 Total Voice Section & Total Mute Section

Total Voice Section and Total Mute Section are displayed at the top of the section and mute section. Total Voice Section counts the used sections, and Total Mute Section counts the used mute sections.

12.6.12 Voice Data Size & Remain ROM Space

Voice Data Size shows the total current used ROM size, Remain ROM Space shows the available total ROM size. The total used ROM Size must not exceed the available total ROM Size displayed to the right of slash (“/”). Please see Table 12.6.6。

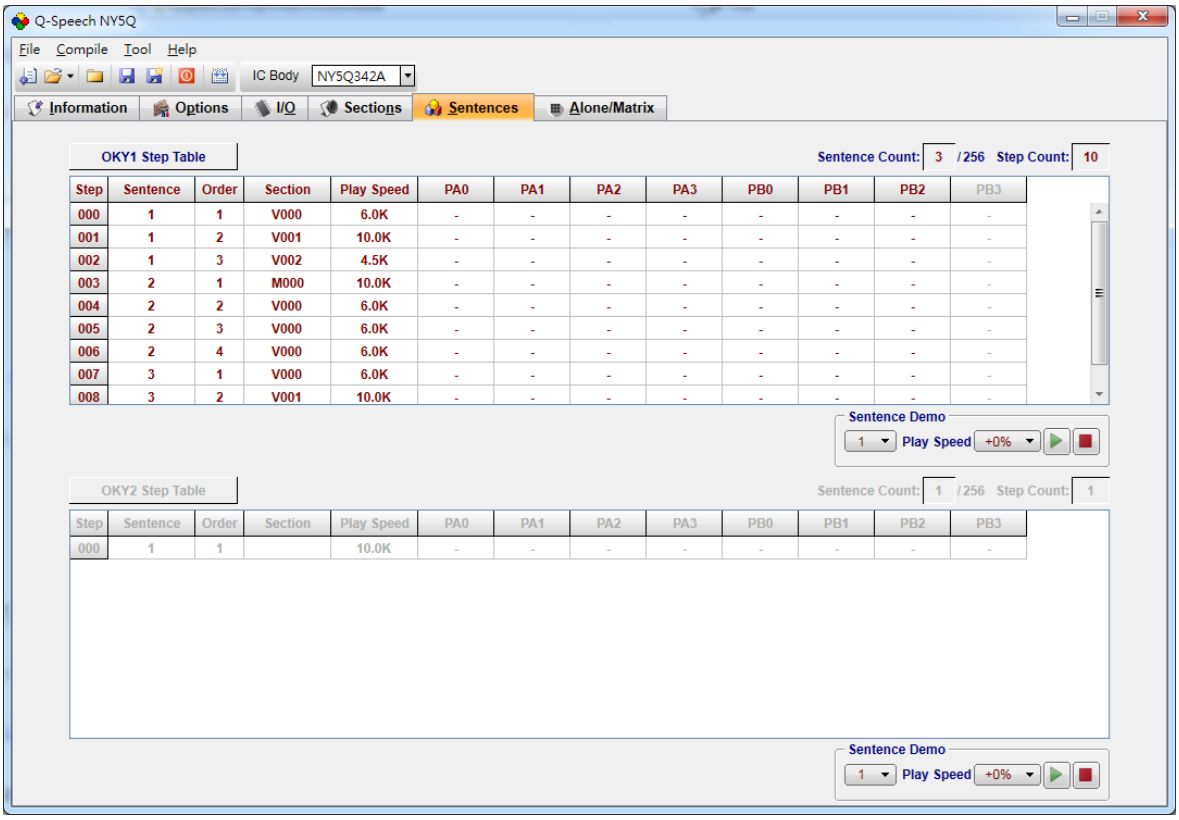
12.6.13 Right-click Menu

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

Menu Item	Function
Add Voice	Add one or more voice file or section at the end of all sections. **(This function doesn’t support mute sections.)**
Add Section	Add a voice or mute section at the end of all sections.
Remove Section	Delete the selected voice or mute section.
Insert Section	Insert a voice or mute section above the selected section.

12.7 Arranging the Sentences

A “sentence” means a combination of sections to be played when triggered. For NY5Q, there are 256 sentences, and the steps maximum is 5000 steps.

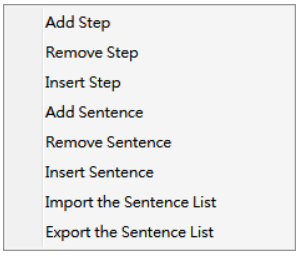


12.7.1 Step

For NY5Q, there are totally 5000 (000 to 4999) steps that can be defined for each step table. Every step can have a section with associated output actions, and the sequence is defined one by one starting from Step 000. There mustn’t be any undefined steps between defined steps. The total number of defined steps is shown above the step table.

12.7.2 Sentence

The Sentence Column shows the sentence numbers the steps belong to. For NY5Q, there are total 256 (1 to 256) sentences available. Every sentence, which may contain several steps, can specify which section to play. To add / remove / insert / import / export a step or sentence, right-clicking on the desired Step or Sentence Column, then select the actions in the pop-up menu.



12.7.3 Order

The Order Column shows the sequence numbers of the steps contained in each sentence. For example, if a sentence contains 3 steps, these steps will be numbered from 1 to 3 in the Order Column. When this sentence is executed due to an input trigger, steps will be played sequentially. *Q-Speech* will automatically generate the numbers of all the steps according with order in a sentence.

12.7.4 Section

Selecting a section here means the corresponding voice file defined on Voice Sections page will be played.

12.7.5 Play Speed

Play Speed means the speed (samples per second) that IC plays a section here. There are 41 kinds of Play Speed available, and each section can be given a unique Play Speed. Please see **12.6.4 Play Speed Column** for more details.

12.7.6 PAx / PBx Column

When PAx / PBx is set as output on I/O page, user must set the corresponding steps with PAx output signals on Sentence page to achieve PAx output. There are 7 available output types of NY5Q that include 6 regular types (please see **Table 12.7.6**) and 1 user-defined output 8ignal Q1 (Q2, Q3, Q4, Q5, Q6, Q7, Q8), whereas Q1 (Q2, Q3, Q4, Q5, Q6, Q7, Q8) are available only when the voice is in *Quick-IO* format (.nyq). The following are the available output signal options:

Table 12.7.6 – NY5Q Output Signals

Option	Output Signals Description
Busy – High Active	High active signal output during playing.
Busy – Low Active	Low active signal output during playing.
Flash Dynamic	LED signals flash with the intensity of volume.
LED: 1.5 Hz	1.50Hz sink signal output for driving LED.
LED: 3 Hz	3 Hz sink signal output for driving LED.
LED: 6 Hz	6 Hz sink signal output for driving LED.

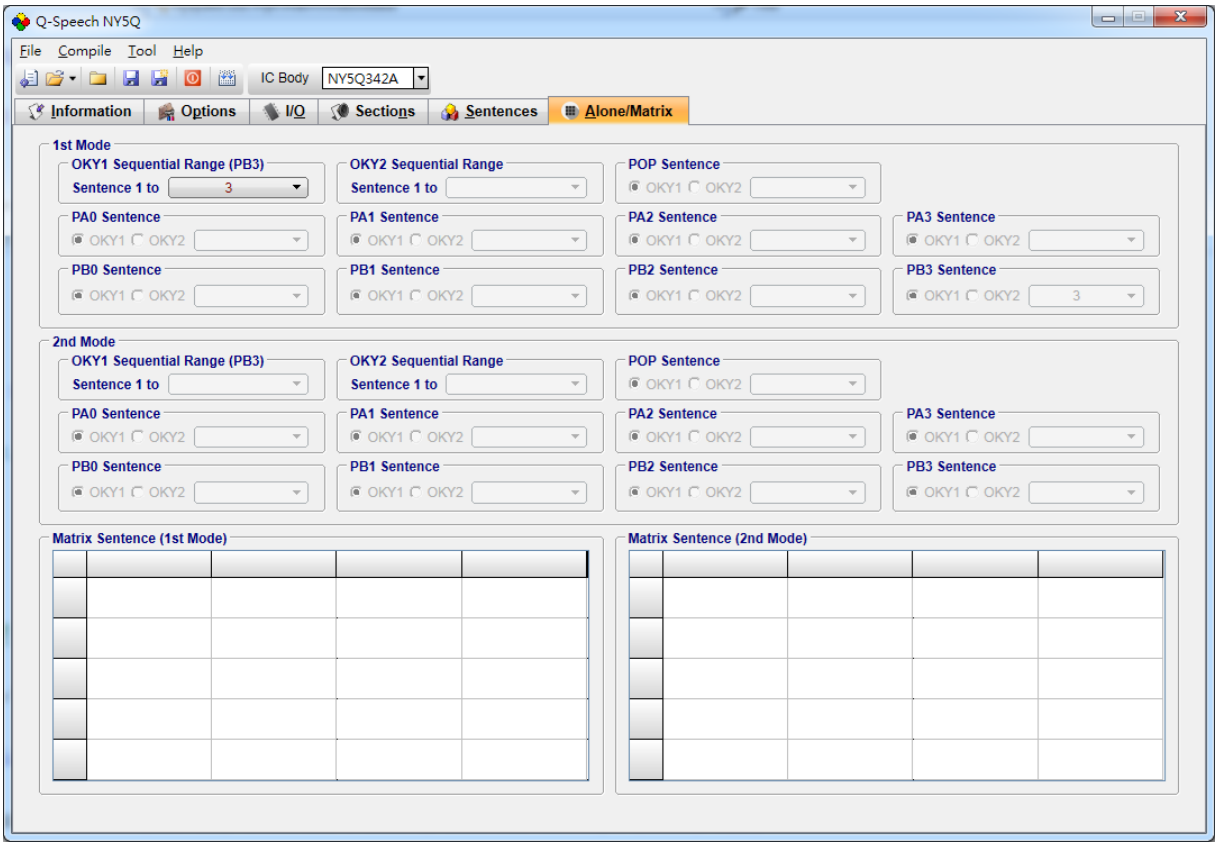
12.7.7 Right-click Menu

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

Option	Function
Add Step	Add a new step at the end of the sentence.
Remove Step	Delete the selected step.
Insert Step	Insert a step above the selected step.
Add Sentence	Add a new sentence at the end of the sentence.
Remove Sentence	Delete the selected sentence.
Insert Sentence	Insert a sentence above 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).

12.8 Alone/Matrix

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



12.8.1 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.

12.8.2 PAx / PBx / POP Sentence

When the PAx (PBx) input or POP is enabled on the Option page, user can specify which sentence will be executed when PAx / PBx / POP is triggered.

13 How to Release Code

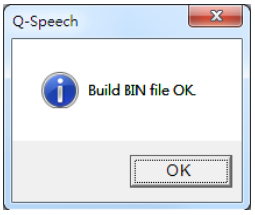
After finishing a *Q-Speech* editing, please follow the instructions in this chapter to release the code.

13.1 Saving the Project

By selecting [Save] from the [File] menu or by clicking the [Save] button on the toolbar, the current *Q-Speech* 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-Speech* project files will have the .prj extension.

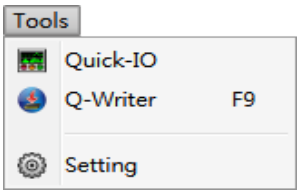
Note: Due to Q-Speech does not provide the auto-save function, please save the undone project frequently in order to avoid unexpected Windows system crash or power failure causing data missing.

13.2 Building Up the .bin File

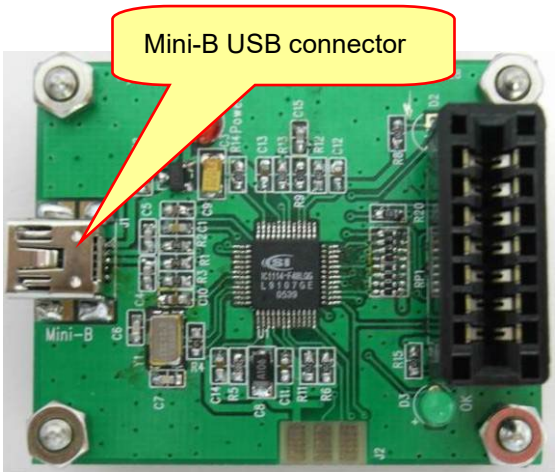


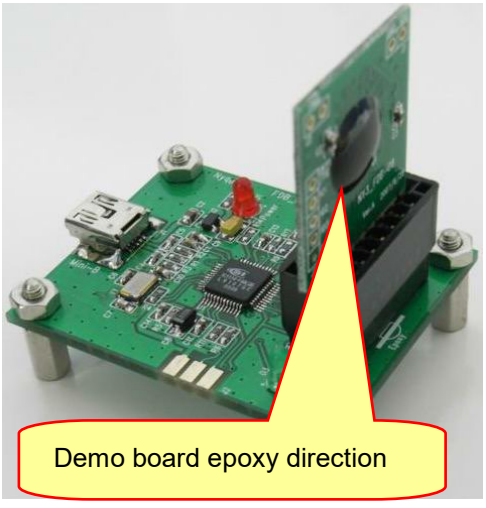
By selecting [Build] from the [Compile] menu or by clicking the [Build] button on the toolbar, the compiling process will start. *Q-Speech* will check all the settings and options first. If there are no errors, the target file (.bin) and checking list file (.htm) will be generated. These two files will be put in the same folder as the project file (.prj) folder. If the compiling 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.

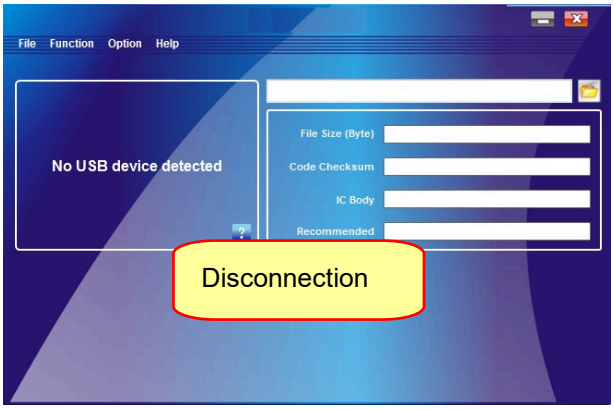
13.3 Making a Demo Board

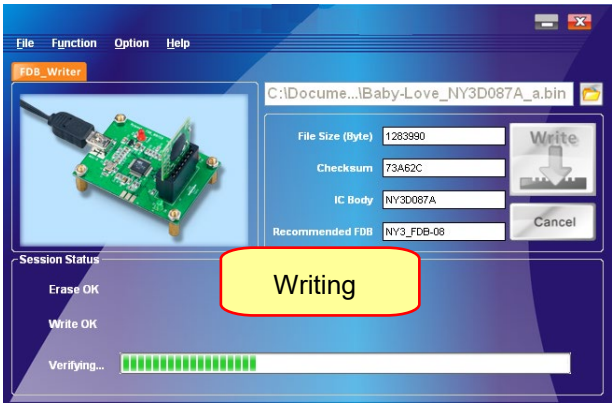


To make a demonstration, please write the target file (.bin) into NY3(B)_FDB or NY4_FDB demo board by Nyquest *FDB_Writer* with its software driver provided by Nyquest. To launch *Q-Writer* software, users can simply select [Q-Writer] from the [Tools] menu.









(A) NY3(B)_FDB

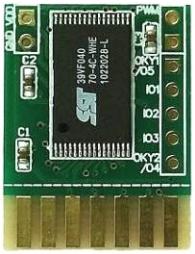
Due to different flash size, there are 3 kinds of NY3(B)_FDB: NY3(B)_FDB-02, NY3(B)_FDB-04 and NY3(B)_FDB-08. The maximum demo voice duration is listed below.

Flash Demo Board	*NY3(B)_FDB-02*	*NY3(B)_FDB-04*	*NY3(B)_FDB-08*
NY3A(D) (Max. body) NY3A(E) (Max. body)	NY3A006D1 NY3A012E	NY3A006D1 NY3A012E	NY3A006D1 NY3A012E
NY3B (Max. body)	NY3B021C	NY3B021C	NY3B021C
NY3C (Max. body)	NY3C043C	NY3C065C	NY3C065C
NY3D (Max. body)	NY3D043C	NY3D087C	NY3D115C
NY3P(D) (Max. body) NY3P(E) (Max. body)	NY3P035D NY3P043E	NY3P035D NY3P086E	NY3P035D NY3P086E

I/O pin mapping for different series IC:

IC Series / *FDB*	*NY3A(D)* *NY3A(E)*	*NY3B*	*NY3C*	*NY3D*	*NY3P(D)* *NY3P(E)*
OKY1/O5	OKY	OKY	OKY/O3	OKY1/O5	OKY1/O5
IO1	-	IO1	IO1	IO1	-
IO2	-	-	IO2	IO2	IO2
IO3	-	-	-	IO3	-
OKY2/O4	-	-	-	OKY2/O4	OKY2/O4

NY3(B)_FDB-02/04
Font



NY3(B)_FDB-02/04
Back

NY3(B)_FDB-08
Font

NY3(B)_FDB-08
Back

(B) NY4_FDB

Due to different flash size, there are 3 kinds of NY4_FDB: NY4_FDB-02, NY4_FDB-04 and NY4_FDB-08. The maximum demo voice duration is listed below.

Flash Demo Board	*NY4_FDB-02*	*NY4_FDB-04*	*NY4_FDB-08*
NY4A (Max. body) NY4B (Max. body)	NY4A011B NY4B045B	NY4A011B NY4B105B	NY4A011B NY4B165B

I/O pin mapping for the NY4 FDB.

FDB \ *IC Series*	*NY4A*	*NY4B*
PA0	PA0	PA0
PA1	PA1	PA1
PA2	PA2	PA2
PA3	PA3	PA3
PB0	-	PB0
PB1	-	PB1
PB2	-	PB2
PB3	-	PB3

NY4_FDB-02/04
Font

NY4_FDB-02/04
Back

NY4_FDB-08
Font

NY4_FDB-08
Back

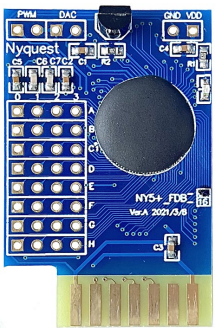
(C) NY5+_FDB

Due to different flash size, there are 2 kinds of NY5+_FDB: NY5+_FDB-04, and NY5+_FDB-16. The maximum demo voice duration is listed below.

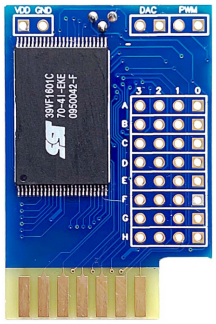
Flash Demo Board	*NY5+_FDB-04*	*NY5+_FDB-16*
NY5Q (Max. body)	NY5Q092A	NY5Q342A

I/O pin mapping for the NY5+ FDB.

IC Series / *FDB*	*NY5Q*
PA0	PA0
PA1	PA1
PA2	PA2
PA3	PA3
PB0	PB0
PB1	PB1
PB2	PB2
PB3	PB3



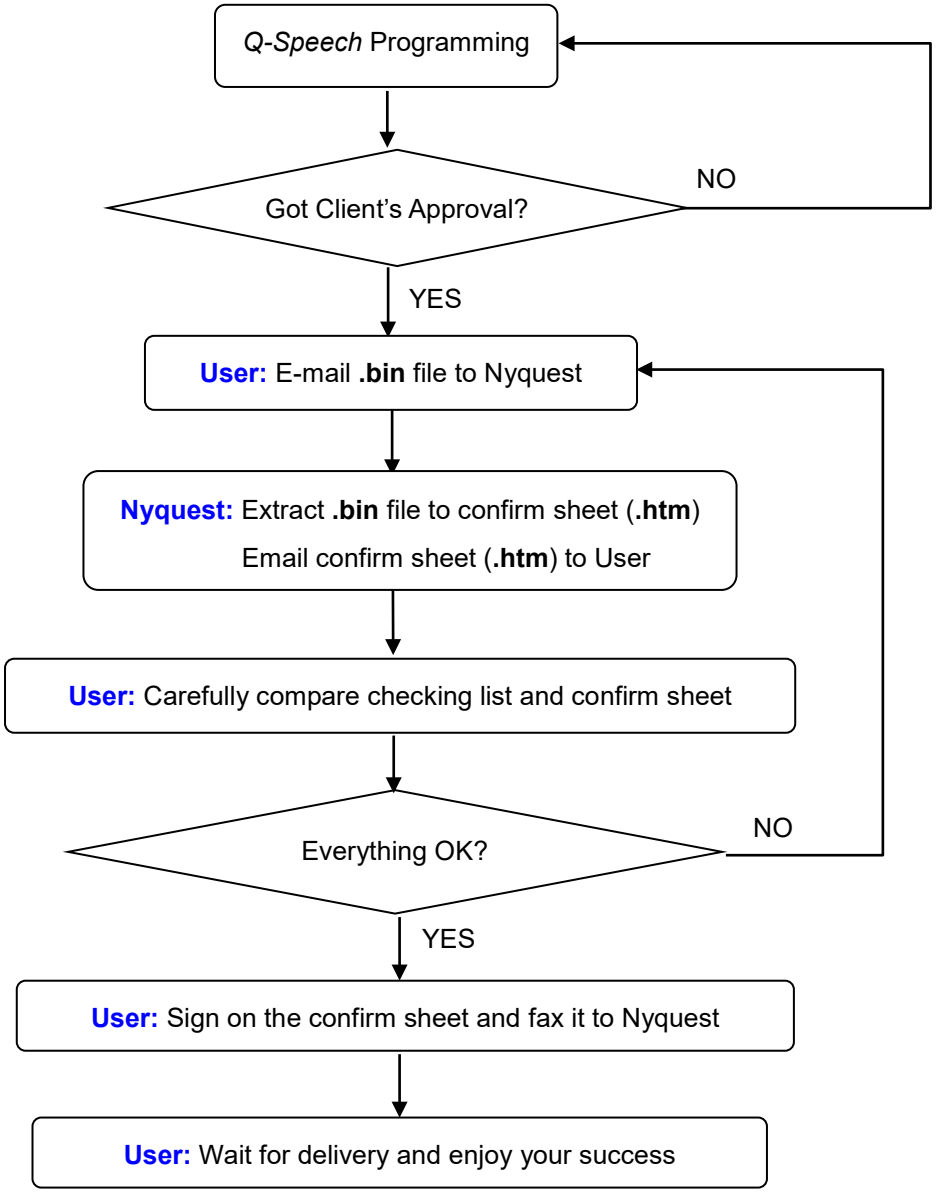
NY5+_FDB-04/16
Font



NY5+_FDB-04/16
Back

13.4 New Code Release Flow

When the client approves of the project, a target file (.bin) and checking list (.htm) will be generated after *Q-Speech* 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 "NY3A003E-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.


Q-Speech Programming
Got Client's Approval?
NO
YES
User: E-mail .bin file to Nyquest
Nyquest: Extract .bin file to confirm sheet (.htm)
Email confirm sheet (.htm) to User
User: Carefully compare checking list and confirm sheet
Everything OK?
NO
YES
User: Sign on the confirm sheet and fax it to Nyquest
User: Wait for delivery and enjoy your success

14 Revision History

Version	Date	Description	Modified Page
1.0	2007/12/17	The first version.	-
1.2	2008/08/11	Make full functions description.	-
1.3	2009/12/31	1. Add 2 kinds of Play Speed for NY3A. 2. Add 2 kinds of Play Speed for NY3B. 3. Add one set of 16 kinds of Play Speed for NY3C. 4. Add one set of 16 kinds of Play Speed for NY3D.	17 26 36, 39 49, 52
1.4	2010/08/18	1. Window 7 complied. 2. Change FDB_Writer to Q-Writer. 3. Add Play Speed Adjustment of Sentence Demo for NY3A. 4. Add Play Speed Adjustment of Sentence Demo for NY3B. 5. Add Play Speed Adjustment of Sentence Demo for NY3C. 6. Add Play Speed Adjustment of Sentence Demo for NY3D.	7 9, 59 23 33 45 58
1.5	2010/11/24	Add description of Mute length dialog box for NY3B/3C/3D.	30, 42, 55
1.6	2011/01/13	1. Modify description of NY3A/3B ROM Size. 2. Add description of NY3P (OTP) ROM Size.	20, 29 20, 30, 40, 53
1.7	2011/06/13	1. Revise NY3P007A P/N to NY3P010A. 2. Revise NY3P010A ROM Size. 3. Revise NY3A009A ROM Size. 4. Revise NY3A012A ROM Size.	20, 30, 40, 53 20, 30, 40, 53 20 20
1.8	2012/03/23	1. Add Chapter 3 Using *Q-Speech* For NY3A(B). 2. Add Chapter 4 Using *Q-Speech* For NY3A(C). 3. Add Chapter 6 Using *Q-Speech* For NY3B(B). 4. Modify the Voice File accepts 16-bit mono wave files (.wav).	27 37 55 22, 51, 71, 84

Version	Date	Description	Modified Page
1.9	2012/06/12	1. Add Voice File accepts *Q-Sound* file (.nyw). 2. Add Chapter 8 Using *Q-Speech* for NY3C(B) 3. Add Chapter 10 Using *Q-Speech* for NY3D(B) 4. Add NY3(B)_FDB for making demonstration.	- 80 106 121
2.0	2013/02/26	Modify the Mute data for NY3C(B) must be the multiple of 80H.	10
2.1	2013/07/25	1. Update IC list. 2. Add Chapter 5 Using *Q-Speech* for NY3A(D). 3. Modify Play Speed of NY3A(B) series IC. 4. Modify Play Speed of NY3A(C) series IC. 5. Modify Play Speed of NY3B(B) series IC. 6. Modify Play Speed of NY3C(B) series IC. 7. Modify Play Speed of NY3D(B) series IC. 8. Add Anti-Noise Debounce to NY3C(B) and NY3D(B). 9. Update NY3(B)_FDB and its maximum demo voice duration.	- 53 35 45 84 455 150 118, 144 158
2.2	2013/11/27	1. Add Chapter 6 Using *Q-Speech* for NY3A(E). 2. Add Chapter 9 Using *Q-Speech* for NY3B(C). 3. Update NY3(B)_FDB maximum demo voice duration.	62 91 158
2.3	2014/08/25	1. Update *Q-Speech* main interface. 2. Modify POP descriptions of NY3C(B) and NY3D(B). 3. Modify Table Random descriptions of NY3D(B). 4. Add Chapter 14 Using *Q-Speech* for NY3L. 5. Add Chapter 15 Using *Q-Speech* for NY3M. 6. Add Chapter 16 Using *Q-Speech* for NY3W. 7. Add NY3M_FDB and NY3W_FDB for making demonstrations.	19 120, 148 149 159 174 189 204

Version	Date	Description	Modified Page
3.0	2014/11/27	1. Update *Q-Speech* main interface and descriptions of functions. 2. Remove chapter: Using *Q-Speech* For NY3A(A), NY3B(A), NY3C(A) and NY3D(A) Series. 3. Add Chapter 13 Using *Q-Speech* For NY4A Series. 4. Add Chapter 14 Using *Q-Speech* For NY4B Series. 5. Remove NY3_FDB and its maximum demo voice duration. 6. Add NY4_FDB and its maximum demo voice duration.	- - 141 157- 176
3.1	2015/01/16	1. Add the description of Remain Time function. 2. Add NY3D032C IC body to NY3D series.	39, 50, 61, 73, 86, 98, 142 -
3.2	2015/08/05	Add NY3P005B IC body.	-
3.3	2016/08/17	1. Remove chapter: Using *Q-Speech* For NY3A(B), NY3A(C), and NY3B(B) Series. 2. Add the Radix column.	- 36, 48, 61, 74, 90, 106, 121, 136, 152, 169
3.4	2017/05/03	Add NY3P(J) series IC body.	-
3.5	2017/08/15	1. Add the Export function to File Menu. 2. Add the description of Setting LVR Voltage.	20 32, 44, 57, 70, 86
3.6	2018/02/21	1. Add NY3M(B) series IC body. 2. Remove NY3M(A) series IC body. 3. Add the description of Setting LVR Voltage. 4. Revise the description of Test mode.	114, 122, 126, 180 114, 122, 126, 180 118 148, 165
3.7	2018/08/01	Adjust the icons of the Options Page.	24

Version	Date	Description	Modified Page
3.8	2018/11/21	1. Add Language and Check for Updates functions to Help menu. 2. Add PWM Anti-Noise parameter. 3. Add Import and Export functions for sentence. 4. Add the Optimize function. 5. Add Setting Functions of IO1 and IO2 for NY3C series.	18 30, 41, 55, 67, 85, 118 36, 50, 62, 78, 97, 112, 128 143, 159, 176 47, 61, 75, 93 109, 125, 140 70
3.9	2019/02/25	1. Modify the description of LVR Voltage 2. Add NY3C003C, NY3C005C, NY3C007C, NY3C010C, NY3C016C, NY3C027C, NY3C043C, NY3C065C, NY3D005C, NY3D010C, NY3D016C, NY3D021C, NY3D043C, NY3D054C, NY3D065C, NY3D076C, NY3D087C, NY3D100C and NY3D115C IC Bodies	29, 40, 52, 64, 80, 111-
4.0	2019/05/24	Modify the dialog box and description of Setting.	18
4.1	2020/03/20	1. Adjust the main interface of Q-Speech. 2. Add NY3B007D IC body. 3. Remove the chapters of Using *Q-Speech* for NY3M / NY3W series.	15 52 -
4.2	2021/11/26	1. Remove the NY3P005B, NY3P010B, NY3P035B, NY3P065B, NY3P087B and NY3P115B. 2. Remove NY3B007C. 3. Remove NY4B018B 4. Add NY4Q series.	141
4.3	2022/01/26	Add NY4Q026A, NY4Q046A, NY4Q080A and NY4Q160A.	142, 151
4.4	2022/08/15	Add the description of Setting Key Trigger.	146
4.5	2023/02/09	Add the description of Setting Audio output to Buzzer.	146
4.6	2023/08/21	1. Remove NY3C003B, NY3C005B, NY3C007B, NY3C010B, NY3C016B, NY3C021B, NY3C027B, NY3C035B, NY3C043B, NY3C054B, and NY3C065B. 2. Remove NY3D005B, NY3D010B, NY3D016B, NY3D021B,	- -

Version	Date	Description	Modified Page
		NY3D032B, NY3D043B, NY3D054B, NY3D065B, NY3D076B, NY3D087B, NY3D100B, and NY3D115B.	
4.7	2023/11/01	1. Add NY3A003D1 and NY3A006D1. 2. Add NY3A006E1. 3. Add NY3B003D, NY3B010D, and NY3B014D. 4. Add the descriptions of One-Wire option.	27, 32 38, 44 52, 57 65, 81
4.8	2024/02/19	1. Update the main interface and description. 2. Update the illustration of NY3A(D), NY3A(E), NY3B and NY3L Sections. 3. Remove the Total ROM Size description of NY3A(D), NY3A(E), NY3B and NY3L. 4. Add the Remain ROM Space of NY3A(D), NY3A(E), NY3B and NY3L. 5. Update the desciptions of One-Wire. 6. Add NY3P(D) series.	16 31, 43, 51, 121 - 34, 47, 60, 127 66, 82 96
4.9	2024/08/19	1. Update the main interface and description. 2. Add NY3P016C, NY3P035C, NY3P065C, NY3P087C, NY3P115C. 3. Remove NY4Q series. 4. Add NY5Q series.	16 28, 32, 39, 45, 53, 58, 65, 73, 80, 89 - 160
5.0	2025/03/20	1. Add NY3P(E) series. 2. Add NY5Q019A, NY5Q039A, NY5Q79A, and NY5Q159A.	116 180
5.1	2025/05/29	1. Update the main interface and description of Q-Speech. 2. Add NY3P021E, NY3P043E, and NY3P086E.	18 117, 125
5.2	2025/08/06	Remove the description of PWM Anti-Noise Parameter.	-