NuTool – LCDView
User Manual

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www.nuvoton.com

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1 OVERVIEW

The **NuTool – LCDView** is used to synchronously display the LCD view on the PC by setting up the Com/Seg table and the icons on Canvas. User can freely design the pattern of screen to emulate each type of LCD view.

1.1 Supported Chips

To see the list of supported chips, refer to Supported_chips.htm in

(Install Location)\resources\assets

2 FEATURES

Features are listed below:

- **Design Canvas by built-in tools**: Use built-in icon, or import SVG file created by user, and place these icons on Canvas to simulate the LCD screen.
- **Code generation**: Generate a header file according to user's design; the generated header file is applied to LCD samples in NuMicro BSP.
- **Synchronously display the LCD view**: By configuring pins, user's Canvas can synchronously display the LCD view when connecting a chip.

Through the application, the user can emulate LCDView on the PC if the LCD screen is not ready.

3 REQUIREMENTS

To use LCDView, software and hardware requirements are listed below:

- Windows 8.1 or later operating system.
- Internet Explorer 11 or later.
- Nu-Link2 debug probe, for emulator function.
- v3.10.74xx Nu-Link2 firmware version or later.

4 QUICK START

4.1 Tool Installation

Follow the steps below to install the application:

1. Locate and double-click the .exe file.

Figure 4-1 Installation File

2. A dialog box will appear. LCDView will be installed.

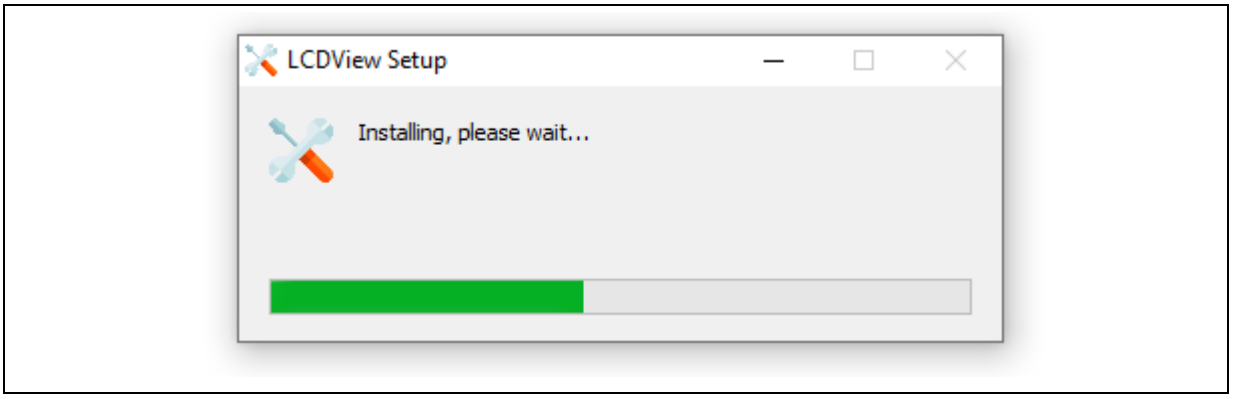


Figure 4-2 Installation Screen

4.2 Tool Execution

Click the start menu of Windows, and select **NuTool – LCDView**.

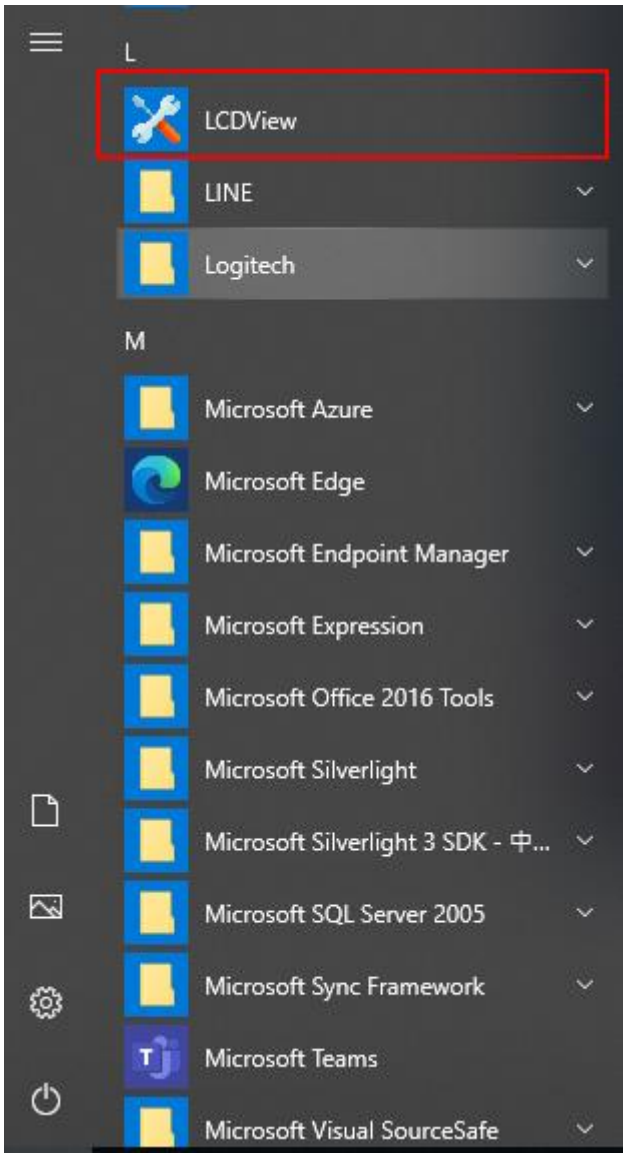
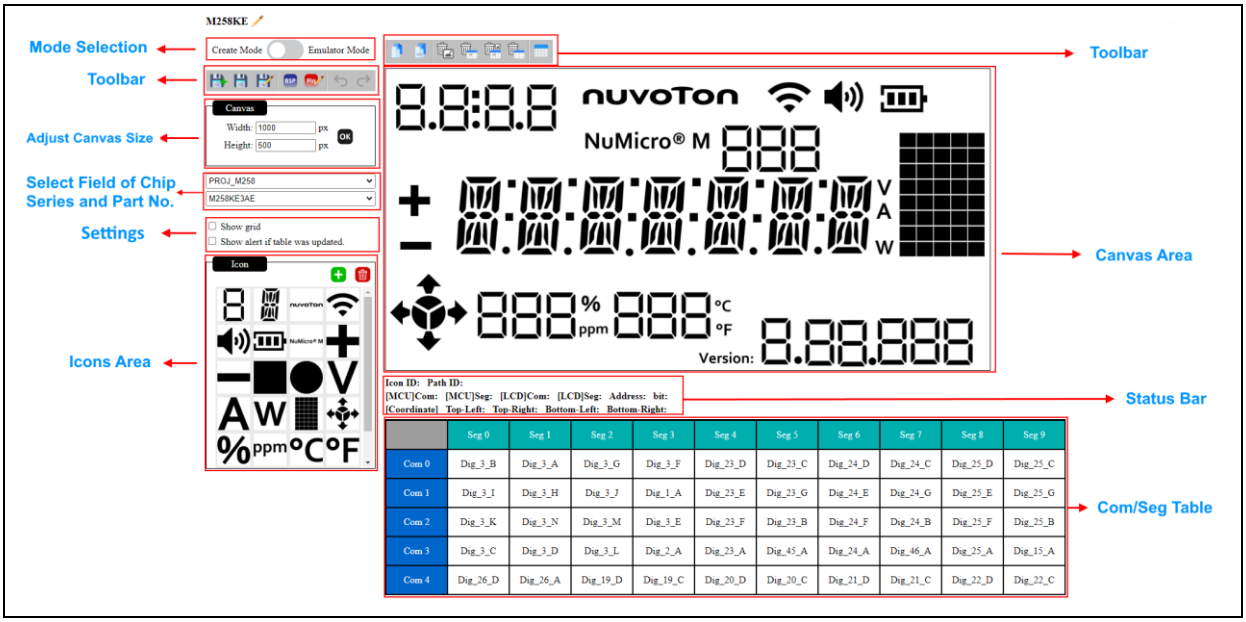


Figure 4-3 Execution Icon

5 USER INTERFACE GUIDE

5.1 Window Overview

The **NuTool - LCDView** window includes a variety of components. The components are described in the following sections.



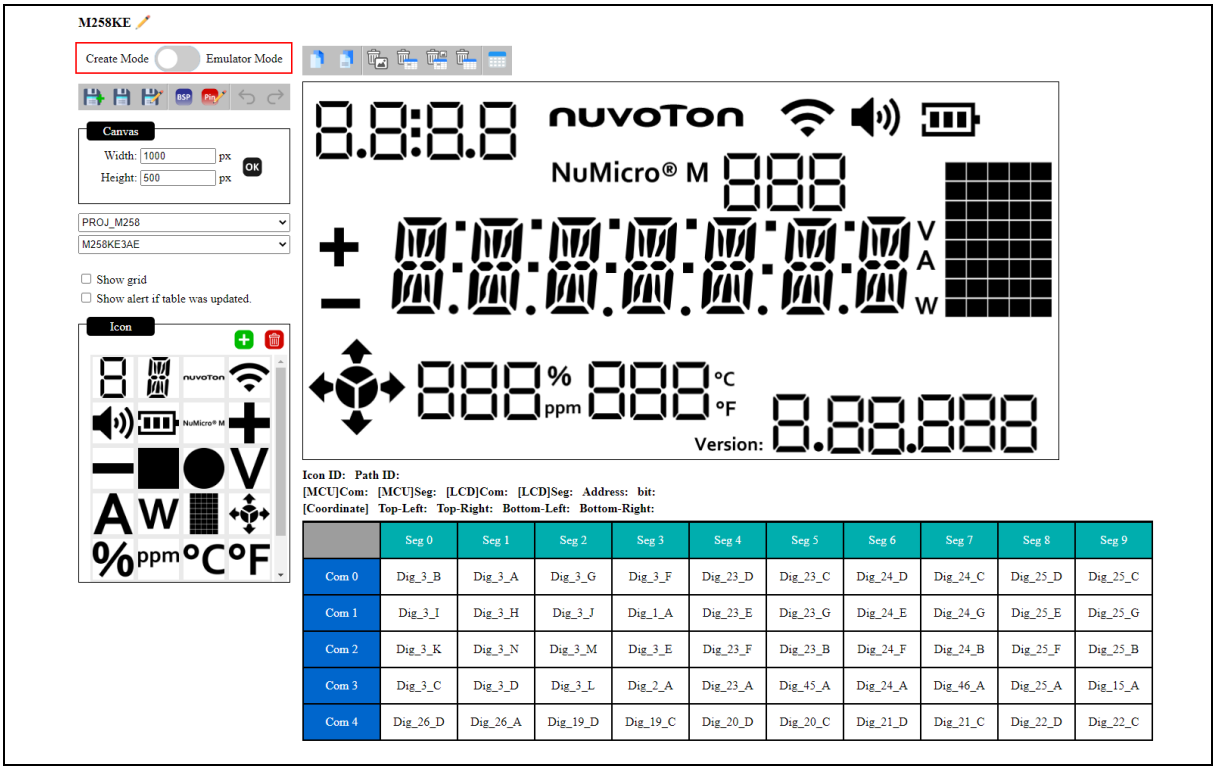
	Seg 0	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9
Com 0	Dig_3_B	Dig_3_A	Dig_3_G	Dig_3_F	Dig_23_D	Dig_23_C	Dig_24_D	Dig_24_C	Dig_25_D	Dig_25_C
Com 1	Dig_3_I	Dig_3_H	Dig_3_J	Dig_1_A	Dig_23_E	Dig_23_G	Dig_24_E	Dig_24_G	Dig_25_E	Dig_25_G
Com 2	Dig_3_K	Dig_3_N	Dig_3_M	Dig_3_E	Dig_23_F	Dig_23_B	Dig_24_F	Dig_24_B	Dig_25_F	Dig_25_B
Com 3	Dig_3_C	Dig_3_D	Dig_3_L	Dig_2_A	Dig_23_A	Dig_45_A	Dig_24_A	Dig_46_A	Dig_25_A	Dig_15_A
Com 4	Dig_26_D	Dig_26_A	Dig_19_D	Dig_19_C	Dig_20_D	Dig_20_C	Dig_21_D	Dig_21_C	Dig_22_D	Dig_22_C

Figure 5-1 LCDView Window

5.1.1 Mode Selection

5.1.1.1 Create Mode

In Create Mode, user can edit the pattern of Canvas, including editing the size of Canvas, style of icon, and Com/Seg table.



	Seg 0	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9
Com 0	Dig_3_B	Dig_3_A	Dig_3_G	Dig_3_F	Dig_23_D	Dig_23_C	Dig_24_D	Dig_24_C	Dig_25_D	Dig_25_C
Com 1	Dig_3_I	Dig_3_H	Dig_3_J	Dig_1_A	Dig_23_E	Dig_23_G	Dig_24_E	Dig_24_G	Dig_25_E	Dig_25_G
Com 2	Dig_3_K	Dig_3_N	Dig_3_M	Dig_3_E	Dig_23_F	Dig_23_B	Dig_24_F	Dig_24_B	Dig_25_F	Dig_25_B
Com 3	Dig_3_C	Dig_3_D	Dig_3_L	Dig_2_A	Dig_23_A	Dig_45_A	Dig_24_A	Dig_46_A	Dig_25_A	Dig_15_A
Com 4	Dig_26_D	Dig_26_A	Dig_19_D	Dig_19_C	Dig_20_D	Dig_20_C	Dig_21_D	Dig_21_C	Dig_22_D	Dig_22_C

Figure 5-2 Create Mode

5.1.1.2 Emulator Mode

With Canvas setup is completed, connect with a chip and switch to emulator mode. User will see the view on Canvas synchronizes with the LCD view on the chip. Note that in emulator mode system will hide any editable options to avoid emulator function being affected.

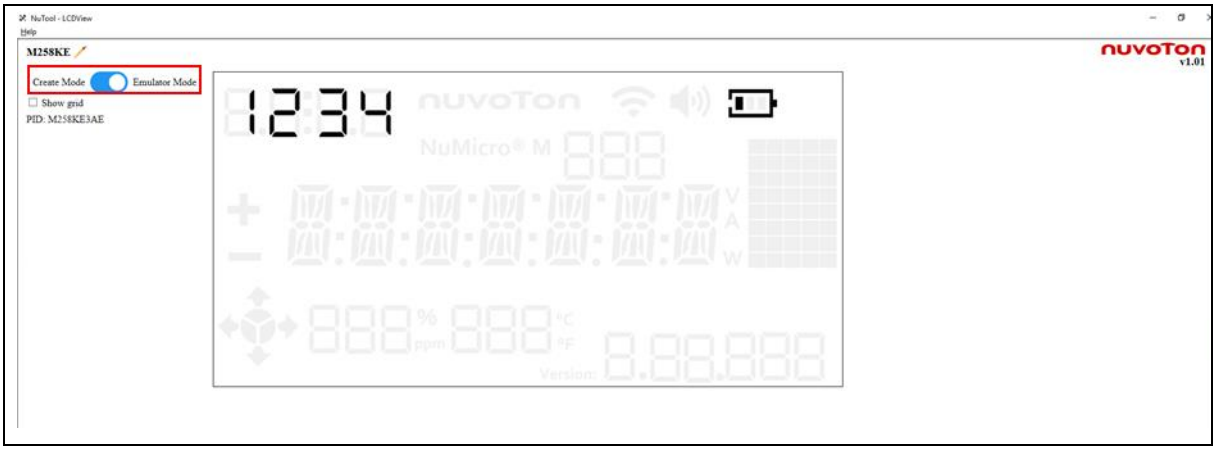
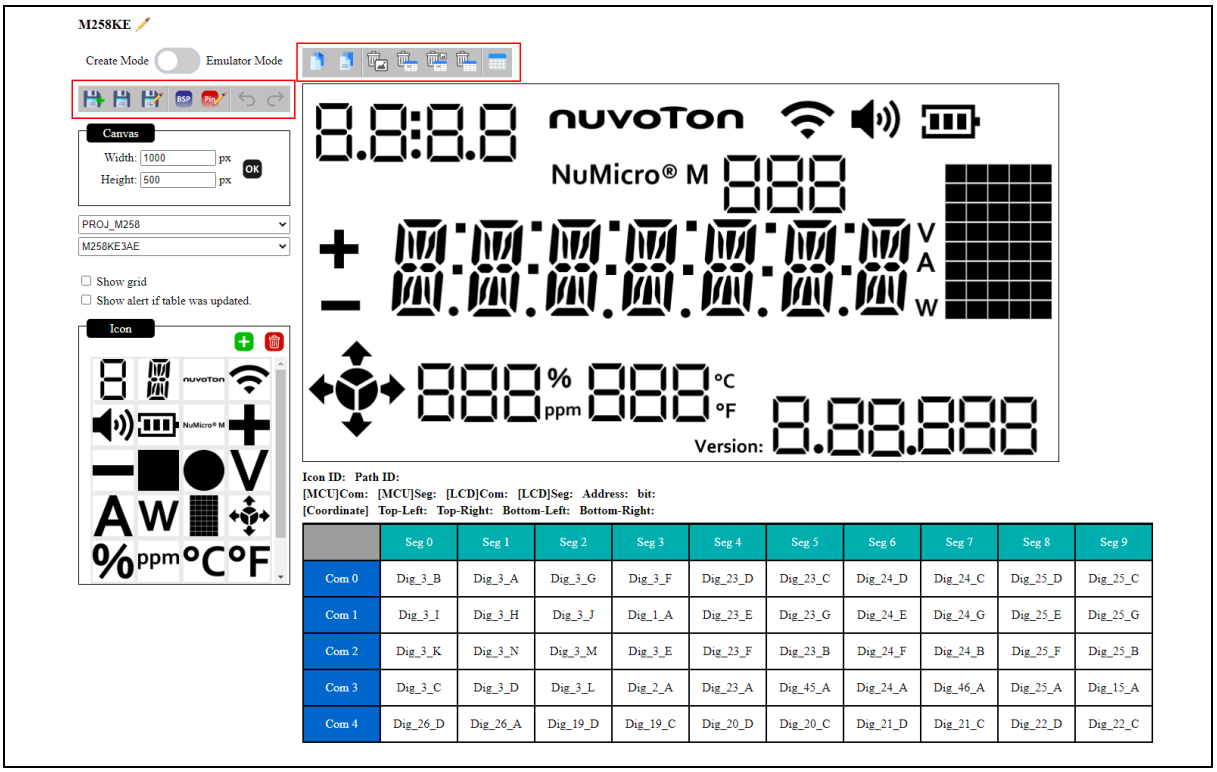


Figure 5-3 Emulator Mode

5.1.2 Toolbar

The icons on the toolbar are shown and described below.



	Seg 0	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9
Com 0	Dig_3_B	Dig_3_A	Dig_3_G	Dig_3_F	Dig_23_D	Dig_23_C	Dig_24_D	Dig_24_C	Dig_25_D	Dig_25_C
Com 1	Dig_3_I	Dig_3_H	Dig_3_J	Dig_1_A	Dig_23_E	Dig_23_G	Dig_24_E	Dig_24_G	Dig_25_E	Dig_25_G
Com 2	Dig_3_K	Dig_3_N	Dig_3_M	Dig_3_E	Dig_23_F	Dig_23_B	Dig_24_F	Dig_24_B	Dig_25_F	Dig_25_B
Com 3	Dig_3_C	Dig_3_D	Dig_3_L	Dig_2_A	Dig_23_A	Dig_45_A	Dig_24_A	Dig_46_A	Dig_25_A	Dig_15_A
Com 4	Dig_26_D	Dig_26_A	Dig_19_D	Dig_19_C	Dig_20_D	Dig_20_C	Dig_21_D	Dig_21_C	Dig_22_D	Dig_22_C

Figure 5-4 NuTool – LCDView Toolbar

5.1.2.1 Create New Project

To create new project, click the **Create project**  icon on the toolbar.

5.1.2.2 Save Project

To Save current status (Canvas, Com/Seg Table, SVG file uploaded by user), follow the steps below:

1. Click the Save project  icon on the toolbar.
2. The current status will be saved to nvt file. It can also be recovered by loading project.

5.1.2.3 Load Project

To recover saved status, click the **Load project**  icon on the toolbar, and select the needed NVT file.

5.1.2.4 Generate Header File

When Canvas setup is completed, click the **Generate header file**  icon on the toolbar to create a header file for BSP.

5.1.2.5 Load Pinconfig Config File

Click the **Load Pinconfig .cfg file**  icon on the toolbar to show the corresponding pin number on the Com/Seg table. (It is recommended to use NuTool-PinConfigure tool and set using Com/Seg pins, then export for NuTool-LCDView).

5.1.2.6 Undo

To undo recent changes you make, click the **Undo**  icon on the toolbar or press Ctrl+Z.

5.1.2.7 Redo

To redo something you've undone, click the **Redo**  icon on the toolbar or press Ctrl+Y.

5.1.2.8 Copy icon

To copy the selecting icon, click the **Copy**  icon on the toolbar or press Ctrl+C.

5.1.2.9 Paste icon

To paste the copied icon, click the **Paste**  icon on the toolbar or press Ctrl+V, and the pasted icon would be added into the canvas.

5.1.2.10 Delete Selected Icon on Canvas

Select an unnecessary icon on Canvas and click **Delete selected icon on Canvas**  icon on the toolbar. The icon and the related Com/Seg value would be deleted.

5.1.2.11 Delete single Com/Seg value

Select an unnecessary Com/Seg value and click **Delete single Com/Seg value**  icon on the toolbar. The Com/Seg value would be deleted.

5.1.2.12 Delete Com/Seg value related to thie icon

To remain icon but reset the related Com/Seg value, select the icon on Canvas and click **Delete Com/Seg value related to this icon**  icon on the toolbar.

5.1.2.13 Delete all Com/Seg value

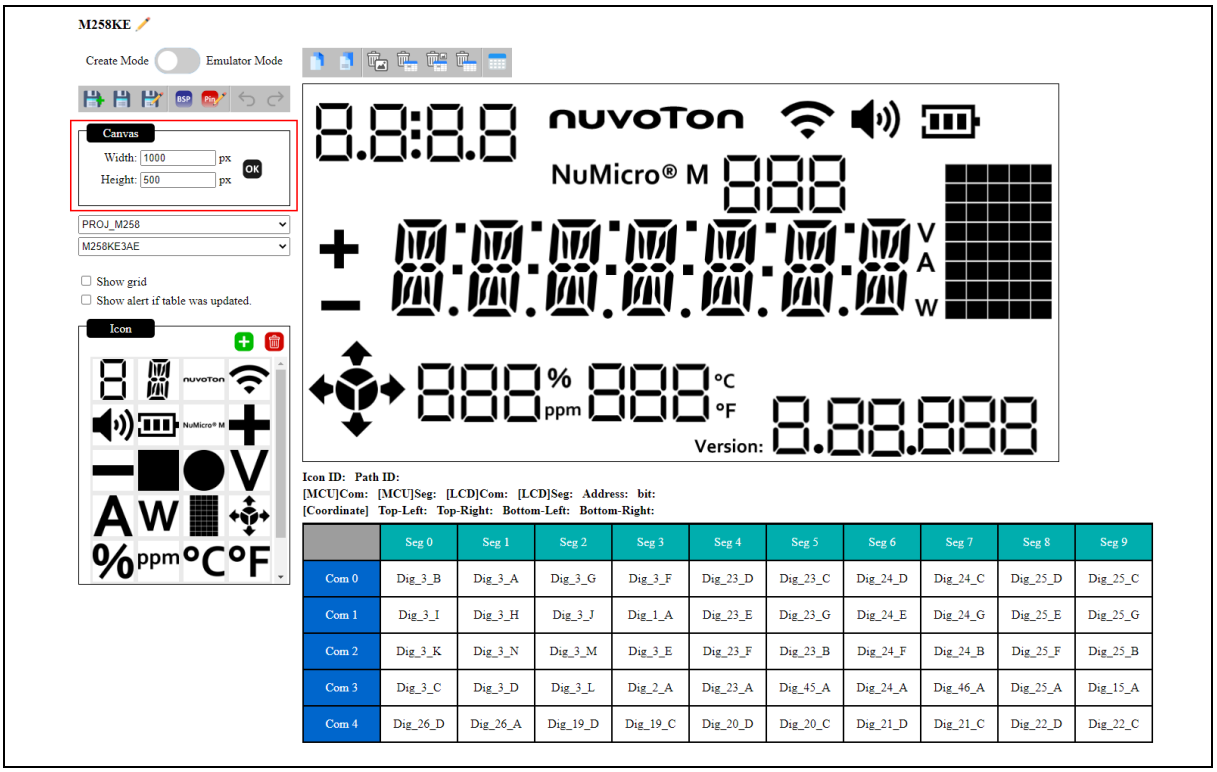
To reset the Com/Seg table, select the icon on Canvas and click **Delete all Com/Seg value**  icon on the toolbar

5.1.2.14 Conversion Table

Click the **Conversion Table**  icon, it shows a form that user can manually fill the mapping of Com/Seg definition for MCU and LCD. After completing filling the table, the converted result will show on the Status Bar when user click any path of icon.

5.1.3 Adjust Canvas Size

The Canvas size can be modified by entering values in Width and Height column.

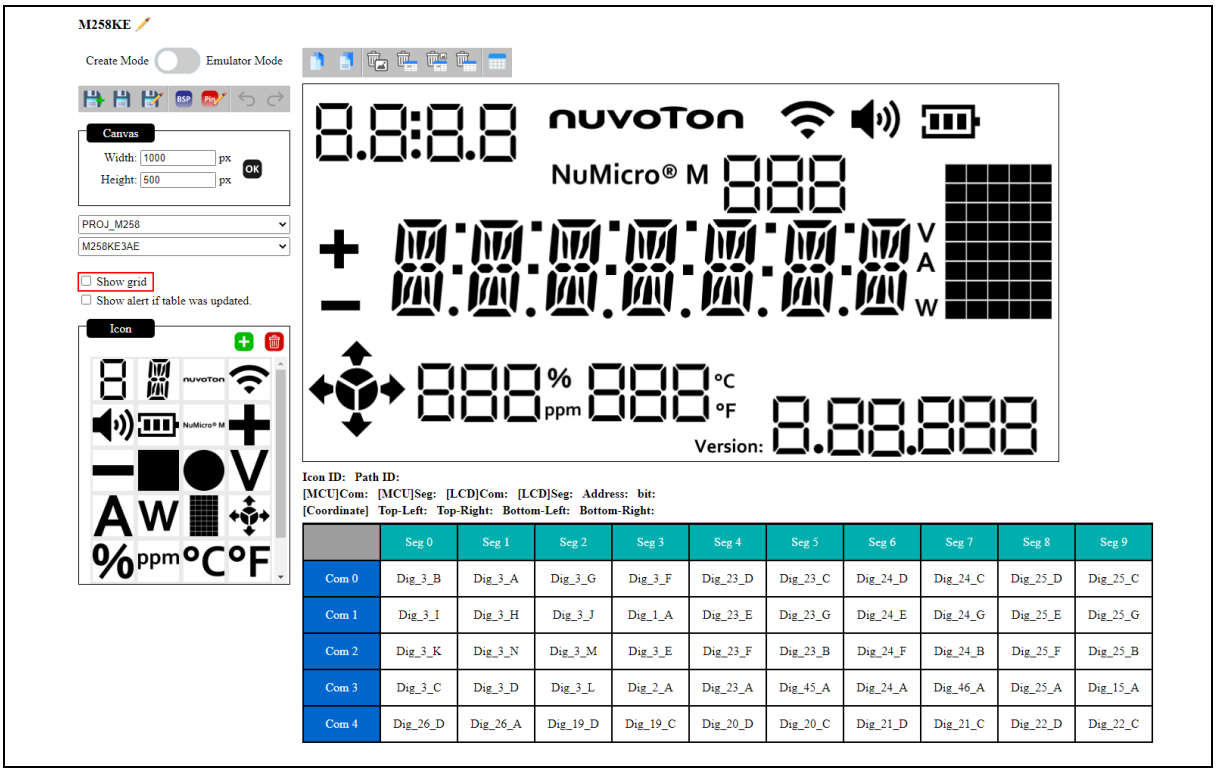


	Seg 0	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9
Com 0	Dig_3_B	Dig_3_A	Dig_3_G	Dig_3_F	Dig_23_D	Dig_23_C	Dig_24_D	Dig_24_C	Dig_25_D	Dig_25_C
Com 1	Dig_3_I	Dig_3_H	Dig_3_J	Dig_1_A	Dig_23_E	Dig_23_G	Dig_24_E	Dig_24_G	Dig_25_E	Dig_25_G
Com 2	Dig_3_K	Dig_3_N	Dig_3_M	Dig_3_E	Dig_23_F	Dig_23_B	Dig_24_F	Dig_24_B	Dig_25_F	Dig_25_B
Com 3	Dig_3_C	Dig_3_D	Dig_3_L	Dig_2_A	Dig_23_A	Dig_45_A	Dig_24_A	Dig_46_A	Dig_25_A	Dig_15_A
Com 4	Dig_26_D	Dig_26_A	Dig_19_D	Dig_19_C	Dig_20_D	Dig_20_C	Dig_21_D	Dig_21_C	Dig_22_D	Dig_22_C

Figure 5-5 Adjust Canvas Size

5.1.4 Show Grid

The checkbox can be enabled to show grids on Canvas.

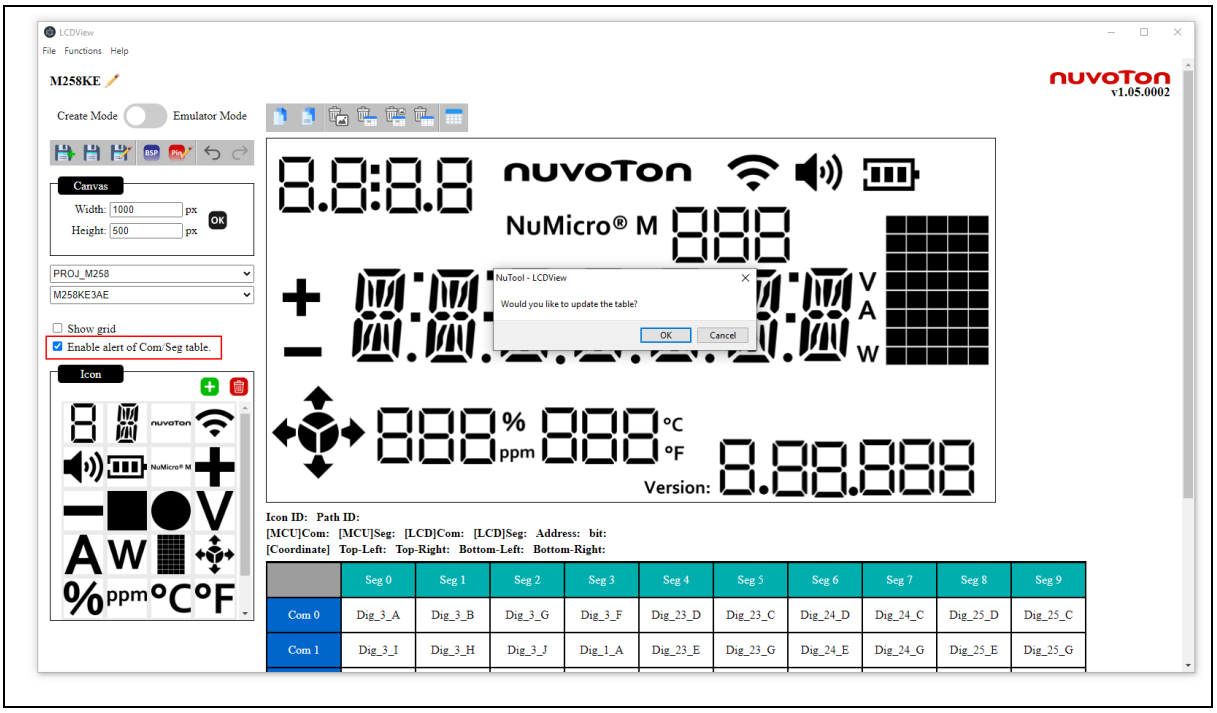


	Seg 0	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9
Com 0	Dig_3_B	Dig_3_A	Dig_3_G	Dig_3_F	Dig_23_D	Dig_23_C	Dig_24_D	Dig_24_C	Dig_25_D	Dig_25_C
Com 1	Dig_3_I	Dig_3_H	Dig_3_J	Dig_1_A	Dig_23_E	Dig_23_G	Dig_24_E	Dig_24_G	Dig_25_E	Dig_25_G
Com 2	Dig_3_K	Dig_3_N	Dig_3_M	Dig_3_E	Dig_23_F	Dig_23_B	Dig_24_F	Dig_24_B	Dig_25_F	Dig_25_B
Com 3	Dig_3_C	Dig_3_D	Dig_3_L	Dig_2_A	Dig_23_A	Dig_45_A	Dig_24_A	Dig_46_A	Dig_25_A	Dig_15_A
Com 4	Dig_26_D	Dig_26_A	Dig_19_D	Dig_19_C	Dig_20_D	Dig_20_C	Dig_21_D	Dig_21_C	Dig_22_D	Dig_22_C

Figure 5-6 Show Grid

5.1.5 Enable alert of Com/Seg table

The checkbox can be enabled to show a confirm dialog when Com/Seg table has been modified.



	Seg 0	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9
Com 0	Dig_3_A	Dig_3_B	Dig_3_G	Dig_3_F	Dig_23_D	Dig_23_C	Dig_24_D	Dig_24_C	Dig_25_D	Dig_25_C
Com 1	Dig_3_I	Dig_3_H	Dig_3_J	Dig_1_A	Dig_23_E	Dig_23_G	Dig_24_E	Dig_24_G	Dig_25_E	Dig_25_G

Figure 5-7 Enable alert of Com/Seg table

5.1.6 Select Field of Chip Series and Part No.

The user can select the chip series and part number of project. After selecting, the system will set corresponding Com/Seg numbers and user can choose to remain settings.

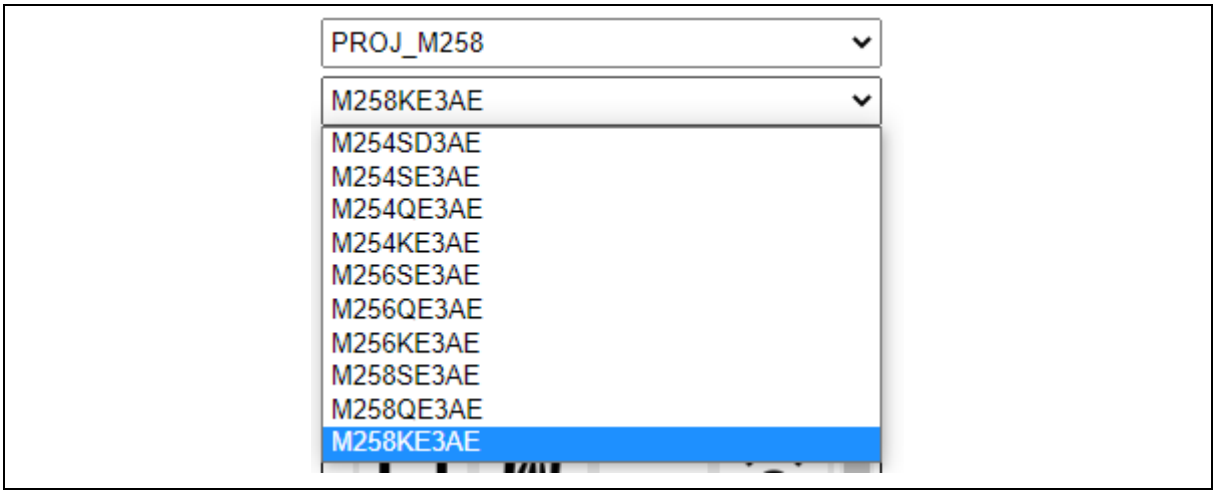
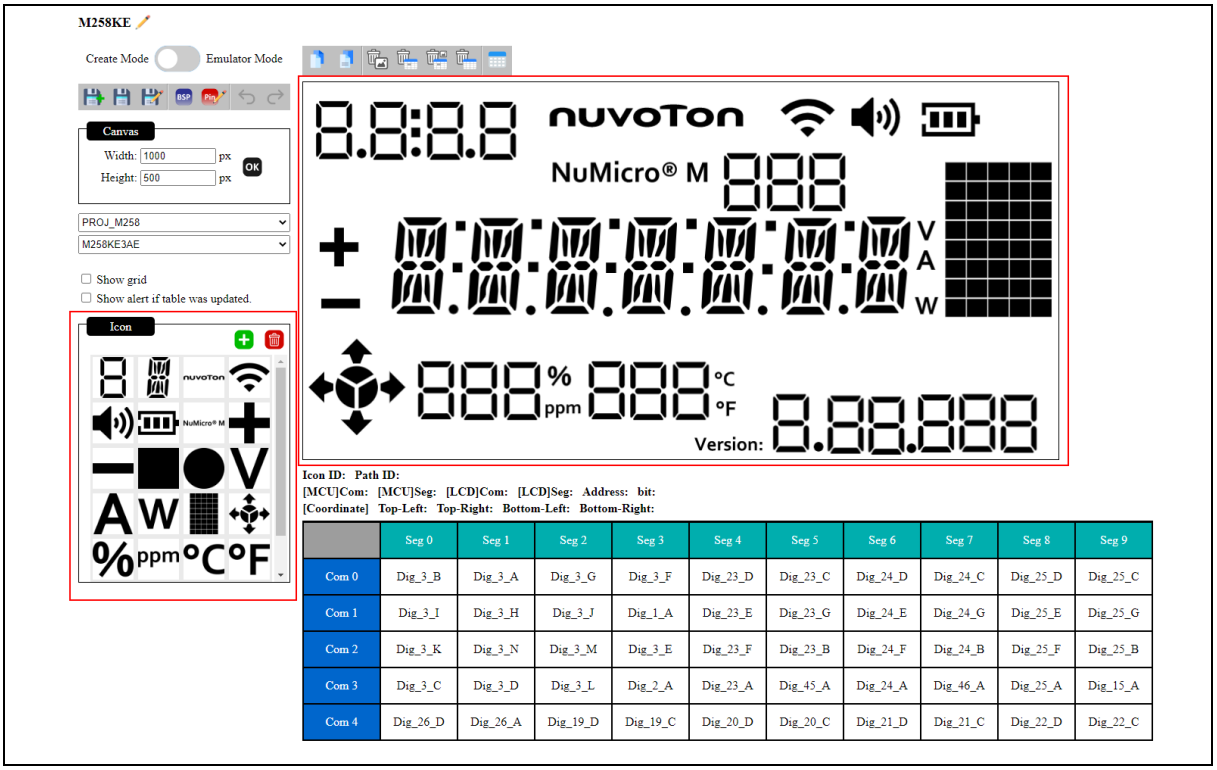


Figure 5-8 Select Part Number

5.1.7 Icon & Canvas

The tool has icons for M258KE3AE screen. User can drag any of the icons and drop the icon to the Canvas. Any icon on Canvas can also be moved and re-sized to emulate the LCD view.

User can import customized SVG file into icon column using the “+” button. Only a SVG file can be improted. The SVG file can be created by a 3rd party tool such as “inkscape” / “adobe”. Also, the same layer of SVG can be lighted together. If user needs to delete an imported icon, select the icon and click the Delete button.



	Seg 0	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9
Com 0	Dig_3_B	Dig_3_A	Dig_3_G	Dig_3_F	Dig_23_D	Dig_23_C	Dig_24_D	Dig_24_C	Dig_25_D	Dig_25_C
Com 1	Dig_3_I	Dig_3_H	Dig_3_J	Dig_1_A	Dig_23_E	Dig_23_G	Dig_24_E	Dig_24_G	Dig_25_E	Dig_25_G
Com 2	Dig_3_K	Dig_3_N	Dig_3_M	Dig_3_E	Dig_23_F	Dig_23_B	Dig_24_F	Dig_24_B	Dig_25_F	Dig_25_B
Com 3	Dig_3_C	Dig_3_D	Dig_3_L	Dig_2_A	Dig_23_A	Dig_45_A	Dig_24_A	Dig_46_A	Dig_25_A	Dig_15_A
Com 4	Dig_26_D	Dig_26_A	Dig_19_D	Dig_19_C	Dig_20_D	Dig_20_C	Dig_21_D	Dig_21_C	Dig_22_D	Dig_22_C

Figure 5-9 Canvas after Edited

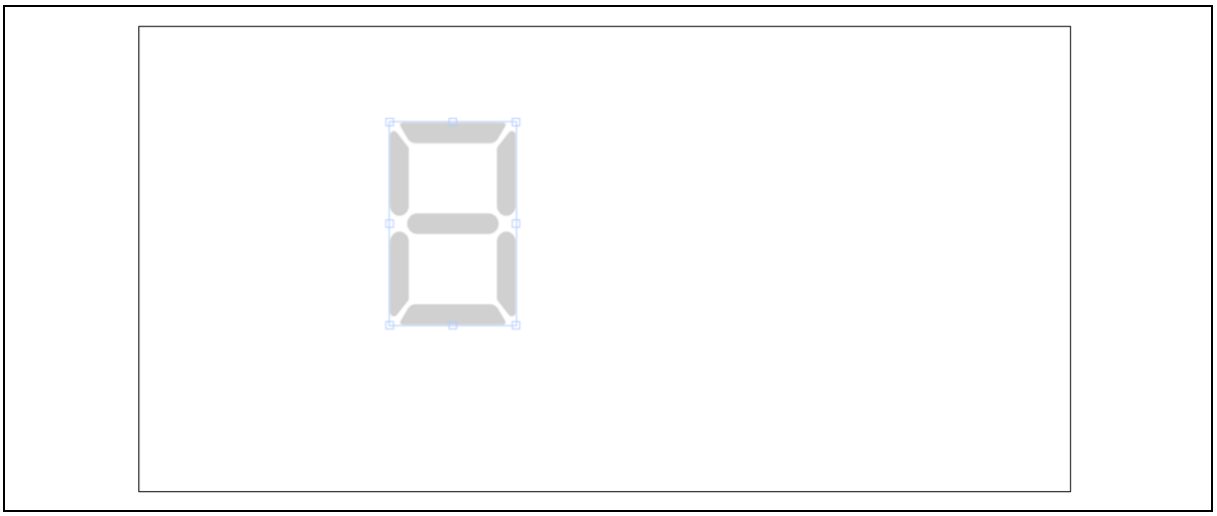


Figure 5-10 Zoom In/Out Icon

5.1.8 Status Bar

When selecting any of the icons on Canvas, the Status Bar under Canvas will show some information about the icon, as shown below.

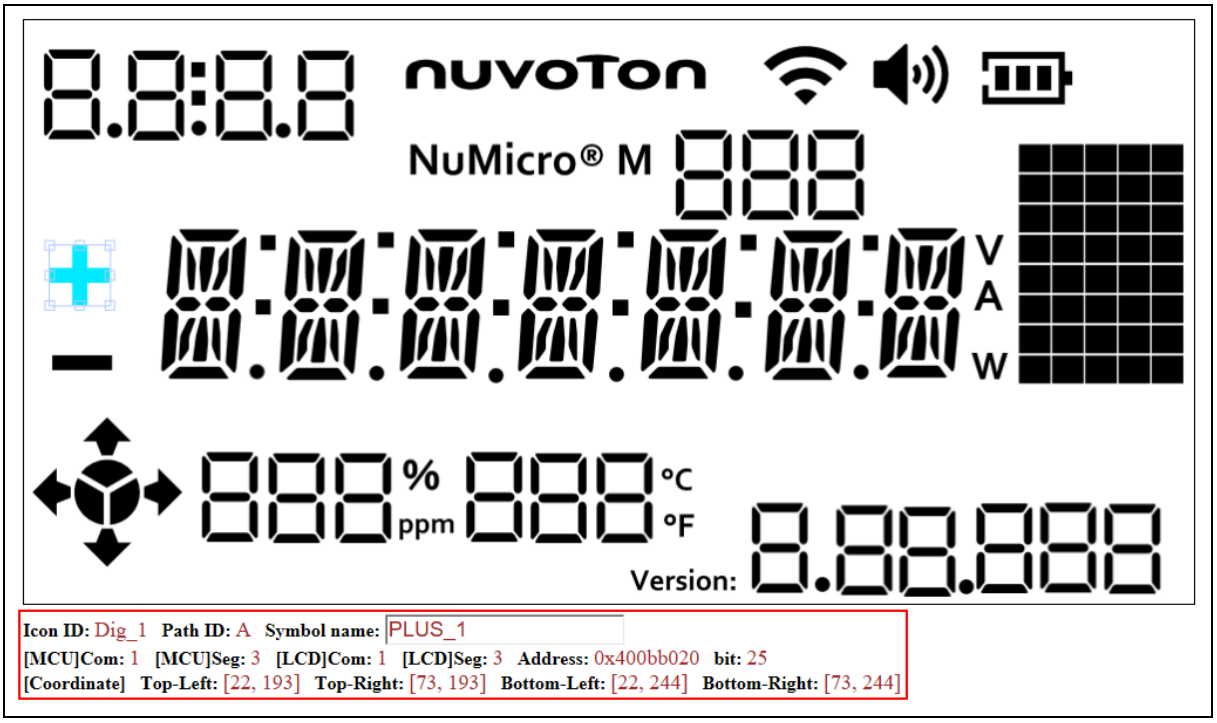
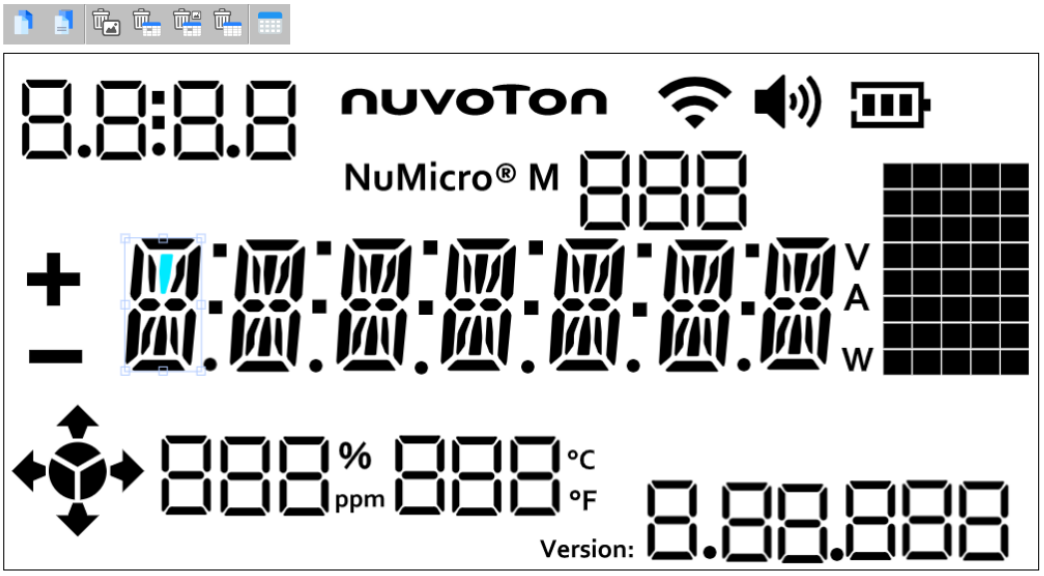


Figure 5-11 Status Bar

- **Icon ID**: Each icon has its unique ID. The value will be assigned by system.
- **Path ID**: Since SVG is a vector illustration, each element is composed by a path. Each path has its unique ID. The value will be assigned by system.
- **Group name**: User can control all the icons with the same group name by setting the 7-segment display or 14-segment display to specific ID for group name. It will be used when creating a header file.
- **Symbol name**: Set ID for selected icon. It will be used when creating a header file. The value will be assigned by system, but user can update it.
- **[MCU]Com / [MCU]Seg:** The index of Com/Seg in MCU view.
- **[LCD]Com / [LCD]Seg:** The index of Com/Seg in LCD view.
- **Address:** The register address of Chip according to the selected path's Com/Seg.
- **Bit:** The bit of register address according to the selected path's Com/Seg
- **Coordinates**: The coordinates with the selected icon. User can update it with keyboard arrow key.

5.1.9 Com/Seg Table

Each path has its corresponding Com/Seg. User should select a path on Canvas and click related Com/Seg Table. The selected grid should be filled with the corresponding Icon ID + Path ID. When clicking any icon on Canvas, all the grids connected to their path will be highlight with a red frame.



Icon ID: Dig_3 **Path ID:** H **Group name:** MAIN
[MCU]Com: 2 **[MCU]Seg:** 2 **[LCD]Com:** 2 **[LCD]Seg:** 2 **Address:** 0x400bb020 **bit:** 18
[Coordinate] **Top-Left:** [117, 179] **Top-Right:** [190, 179] **Bottom-Left:** [117, 308] **Bottom-Right:** [190, 308]

	Seg 0	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9
Com 0	Dig_3_B	Dig_3_A	Dig_3_G	Dig_3_F	Dig_23_D	Dig_23_C	Dig_24_D	Dig_24_C	Dig_25_D	Dig_25_C
Com 1	Dig_3_I	Dig_3_H	Dig_3_J	Dig_1_A	Dig_23_E	Dig_23_G	Dig_24_E	Dig_24_G	Dig_25_E	Dig_25_G
Com 2	Dig_3_K	Dig_3_N	Dig_3_M	Dig_3_E	Dig_23_F	Dig_23_B	Dig_24_F	Dig_24_B	Dig_25_F	Dig_25_B
Com 3	Dig_3_C	Dig_3_D	Dig_3_L	Dig_2_A	Dig_23_A	Dig_45_A	Dig_24_A	Dig_46_A	Dig_25_A	Dig_15_A

Figure 5-12 Com/Seg Table

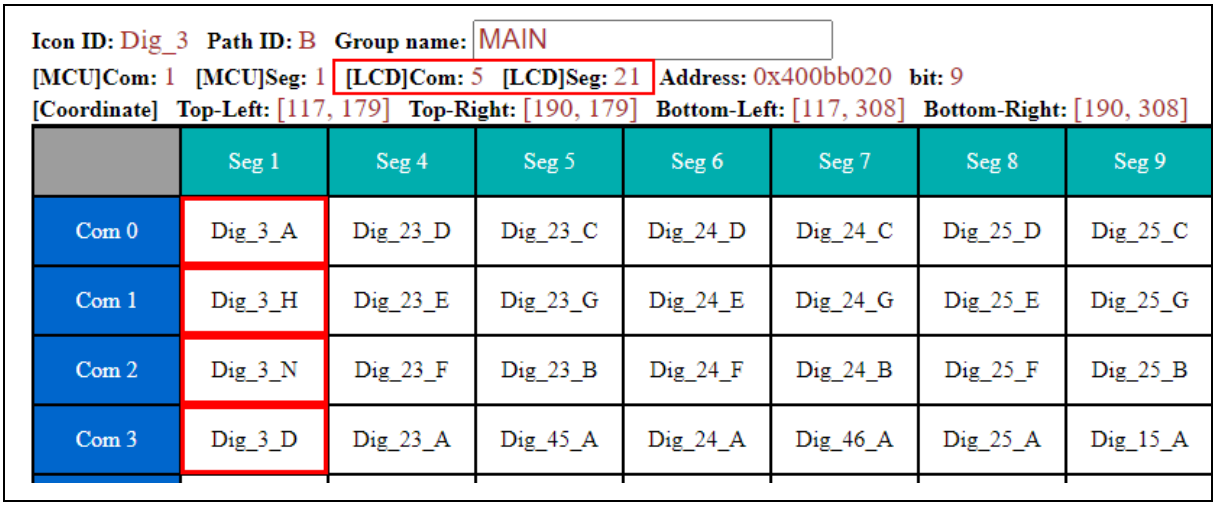
5.1.10 Conversion Table

When ticking the checkbox on the left side of table, the Seg column of Com/Seg table would be hidden. User can hide the Seg columns which are useless.

Due to the Com/Seg table is for MCU but there could be another Com/Seg setting for LCD. User can fill the blanks on the right side of table to set the mapping table of MCU and LCD. The filled number will show on the “[LCD]Com” or “[LCD]Seg” field of status bar.

Hide	From MCU	From LCD
	Com 0	Com 4
	Com 1	Com 5
	Com 2	Com 6
	Com 3	Com 7
	Com 4	Com 0
	Com 5	Com 1
	Com 6	Com 2
	Com 7	Com 3
☑	Seg 0	Seg 20
☐	Seg 1	Seg 21
☑	Seg 2	Seg 22
☑	Seg 3	Seg 23
☐	Seg 4	Seg 24

Figure 5-13 Conversion Table



	Seg 1	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9
Com 0	Dig_3_A	Dig_23_D	Dig_23_C	Dig_24_D	Dig_24_C	Dig_25_D	Dig_25_C
Com 1	Dig_3_H	Dig_23_E	Dig_23_G	Dig_24_E	Dig_24_G	Dig_25_E	Dig_25_G
Com 2	Dig_3_N	Dig_23_F	Dig_23_B	Dig_24_F	Dig_24_B	Dig_25_F	Dig_25_B
Com 3	Dig_3_D	Dig_23_A	Dig_45_A	Dig_24_A	Dig_46_A	Dig_25_A	Dig_15_A

Figure 5-14 The result of setting Conversion table

5.2 Using the Tool

The tool can be used with Nuvoton BSP sample. Follow the steps below:

1. Select the Chip series and part number.
2. Use Create Mode to create the LCD-like canvas, and set up the Com/Seg Table with corresponding icon by documents, then save it to NVT file.
   - User should manually assign the group name of each 7-segment display or 14-segment display; otherwise, these icons will not be recognized in lcdzone.h file.
   - The same group of each 7-segment display or 14-segment display should be assigned to the same ID.
   - Other icon's symbol name will be auto assigned.
3. Click Generate header file and replace original lcdzone.h file with the folder LCD_* sample code (e.g. LCD_Print_Text) provided by BSP.
4. Open main.c in the project. User can set what to show on LCD screen within main function.
   - **Printf:** Set the word of a set of 7-segment display or 14-segment display.
   - **SetSymbol:** Set whether to show other types of icons. (1 means to show).

```
LCDLIB_SetSymbol(SYMBOL_SOUND_17, 1);
LCDLIB_SetSymbol(SYMBOL_BAT_1_18, 1);
LCDLIB_SetSymbol(SYMBOL_BAT_3_18, 1);

LCDLIB_Printf(ZONE_MAIN_DIGIT, "NUVOTON");
```

Figure 5-15 BSP Code Sample

5. Replace the pin config of Configure_LCD_Pins() function in main.c with the code generated by the NuTool-PinConfigure tool. The project can only work by correct pin config and lcdzone.h.
6. Execute Build command and download code into chip. Open LCDView. Load the NVT file described in Step 1 or created before. Then, open emulator mode, and you can see that Canvas is shown synchronously with LCD screen on the chip.

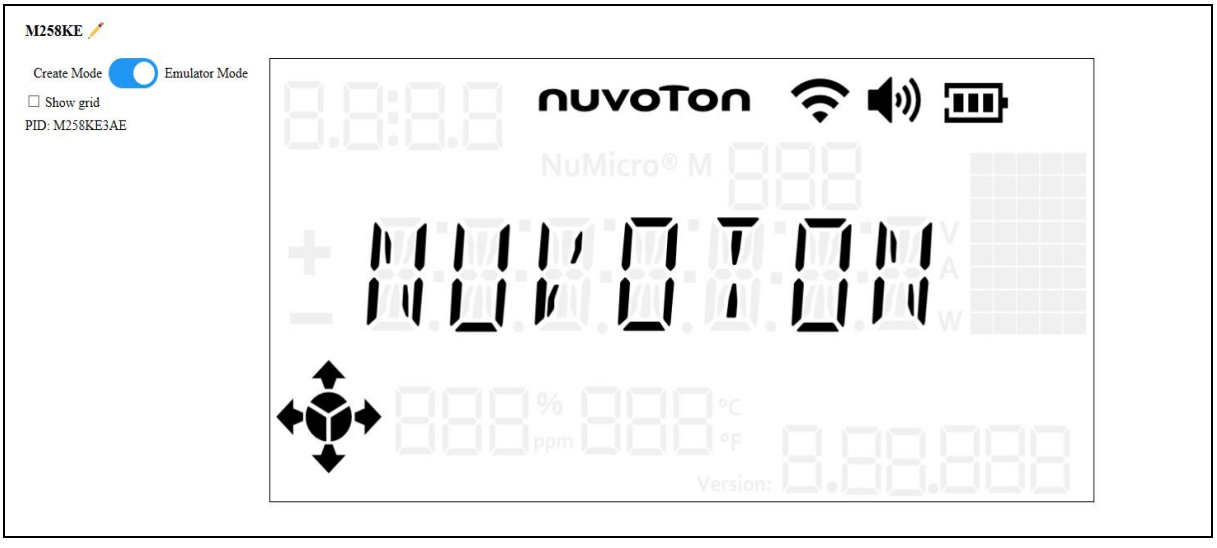


Figure 5-16 Synchronized Canvas

6 HOW TO USE THE TOUCH KEY FEATURE

This tool enables the simulation of Touch Key functionalities on the screen. Using Keil for demonstration, please proceed according to the following steps:

1. Once the project has been successfully compiled, search for the file with a .map extension in the project folder:

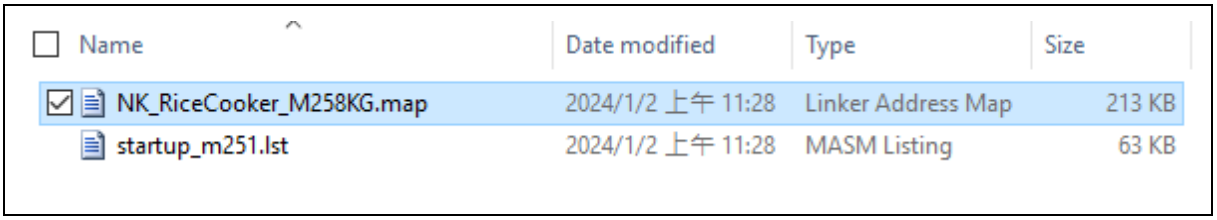


Figure 6-1 .map File

2. Locate the addresses of the following four variables in the .map file: u8MaxScKeyNum、u8Key_Simulation_En、u8Key_Simulation_Press、i8ProcessSigLvl：

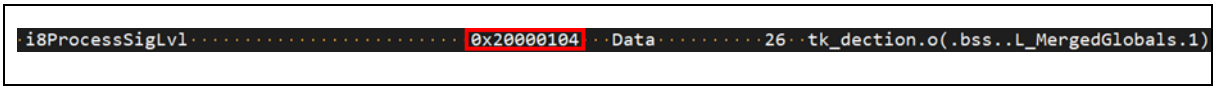


Figure 6-2 Locate the Address of a Variable

3. Once the addresses are located, enter them into the corresponding fields on the LCDView:

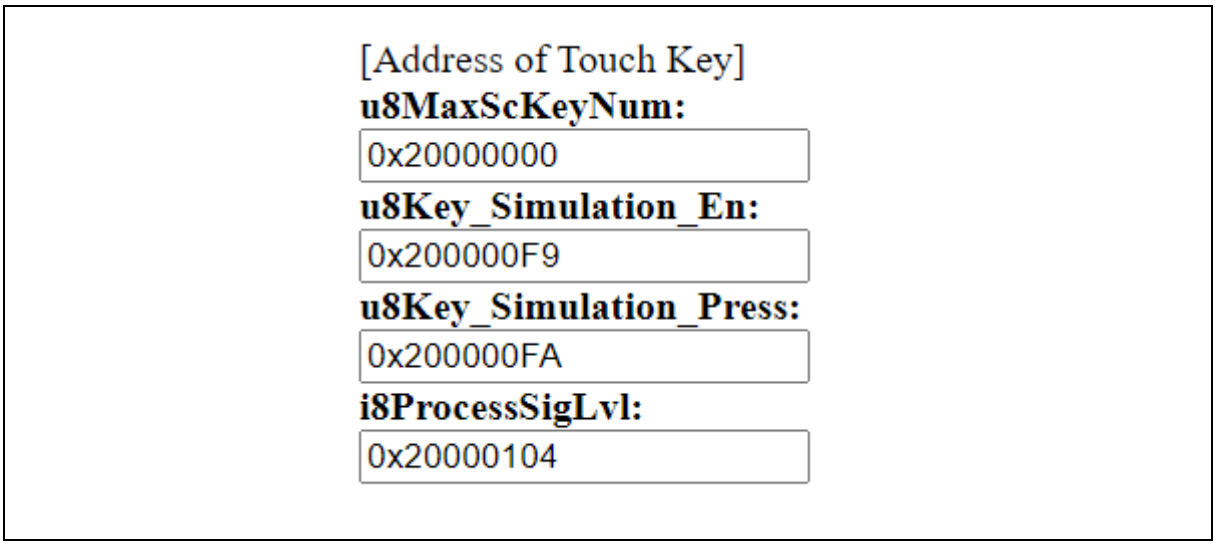


Figure 6-3 Enter the address into the corresponding field.

4. After selecting an icon, input the "touch key index" associated with that icon into the 'TK Index' field in the information column:

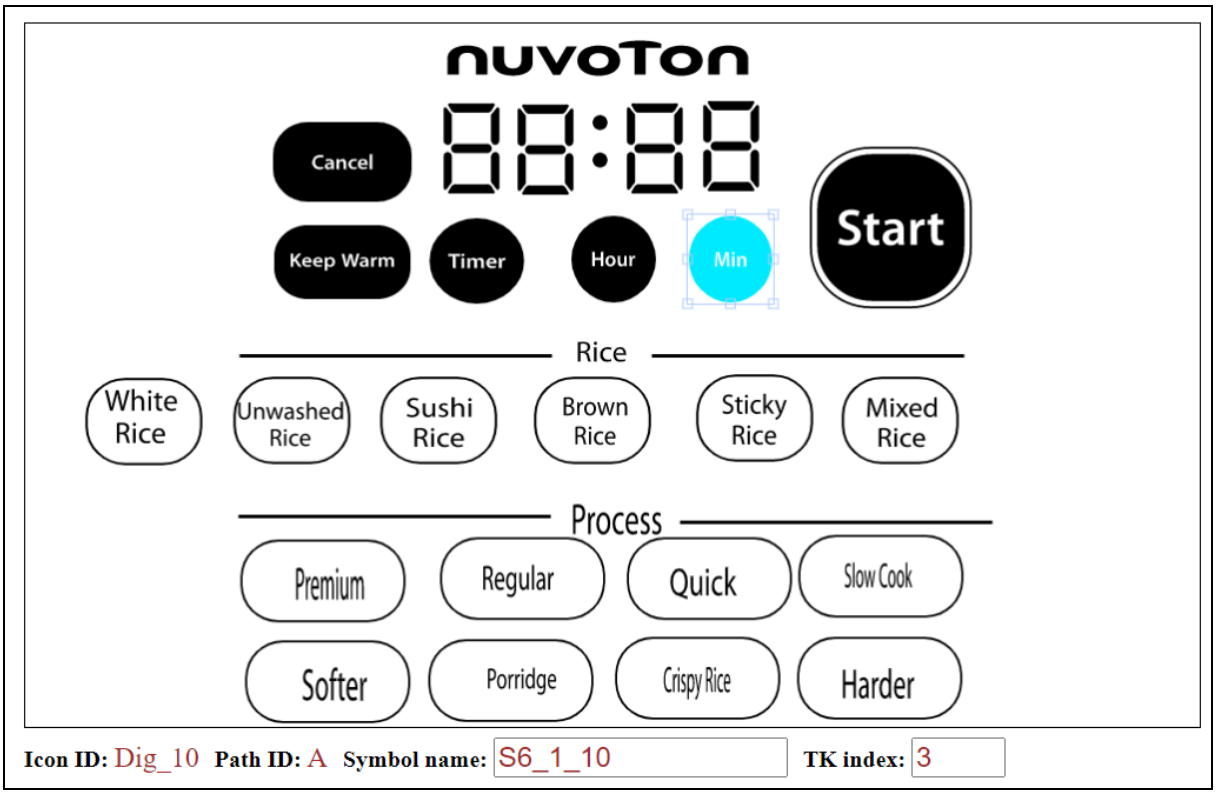


Figure 6-4 Set the corresponding TK index for the icon.

5. Switch to Emulator mode and you can then click on the icon to simulate the effect of a Touch Key click.

Note: When switching to emulator mode and clicking on any icon, the physical touch key panel will become inoperative. This is a mechanism to prevent interference between the two systems. Once you switch back to create mode, the physical touch key panel will resume normal operation.

7 REVISION HISTORY

Date	Revision	Description
2021.10.14	1.00	• Release primary version.
2021.12.10	1.01	• Supported the save and load project feature. • Supported the generate header file feature. • Added supported micro controller: – NuMicro M23 Family: M258 Series.
2022.01.26	1.02	• Supported the info area feature. • Supported the warning dialog feature.
2022.03.07	1.03	• Improved performance and GUI.
2022.05.20	1.04	• Added supported micro controller: – NuMicro 8051 Family: ML56 Series. – NuMicro M23 Family: M2354 Series. • Enhanced stability.
2022.11.01	1.05	• Supported the conversion table feature. • Supported the copy and paste feature. • Supported the redo and undo feature.
2024.01.16	1.06	• Support the touch key feature.

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