GUIGUIDERUG

GUI Guider User Guide

Rev. 12 — 31 July 2023 **User guide**

Document Information

Information	Content
Keywords	GUIGUIDERUG, IDE, GUI, MCU, LVGL, RTOS
Abstract	This document describes GUI Guider and targets embedded GUI application developers with a basic knowledge of C on NXP MCU devices.

1 Introduction

The GUI Guider is built on the Light and Versatile Graphics Library (LVGL) library. GUI Guider provides an IDE to design embedded graphic application UI using drag and drop widgets and helps in the editing process. The software facilitates the UI design for graphic application on embedded devices.

This document describes GUI Guider and targets embedded GUI application developers with a basic knowledge of C on NXP MCU devices.

The major sections of this user guide are:

- Introduction — General information and feature list of GUI Guider
- Installation — Steps to install the software and set up the environment
- GUI Guider Usage — Steps to use GUI Guider and design GUI application
- Widget Details — Description of supported widgets and attributes
- Event Details — Supported events and actions of each widget
- LVGL hardware acceleration — Steps to use PXP/VGLite hardware acceleration
- Performance — Introduces the performance monitor function and tips for performance optimization for NXP MCU devices
- Debug GUI Guider project — Description of how to debug GUI applications designed by GUI Guider in supported IDE and toolchain
- MicroPython — Introduces how to design GUIs, generate MicroPython code, and run Python code in a simulator
- Porting RTOS — Steps to port source code of GUIs for variant RTOS, build, and deploy binary image on NXP MCU
- External storage — Describes how to use external storage (SD card) to store images and video in the GUI Guider project
- External image in QSPI flash — Introduces how to store the image binary in QSPI flash and access the image data in GUI application
- Frequently Asked Questions (FAQs) — Frequently asked questions and answers

1.1 Supported features

- IDE
  - Supports Win10, Ubuntu 22.04, MacOS (Intel Core, Apple M2 core)
  - Multi-LVGL-version (v7.10.1, v8.3.5)
  - RT-Thread, Zephyr real-time operating system (RTOS), and Linux
  - Compatible with MCUXpresso IDE v11.8.0, MCU SDK 2.14.0, IAR 9.40.1, and Keil MDK 5.38
  - Color depth: 1 bit, 8 bit, 16 bit, and 24 bit
  - Shortcut of bring forward and backward, copy, paste, delete, undo, redo, to top, and to bottom
  - Widget attributes group and setting; widgets group move
  - New event function
  - Supports gesture event
  - Supports predefined style for widgets
  - Supports more event triggers and actions
  - Supports more style settings
  - Supports widgets to add flags
  - Supports downloading online template

- More options are available for animation and 3D images: reverse, playback, and play back time
- New demos:
  - Widgets usage: dashboard menu, lottie demo
  - Reference design: smart appliance, smart label
- Optimizes the speed of the generated code

- Widgets
  - V7 supports 32 widgets
    - Button (5): button, image button, checkbox, button group, and switch
    - Form (4): label, drop-down list, text area, and calendar
    - Table (9): table, tab, message box, container, chart, canvas, list, window, and titleview
    - Shape (7): arc, line, roller, LED, spinbox, color picker, and spinner
    - Image (3): image, animation image, and 3D image
    - Progress (2): bar and slider
    - Gauge (2): gauge and line meter
  - V8 supports 43 widgets
    - Button (5): button, image button, checkbox, button group, and switch
    - Form (6): label, spangroup, drop-down list, text area, calendar, and date text box
    - Table (10): table, tab, message box, container, chart, canvas, list, window, titleview, and menu
    - Gauge (1): meter
    - Shape (7): arc, line, roller, LED, spinbox, color picker, and spinner
    - Image (3): image, animation image, and 3D image
    - Progress (2): bar and slider
    - Advanced (9): analog clock, carouse, video, lottie, QR code, barcode, digital clock, radio button, and text progress bar
    -
  - Common functions
    - Animation: lottie animation, animation image, GIF to animation, animation easing, and animation path
    - Support event trigger and action selection, custom action code, and custom style code for screen
    - Support tileview design by drag and drop operation in editor
    - Support parent/child hierarchy for carousel container, tabview, and tileview
    - Support two widgets theme:
      - Default
      - Dark
    - Support four IDE themes:
      - Dark Blue
      - Light Blue
      - Light
      - Dark
    - Chinese display and Chinese input
    - Support fonts:
      - .simsun (can support Chinese characters)
      - .arial
      - .montserratMedium
      - .Abel_regular
      - .Acme_Regular
      - .Adventpro_regula
      - .AguafinaScript_Regular

  - .Alatsi_Regular
  - .AlexBrush_Regular
  - .AmaticSC_Regular
  - .Amiko_Regular
  - .Antonio_Regular
  - .ArchitectsDaughter
- Target devices
  - Type: i.MX RT; MIMXRT1010-EVK, MIMXRT1015-EVK, MIMXRT1020-EVK, MIMXRT1024-EVK, MIMXRT1040-EVK, MIMXRT1050-EVKB, MIMXRT1060-EVK, MIMXRT1064-EVK, MIMXRT595-EVK, MIMXRT1160-EVK, MIMXRT1170-EVK, and MIMXRT1170-EVKB (portrait mode and landscape mode)
  - Type: LPC; LPCXpresso54628, LPCXpresso54S018, LPCXpresso54S018M, LPCXpresso55S06, LPCXpresso55S16, LPCXpresso55S28, and LPCXpresso55S69
  - Type: MCX; NXP MCXN947BRK, and MCX-N5xx-EVK
  - Type: KW KW45B41Z-EVK
  - Type: RW RD-RW612-BGA
  - Type: MPU MCIMX93EVK
  - External flash storage for LPCXpresso54628

Table 1. Board name and verified display

Board	Verified display part number
LPCXpresso54S018M	RK043FN02H-CT, RK043FN66HS-CTG
LPCXpresso54S018	RK043FN02H-CT, RK043FN66HS-CTG
LPCXpresso54628	RK043FN02H-CT, RK043FN66HS-CTG
LPCXpresso55S69	adafruit-1947
LPCXpresso55S28	adafruit-1947
LPCXpresso55S16	adafruit-1947
LPCXpresso55S06	adafruit-1947
MCXN947BRK	Mikroe TFT Proto 5"
MIMXRT1010-EVK	adafruit-1947
MIMXRT1015-EVK	adafruit-1947
MIMXRT1020-EVK	adafruit-1947
MIMXRT1024-EVK	adafruit-1947
MIMXRT1160-EVK	RK055AHD091, RK055MHD091
MIMXRT1170-EVK	RK055AHD091, RK055MHD091
MIMXRT1170-EVKB	RK055AHD091, RK055MHD091
MIMXRT595-EVK	G1120B0MIPI, Mikroe TFT Proto 5", RK055AHD091, RK055MHD091
MIMXRT1060-EVK	RK043FN02H-CT, RK043FN66HS-CTG
MIMXRT1060-EVKB	RK043FN02H-CT, RK043FN66HS-CTG
MIMXRT1064-EVK	RK043FN02H-CT, RK043FN66HS-CTG
MIMXRT1040-EVK	RK043FN02H-CT, RK043FN66HS-CTG
MIMXRT1050-EVKB	RK043FN02H-CT, RK043FN66HS-CTG

  - Device template, auto-build, and auto-deploy for supported platforms

Table 2. Status of advance functions

Feature list	lvgl version	Toolchain	Platform
widget:lottie	v8.3.5	MCUXpresso	MIMXRT1040-EVK, MIMXRT1050-EVKB, MIMXRT1060-EVK, MIMXRT1064-EVK, MIMXRT1160-EVK, MIMXRT1170-EVK
widget:video	v8.3.5	MCUXpresso, IAR, ARMGcc, MDK	MIMXRT1040-EVK, MIMXRT1050-EVKB, MIMXRT1060-EVK, MIMXRT1064-EVK, MIMXRT1160-EVK, MIMXRT1170-EVK
SD card storage	v8.3.5	MCUXpresso, IAR, ARMGcc, MDK	MIMXRT1040-EVK, MIMXRT1050-EVKB, MIMXRT1060-EVK, MIMXRT1064-EVK, LPCXpresso54S018M

1.2 Hardware requirement of LVGL application

Every modern controller which is able to drive a display is suitable to run LVGL. The minimal requirements are:

- 16, 32, or 64-bit microcontroller or processor
- 16 MHz clock speed is recommended
- Flash/ROM: > 64 kB for the essential components (> 180 kB is recommended)
- RAM:
  - Static RAM usage: ~2 kB depending on the used features and object types
  - Stack: > 2 kB (> 8 kB is recommended)
  - Dynamic data (heap): > 4 kB (> 32 kB is recommended if using several objects). Set by `LV_MEM_SIZE` in `lv_conf.h`
  - Display buffer: > "Horizontal resolution" pixels (> 10 × "Horizontal resolution" is recommended).
  - One frame buffer in the MCU or in an external display controller
- Basic C (or C++) knowledge: pointers, structures, and callbacks

Note: *Memory usage may vary depending on architecture, compiler, and build options.*

2 Installation

This section describes the prerequisites and steps to install GUI Guider.

2.1 Prerequisites of Windows 10

- PC with Windows 10

2.2 Install GUI Guider on Windows 10

To install GUI Guider on Windows 10, perform the following steps:

1. Download the installer from www.nxp.com/gui-guider.
2. To install the software, double-click the installer.
3. Choose the language.

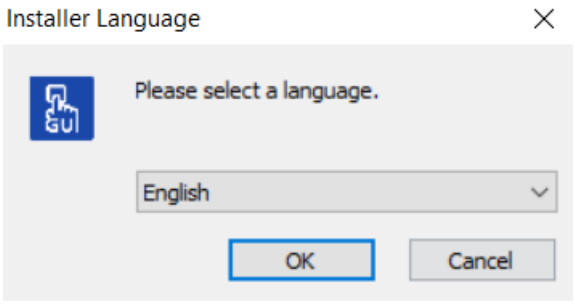


Figure 1. Choose language

4. Accept the terms of the agreement.

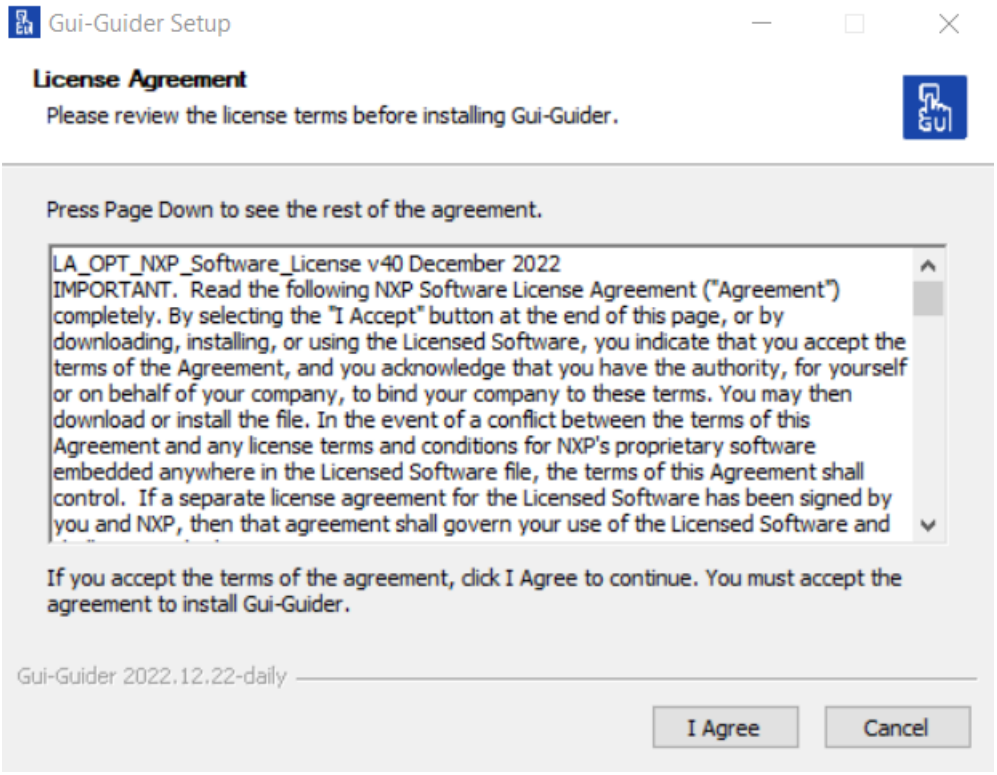


Figure 2. Accept terms and conditions

5. Select the location where you want to install GUI Guider.

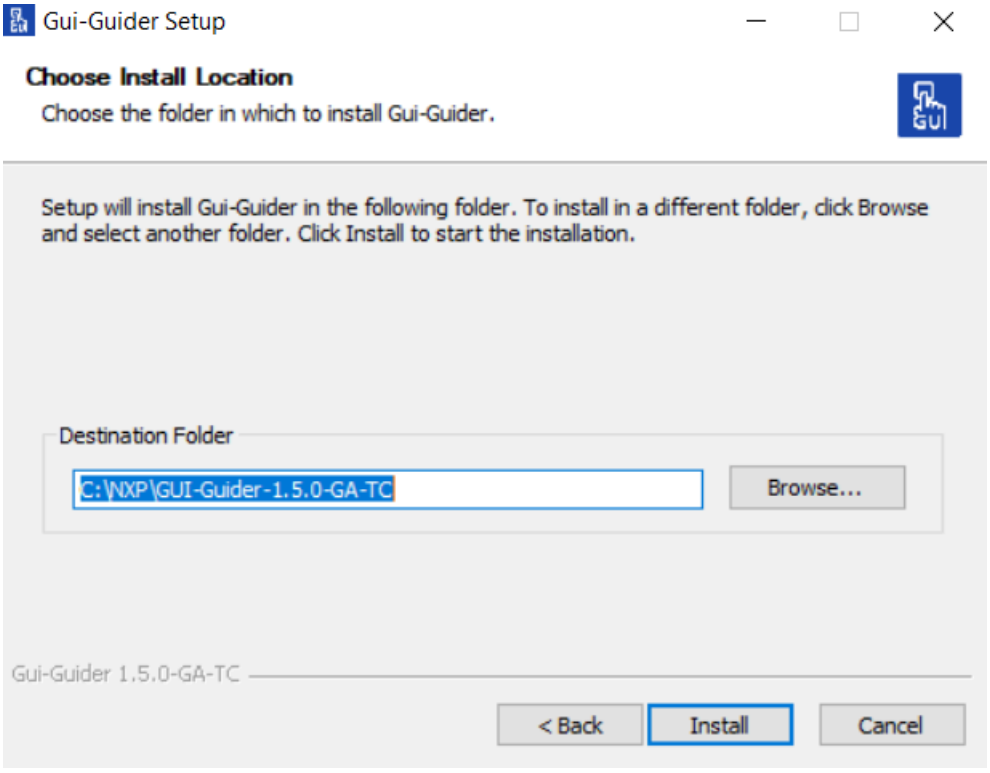


Figure 3. Choose install location

2.3 Uninstall GUI Guider on Windows 10

To uninstall GUI Guider on Windows, perform the following steps:

1. Open **Control Panel** > **Programs and Features**.
2. Select **Gui-Guider-<version>** and click **Uninstall**.

2.4 Prerequisites of Ubuntu 22.04

- PC with Ubuntu 22.04

2.5 Install GUI Guider on Ubuntu 22.04

1. Download the installer from www.nxp.com.
2. To install the software, run the following command.

```
$ sudo apt install ./Gui-Guider-Setup-1.6.0-GA.deb
```

2.6 Uninstall GUI Guider on Ubuntu 22.04

Run the following command in the command-line tool.

```
$ sudo apt remove gui-guider
```

2.7 Prerequisites of MacOS

The following steps are required before installing GUI Guider on MacOS:

1. Install SDL2:
   - Download SDL source code:

```
wget https://github.com/libsdl-org/SDL/releases/download/release-2.26.5/
SDL2-2.26.5.tar.gz
tar -zvxf SDL2-2.26.5.tar.gz
cd SDL2-2.26.5
./configure --prefix=/usr/local
```

2. Run `brew install cmake` command.
3. Install the MCUXpresso IDE.

Note: *M core chip: ensure that the SDL2 is installed in* `/usr/local`.

2.8 Install GUI Guider on MacOS

To install GUI Guider on MacOS, perform the following steps.

1. Download the installer from www.nxp.com.
2. Click the installer package.

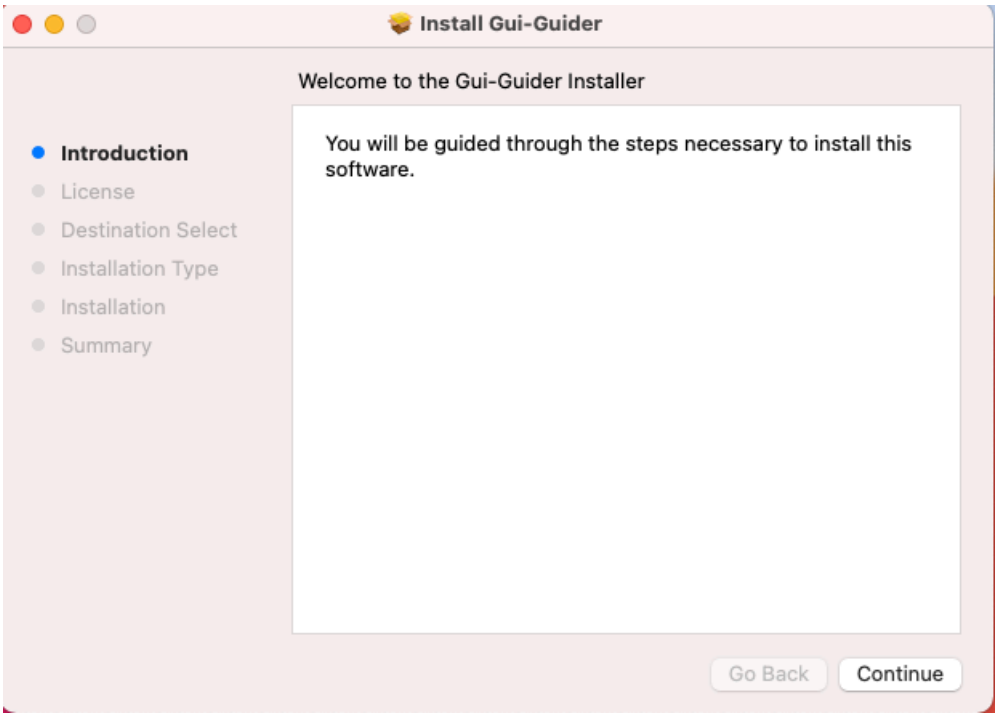


Figure 4. Install GUI Guider

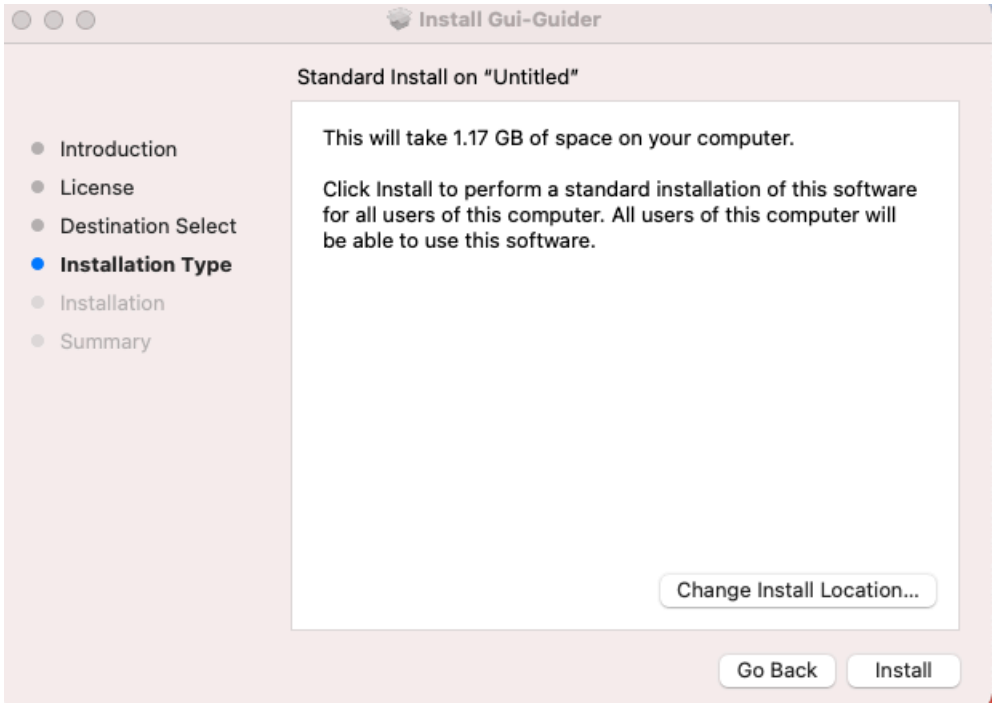


Figure 5. Click 'Install'

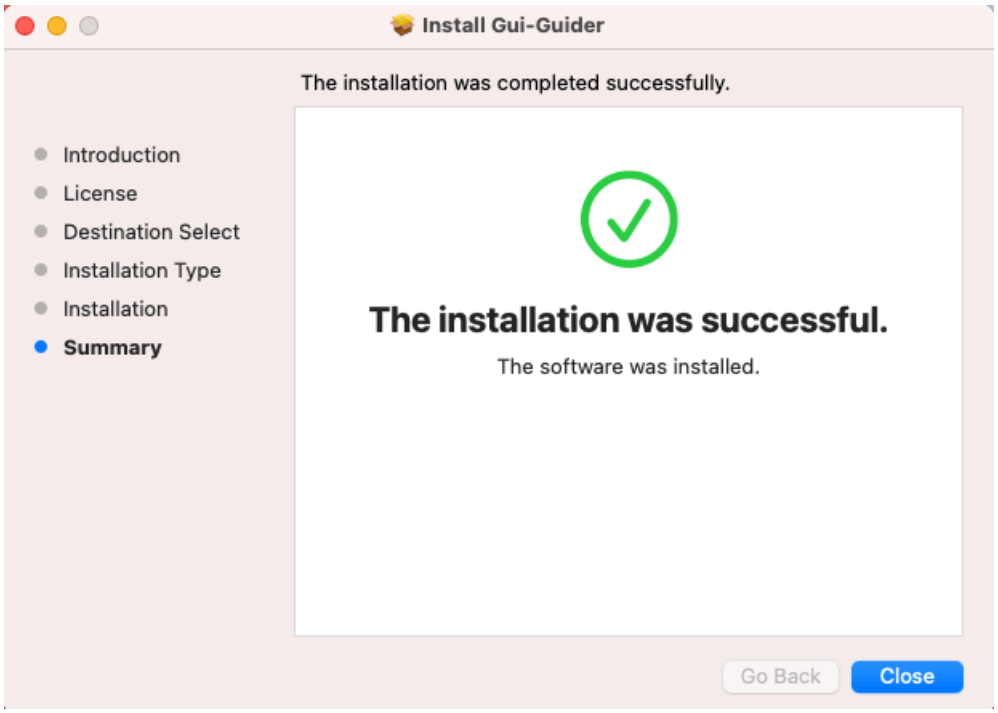


Figure 6. Installation successful

2.9 Uninstall GUI Guider on MacOS

To uninstall GUI Guider on MacOS, run the following command.

```
$ rm -r /Applications/Gui-Guider.app
```

3 Usage

When GUI Guider is launched, the following options appear:

- Create a new project: Wizard to create a project.
- Open a recent project: Enables you to open a project from recent projects list.
- Import a local project: Enables you to import a project from the local disk.

3.1 Create a project

To create a project, perform the following steps:

1. Click the **Create a new project** button.

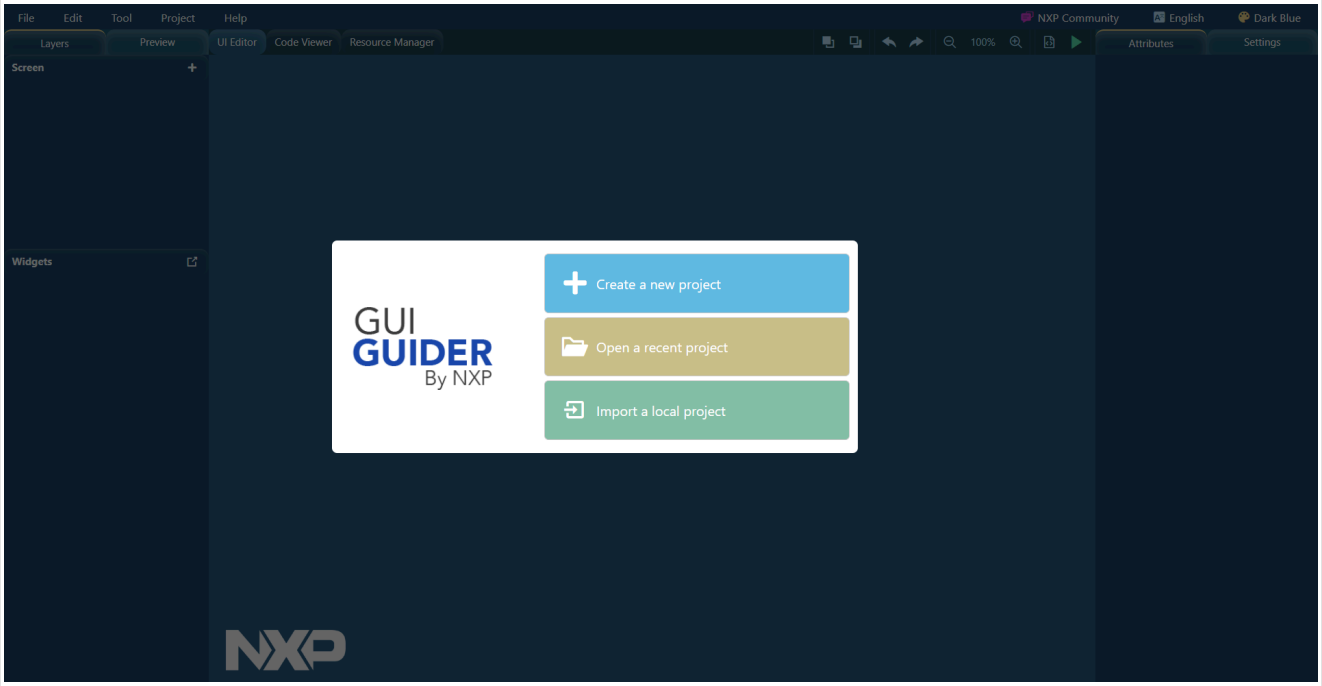


Figure 7. Create a project

Note: *Alternatively, you can select **File** > **New** in the GUI editor.*

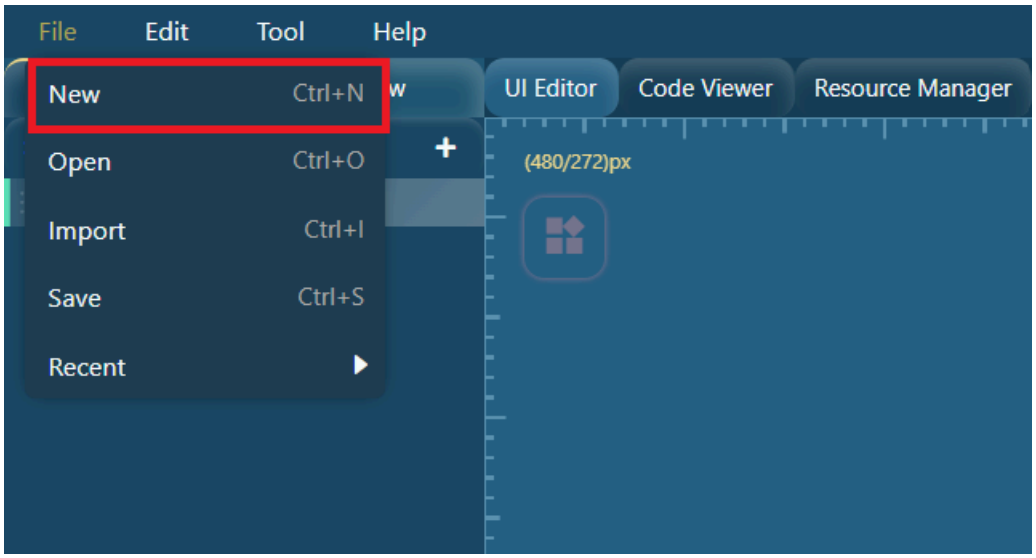


Figure 8. Alternative way to create a project

*The **New Project** wizard dialog box appears.*

2. Select the LVGL version that you want to use. For example, v8.

Figure 9. Select LVGL version

3. Click **Next** or double click.
   The **Select a Board Template** page of the wizard appears.

4. Click the **Simulator**, **i.MX RT**, or **LPC** tab and select a board from the template list. For example, select MIMXRT1050-EVK.
5. Click **Next** or double click.

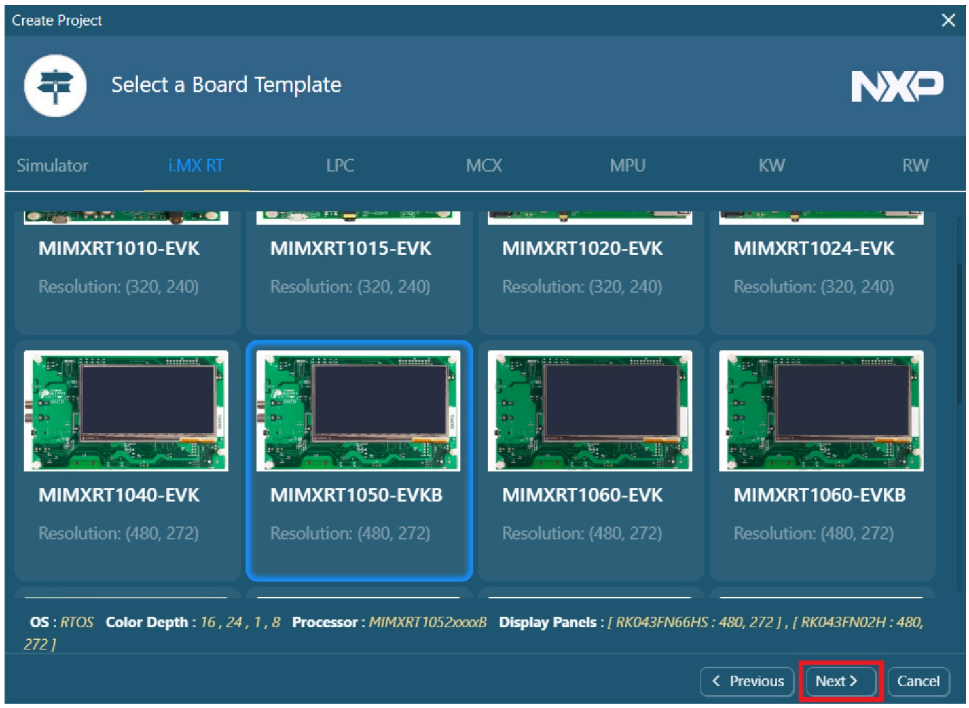


Figure 10. Select a board template

The **Select an Application Template** appears.

6. Select a GUI application template, For example, ScreenTransition.

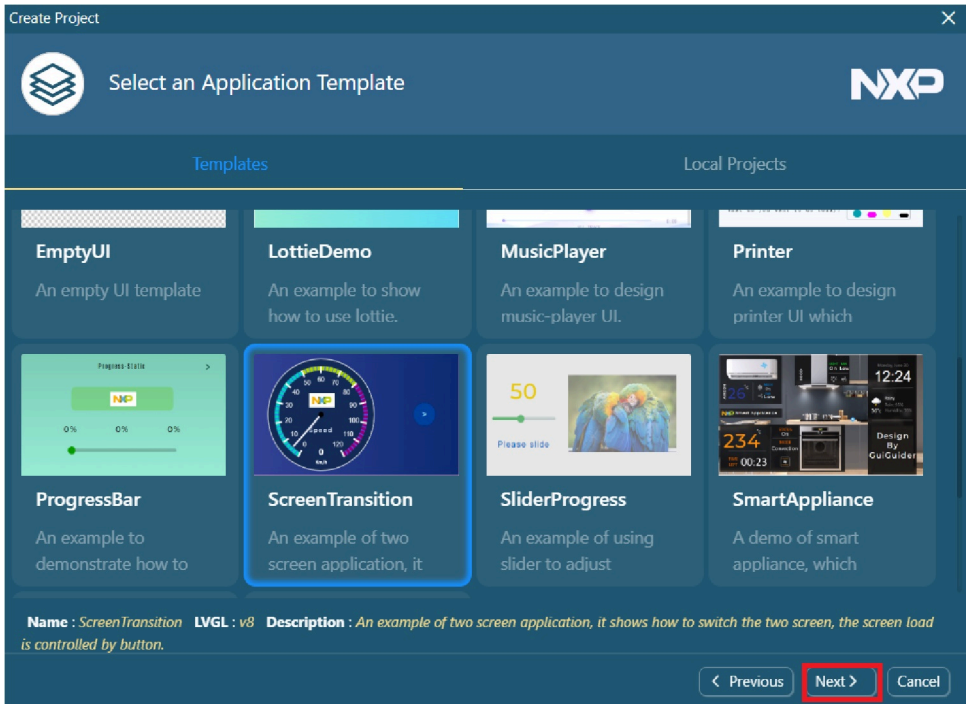


Figure 11. Select a GUI application template

7. Click **Next** or double click.
   The **Project Settings** page appears.
8. Configure the basic information of the project, including **Project Name**, **Project Directory**, **Panel Type**, **Color Depth**, and **GUI Resize**.
   Note: *To ensure that the GUI application is displayed normally on the board, select Auto Ratio. To customize the size of the application display, set the scaling ratio of width and height in custom ratio.*

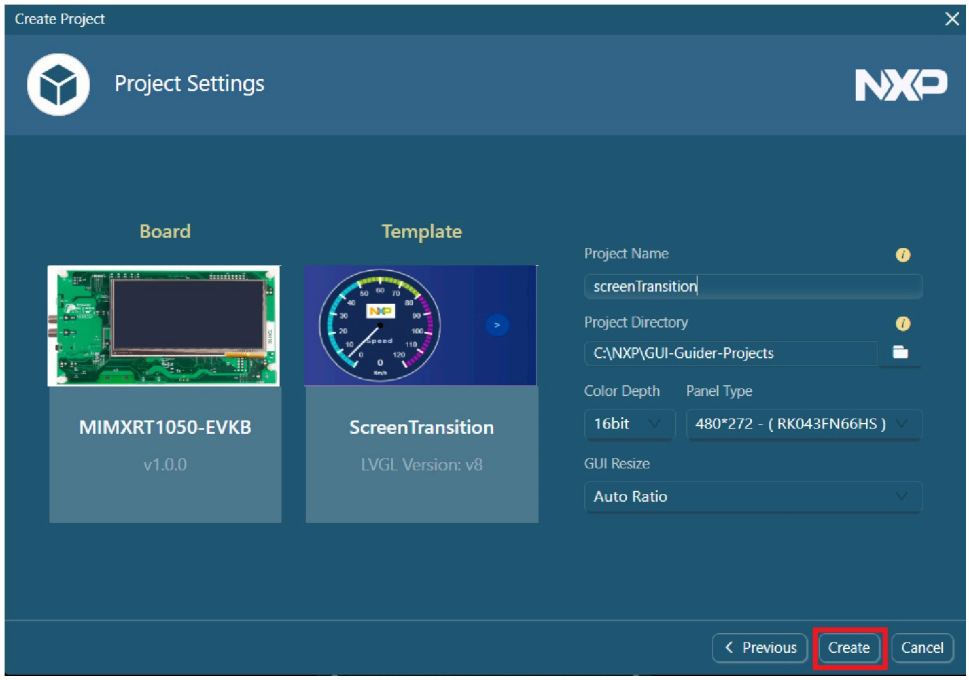


Figure 12. Set up project settings

   Note: *GUI Guider supports multiple panel types for each board. The new panel is selected by default. Check the display type on your board and select the right panel type.*
9. Click **Create**.
   The project appears in the **Editor** tab.
10. To run the GUI application in a simulator, click  and select the simulator. For example, select C.

Figure 13. Run a project

The project log appears in the **Information** view.

3.2 Open a project

To open a recent project, perform the following steps:

1. Click the **Open a recent project** button.

Figure 14. Open a recent project

The **Manage project** dialog box appears with a list of existing projects.

Note: *Alternatively, you can select* ***File > Open*** *in the GUI editor.*

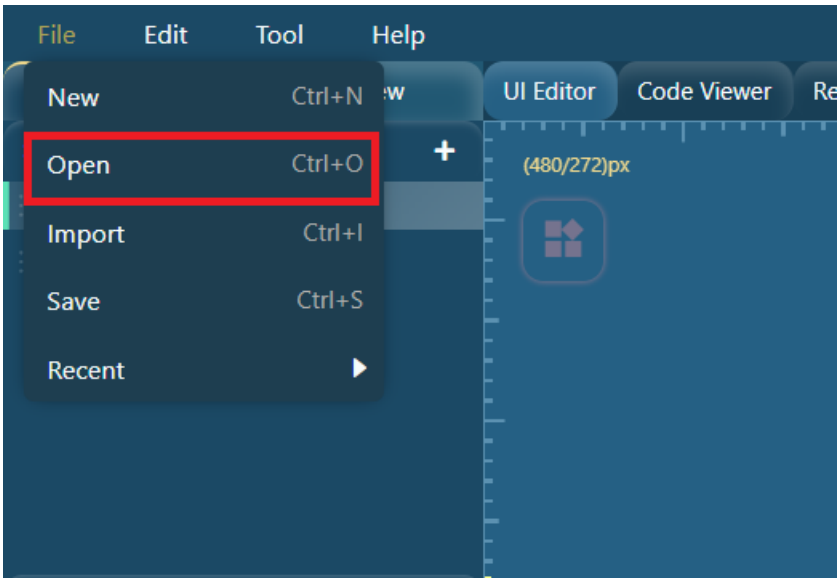


Figure 15. Alternative way to open a project

2. Select a project in the list.
   The selected project opens in the GUI editor.
   Note: *The projects of different lvgl version appear in the respective tabs.*

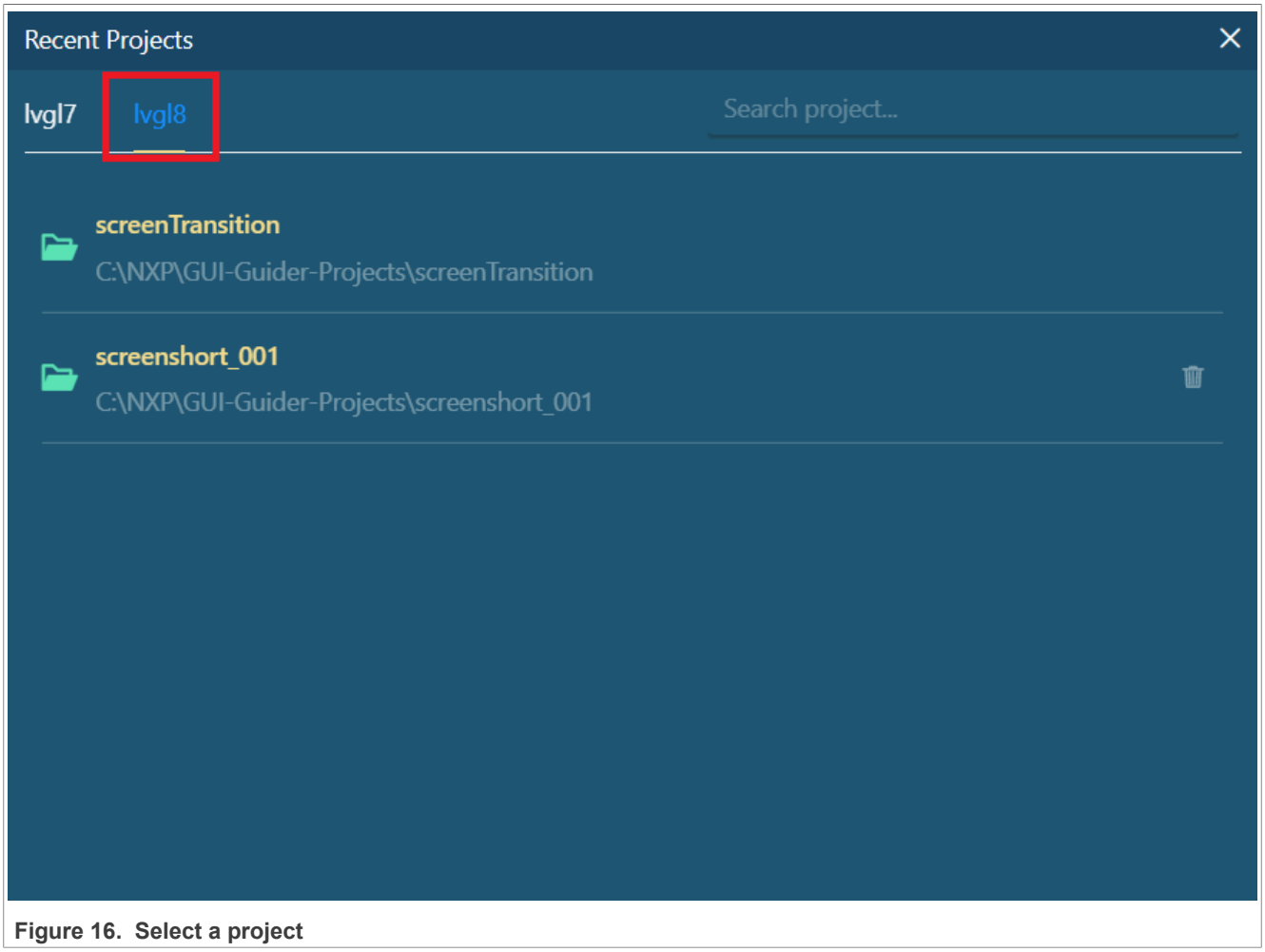


Figure 16. Select a project

3.3 Import a local project

To import an existing project, perform the following steps.

1. Click the **Import a local project** button.

Figure 17. Import a local project

Note: *Alternatively, you can select* ***File*** *>* ***Import*** *from the GUI editor.*

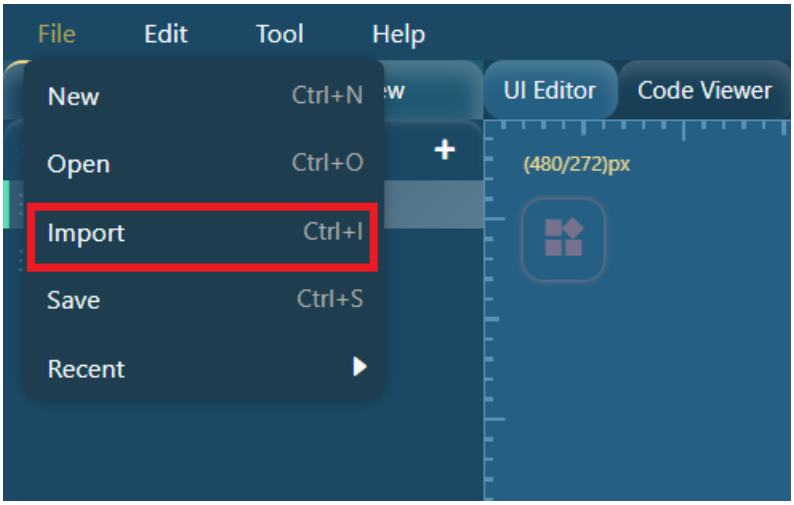


Figure 18. Alternative way to import a project

The **Choose Project** dialog box appears.

2. Navigate to the project that you want to import from your local directory.
3. Click **Open**.

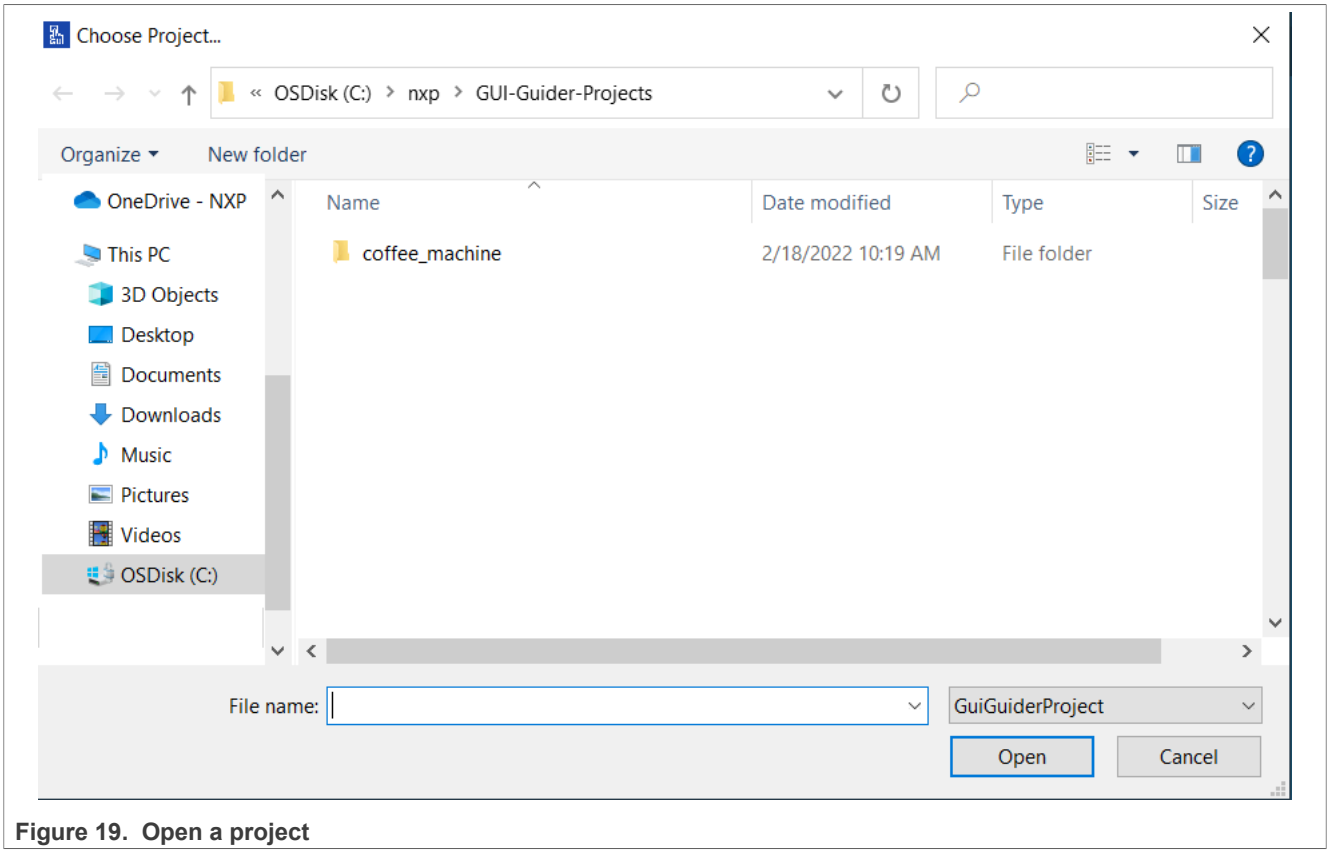


Figure 19. Open a project

The project is imported in the editor. However, if you try to import an older version of the project, a message prompts whether you want to update the project to match the current GUI Guider. Click **OK** to proceed. If you select "Backup", you can find the backup project zip file in the workspace.

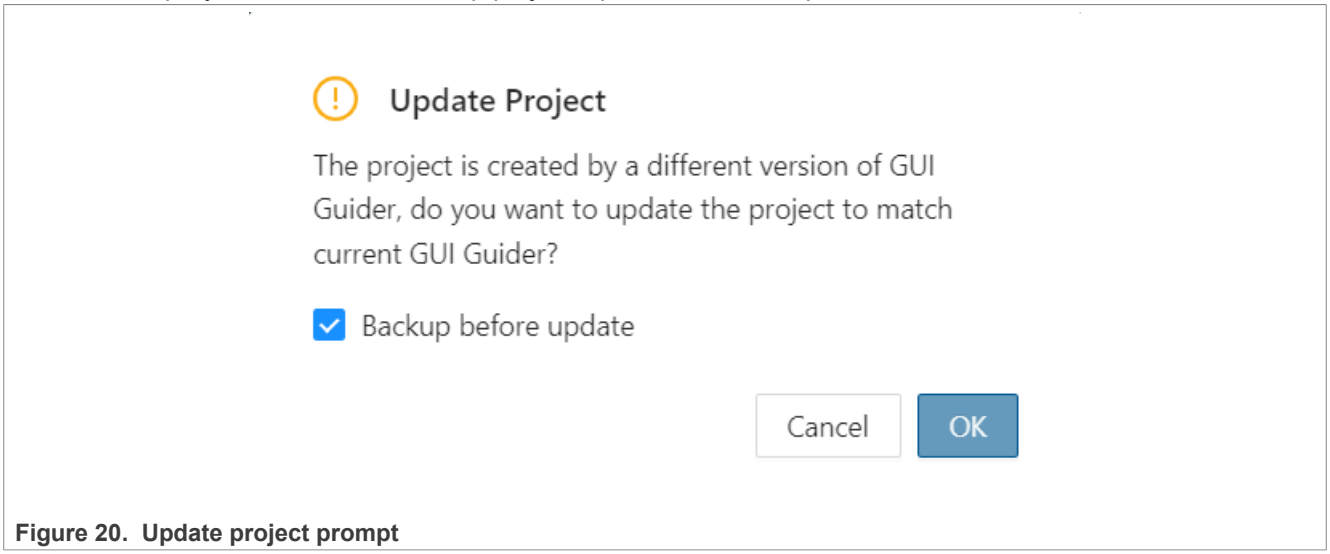


Figure 20. Update project prompt

3.4 Delete a project

To delete a project, perform the following steps:

1. Exit GUI Guider IDE.

2. Delete the project folder from local file system if the project is not needed.
3. Open the GUI Guider IDE.
4. Select the **Open a recent project** button.
5. Click the delete icon corresponding to the project you want to delete.

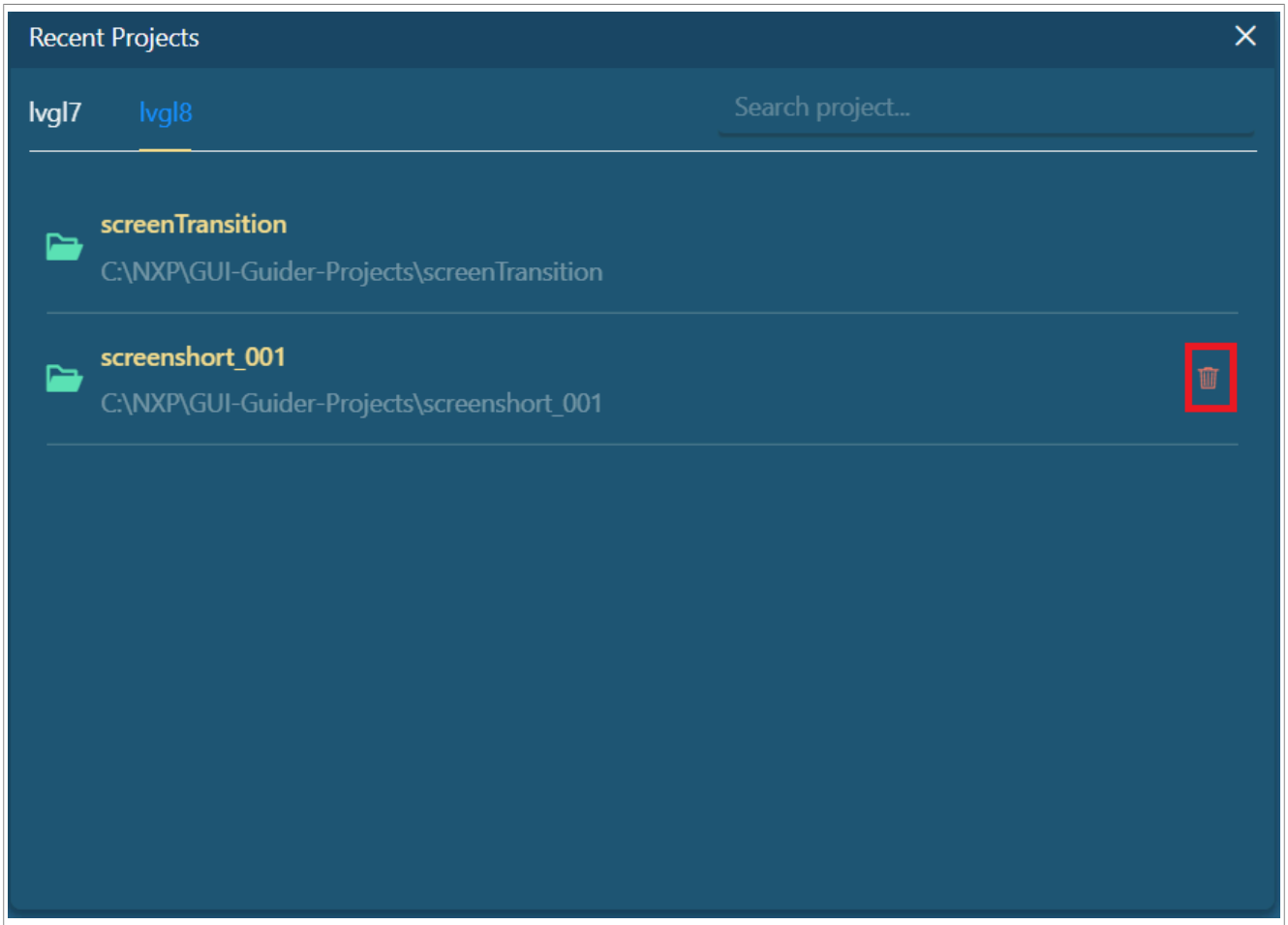


Figure 21. Click the delete icon

3.5 Generated code

To generate source code of GUI project, click the  icon in the right-upper of edit window. It is possible to generate both the C and Python code automatically.

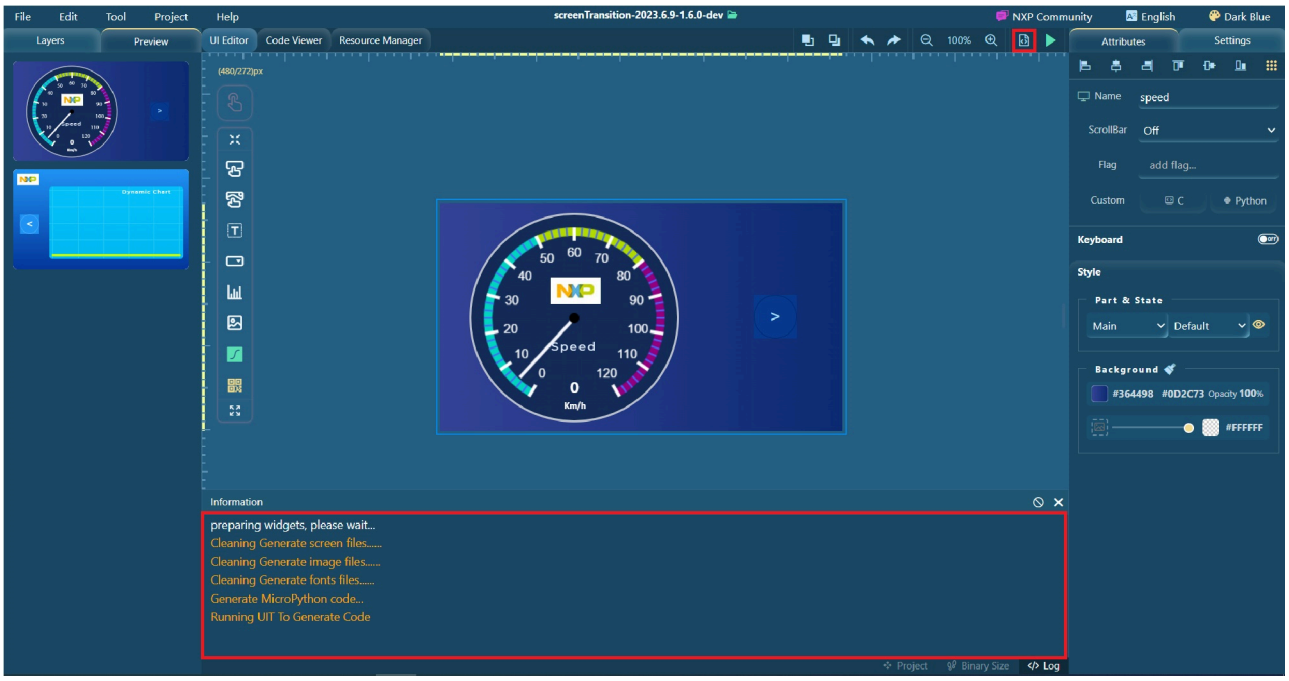


Figure 22. Generating code

3.6 Export Code

To export the source code to a destination folder, the destination folder should be specified for the first time. The IDE remembers the path for future export.

Note: *Before exporting the code, first generate it.*

To export the code, click **Project** > **Export Code**.

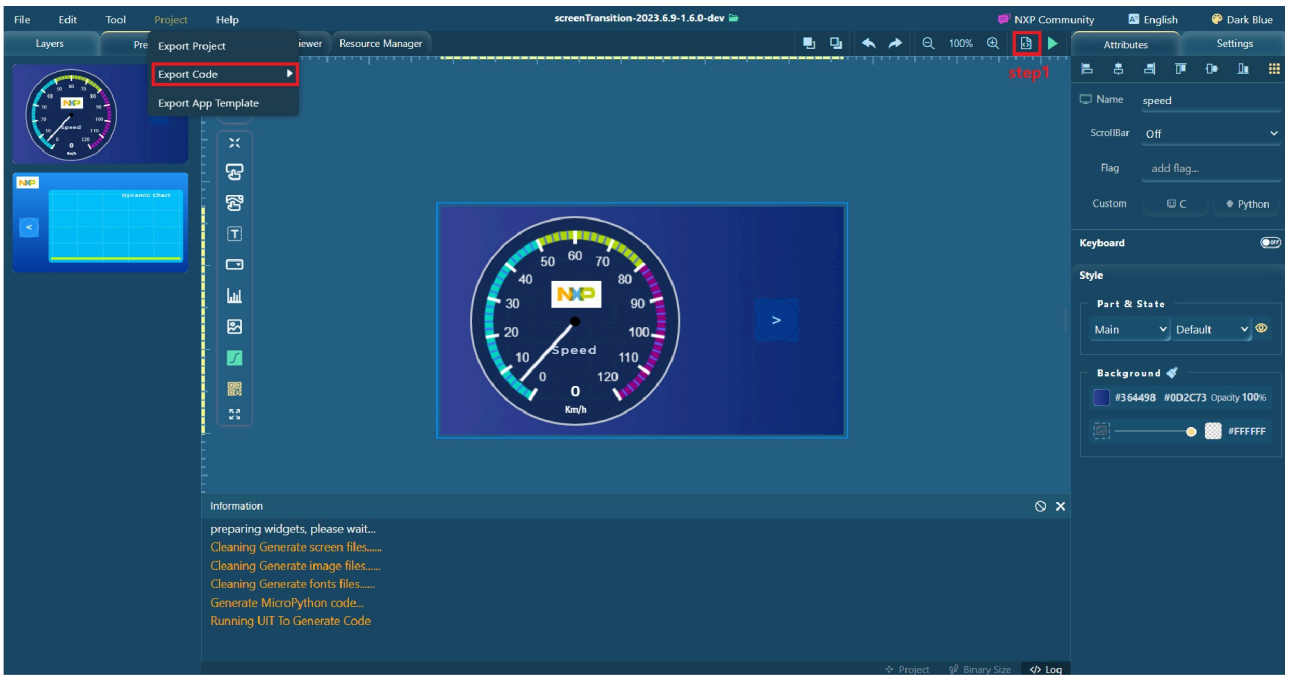


Figure 23. Exporting code

3.7 Export project

To share the GUI Guider project more conveniently, we have added the export project function. The IDE remembers the export path which is a common path in the export code function.

To export the project, click **Project** > **Export project**.

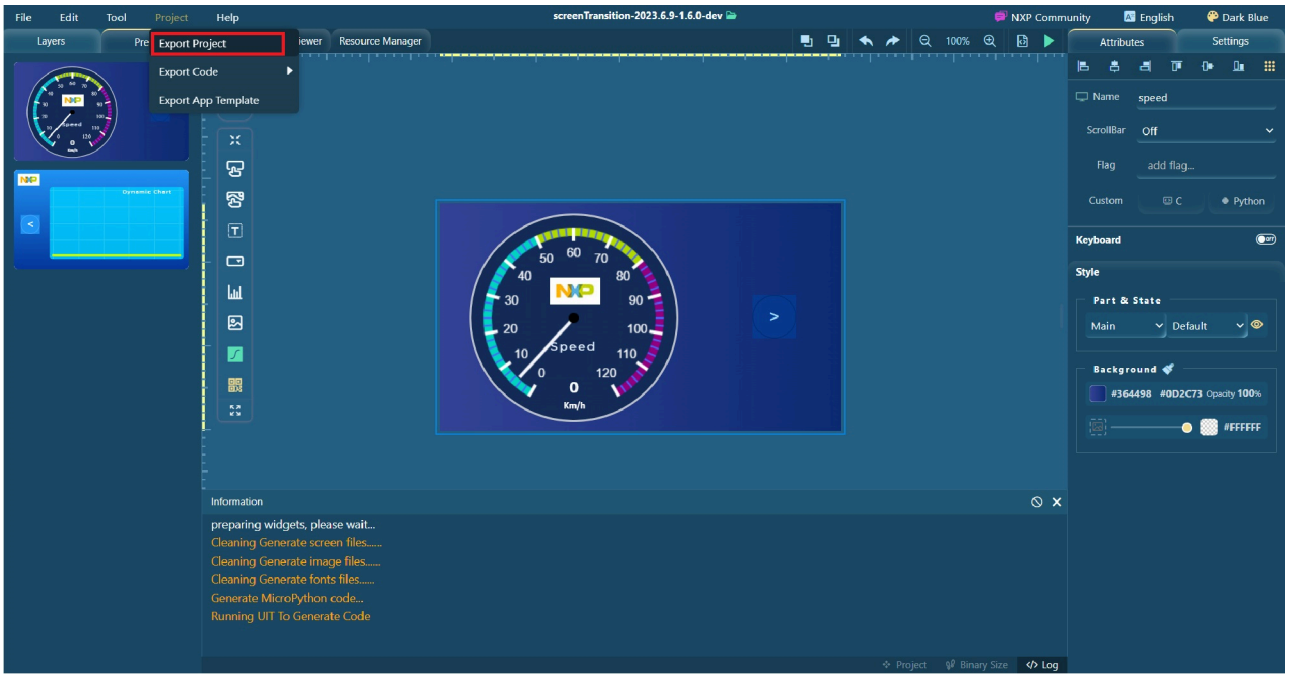


Figure 24. Exporting a project

The output of the export is the condensed project directory and a compressed file named <projectname>.zip. This file contains custom code, project resources, and UI configure files.

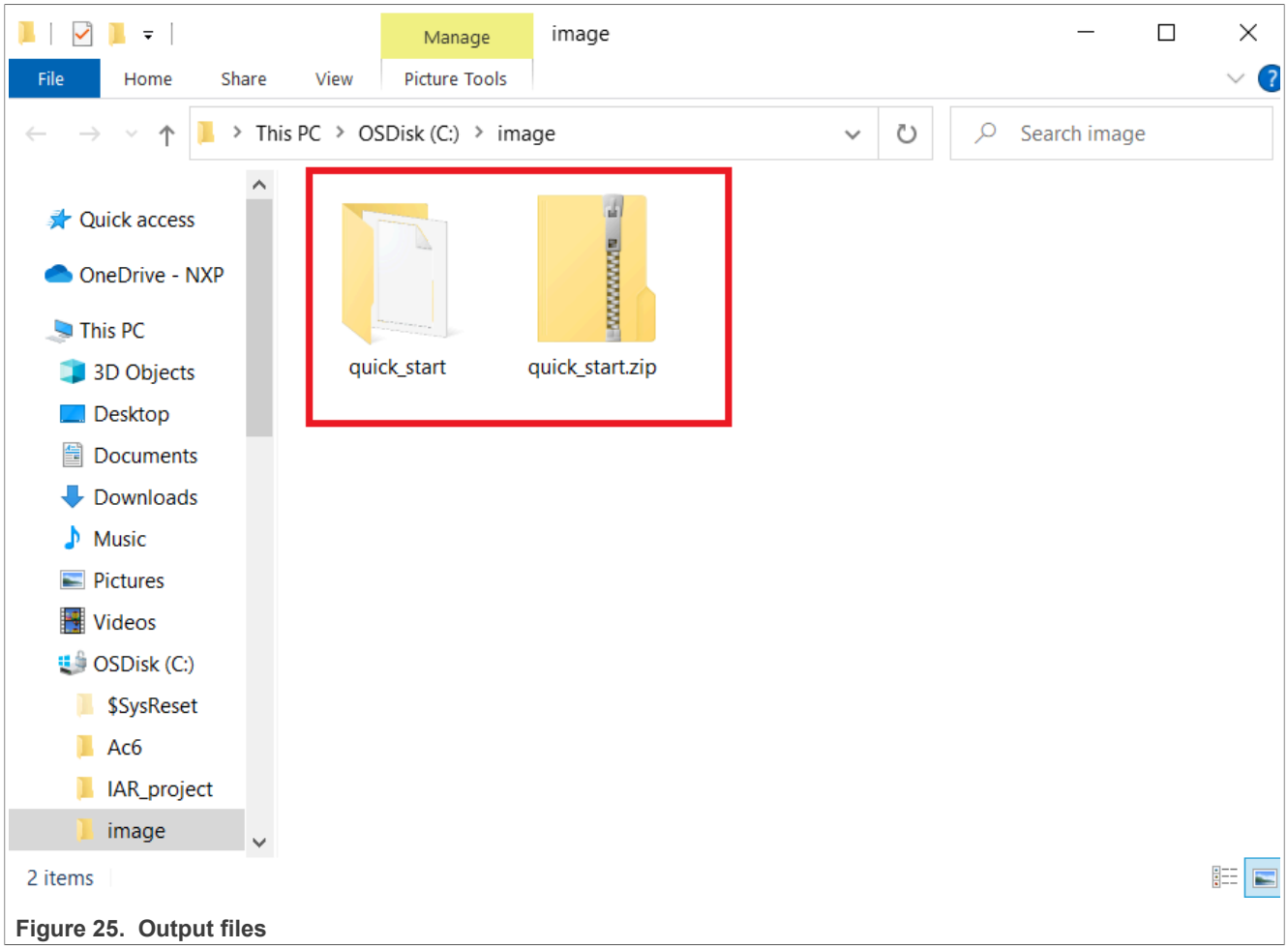


Figure 25. Output files

3.8 Import fonts

To import fonts, perform the following steps:

Note: *GUI Guider supports TFF and WOFF font type.*

1. Select **Tool** > **Import Fonts**.
   The **Import Font File** dialog box appears.
2. Navigate to the folder where the font that you want to import is located.
3. Select the font.
4. Click **Open**.
   Note: *The extended fonts are provided at the following location:*
   - *Windows:* `${GG install path}\environment\extended_fonts`
   - *Linux:* `/opt/Gui-Guider/environment/extended_fonts`
   - *Darwin:* `/Applications/Gui-Guider.app/Contents/environment/extended_fonts`

   Note: *The font imported for the current project is available for all widgets of the project.*

3.9 Generate fonts

The generated font file is stored in the *<project_name>\generated\guider_customer_fonts* folder. The purpose is to add new characters which otherwise are supported by the selected font type and size. The function is used for non-English languages. For example, Chinese.

To generate fonts, perform the following steps:

1. Select **Tool** > **Generate Fonts**.
   The **Generate Fonts** dialog box appears.
2. Select the font family and size. Ensure that the font family is for the English language.
   The following image is an example of fonts generated for Chinese.

Figure 26. Select font and size

3. Click **Submit**.
   The newly generated font appears normal in the GUI application.

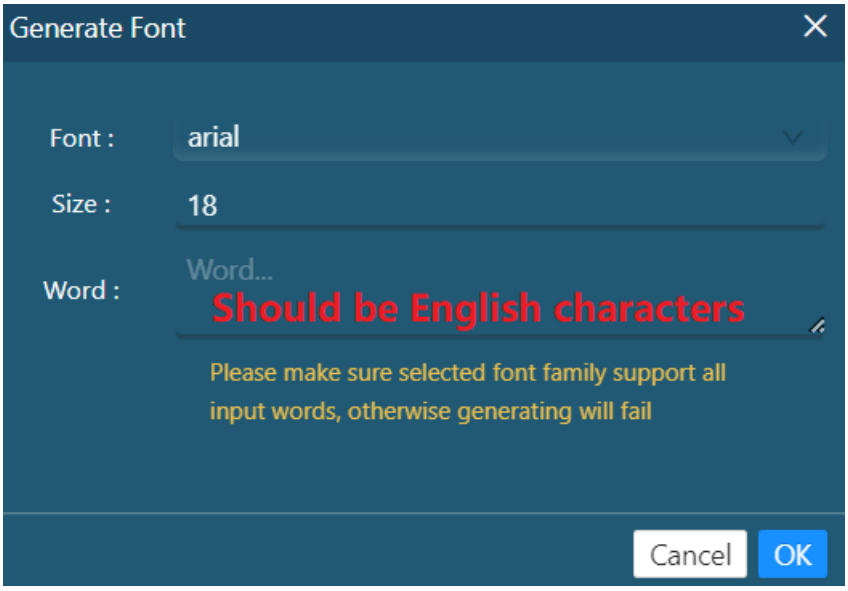


Figure 27. Generate your fonts

The function provides an API to convert fonts to a C array. The C array file is generated in the `generated\guider_customer_fonts` folder.
The following is the example code of using the generated font.

```
#include "lv_font.h"
LV_FONT_DECLARE(lv_font_simsun_12)
```

```
lv_style_set_text_font(&style_screen_ddlist1_selected,
LV_STATE_DEFAULT, &lv_font_simsun_12);
```

3.10 Code view

The source code generated by GUI Guider appears in the **Code Viewer** tab. The navigator is on the left side of the code viewer and switches to the source file that you want to view.

Note: *Ensure to generate the code before using the code viewer.*

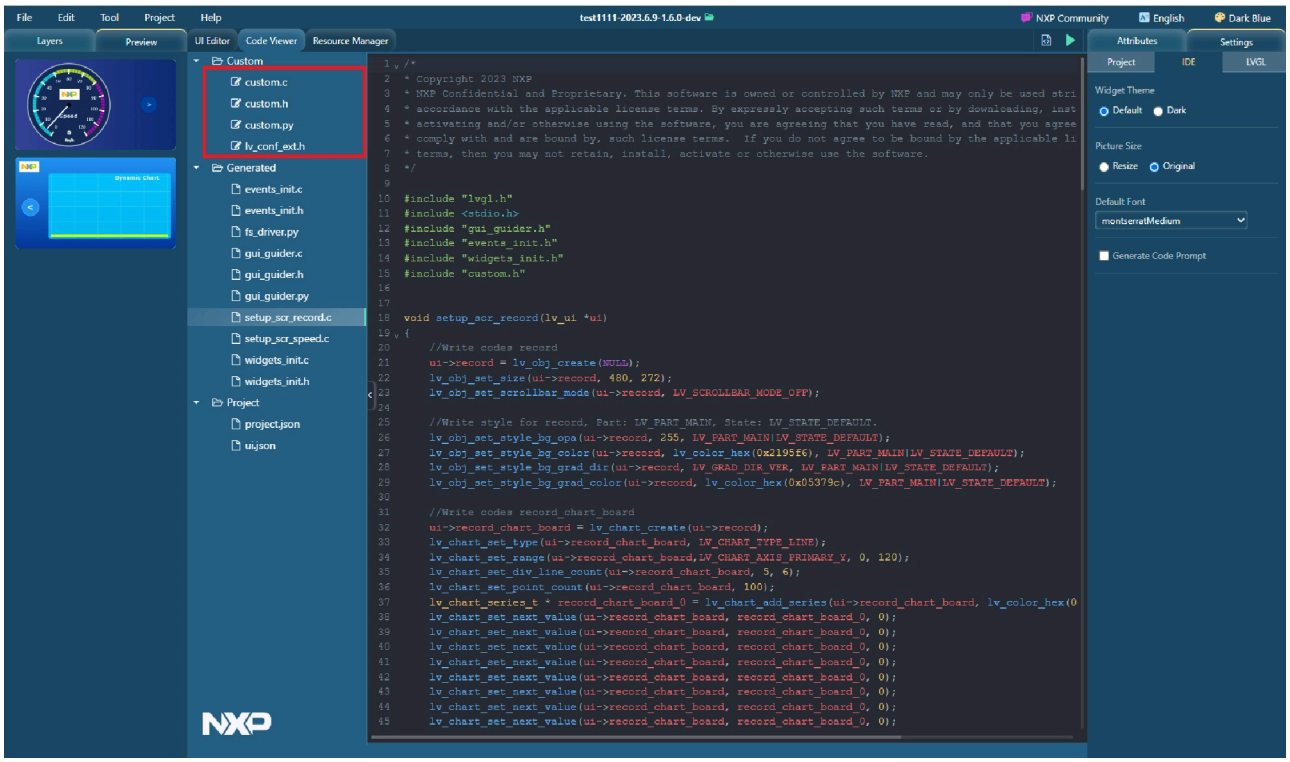


Figure 28. Code view

3.11 Run simulator

Both the C simulator and the MicroPython simulator are supported. To select a simulator and run it in the GUI application, click the  icon.

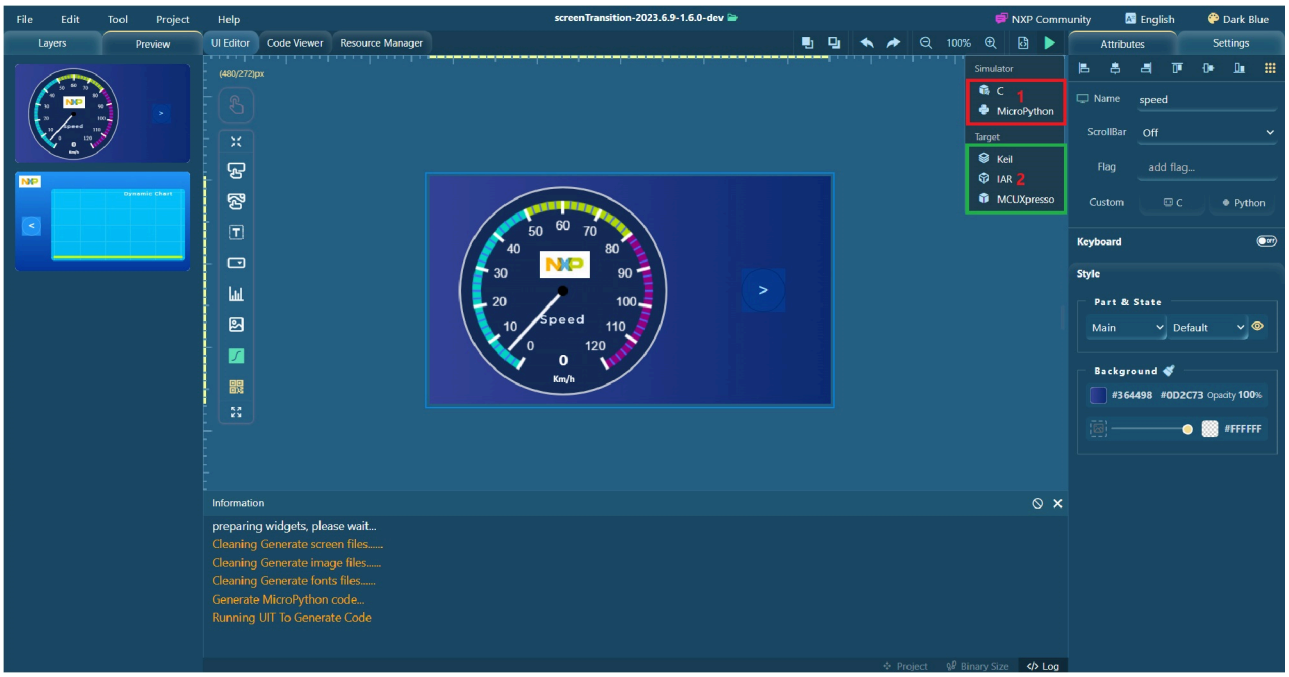


Figure 29. Running simulator

The simulator opens in a separate window.

Note: *When the simulator is launched, the* ***Generate Code****,* ***Run Simulator****, and* ***Run Target*** *options are disabled until the simulator window is closed. You can use the mouse or the keyboard to interact with the GUI elements in the simulator.*

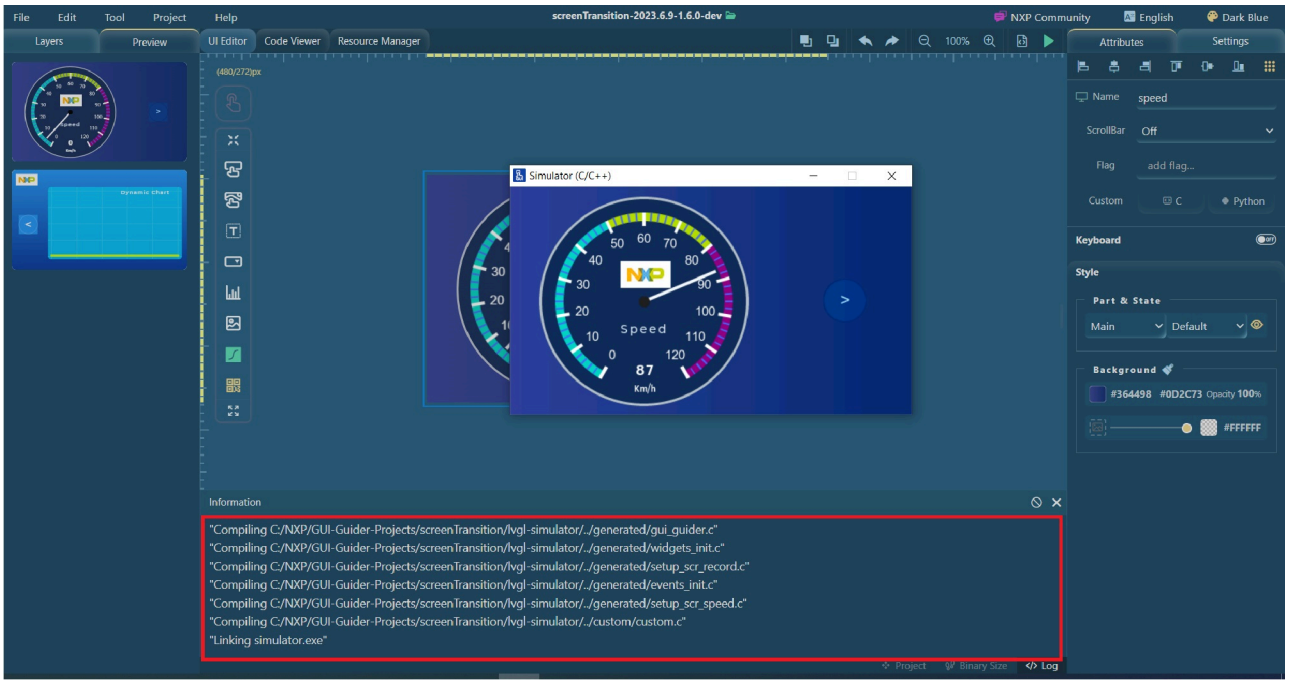


Figure 30. Interacting with GUI elements in simulator

Note: *The GUI Guider main window changes to modal state when* ***Run simulator*** *is clicked. MicroPython is not supported for lvgl v7.*

3.12 Run target

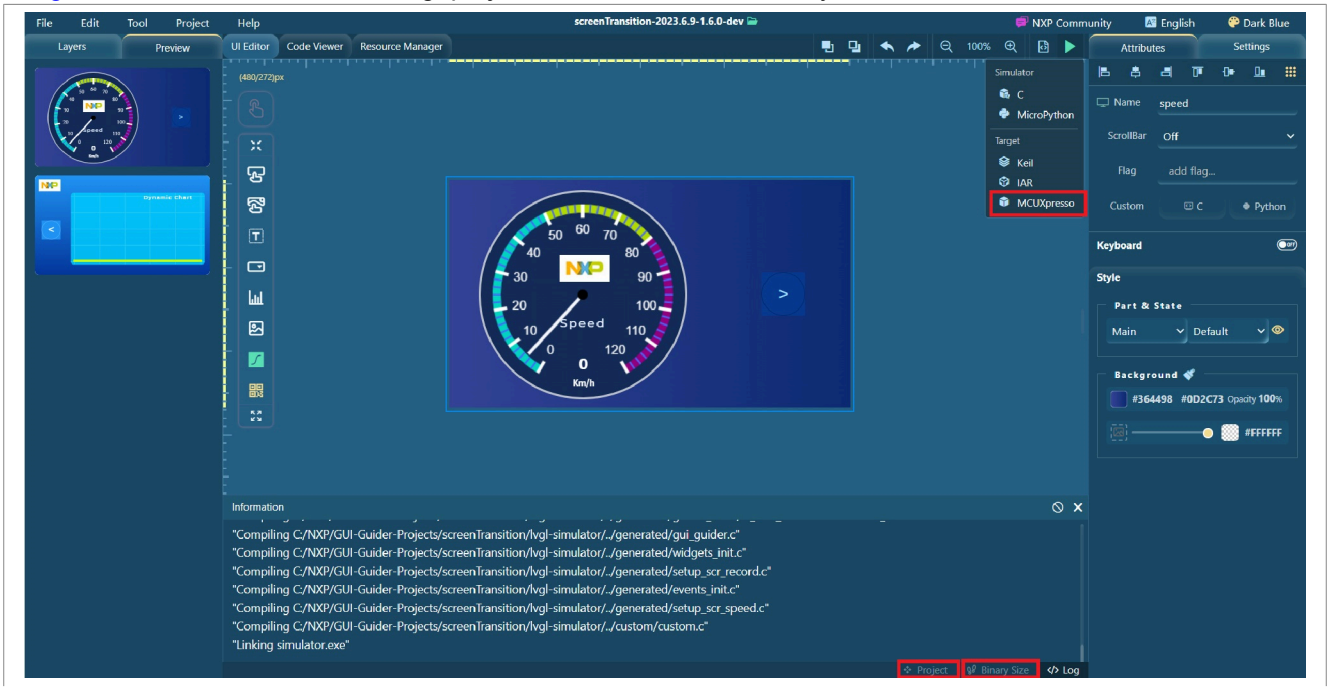
GUI Guider supports one-key build and deploy image on target board. GUI Guider also supports three toolchains: MCUXpresso, IAR, and Keil. Ensure that the corresponding IDE is installed on your host machine. Table 3 provides information on the supported toolchain.

Table 3. Supported toolchain

Toolchain	Version	Support OS	Connector
IAR	9.40.1	Win10	USB
MCUXpresso IDE	11.8.0	Win10, OSX11, and Ubuntu 22.04	USB
Keil MDK	5.38	Win10	USB

The following prerequisites must be met to run the target successfully:

- Boards with CMSIS-DAP/mbed/DAPLink interface.
- For LPCXpresso boards, install the DFU jumper for the debug probe.
- Connect the development platform to your PC via USB cable.
  Figure 31 shows the window of log, project information, and memory monitor.



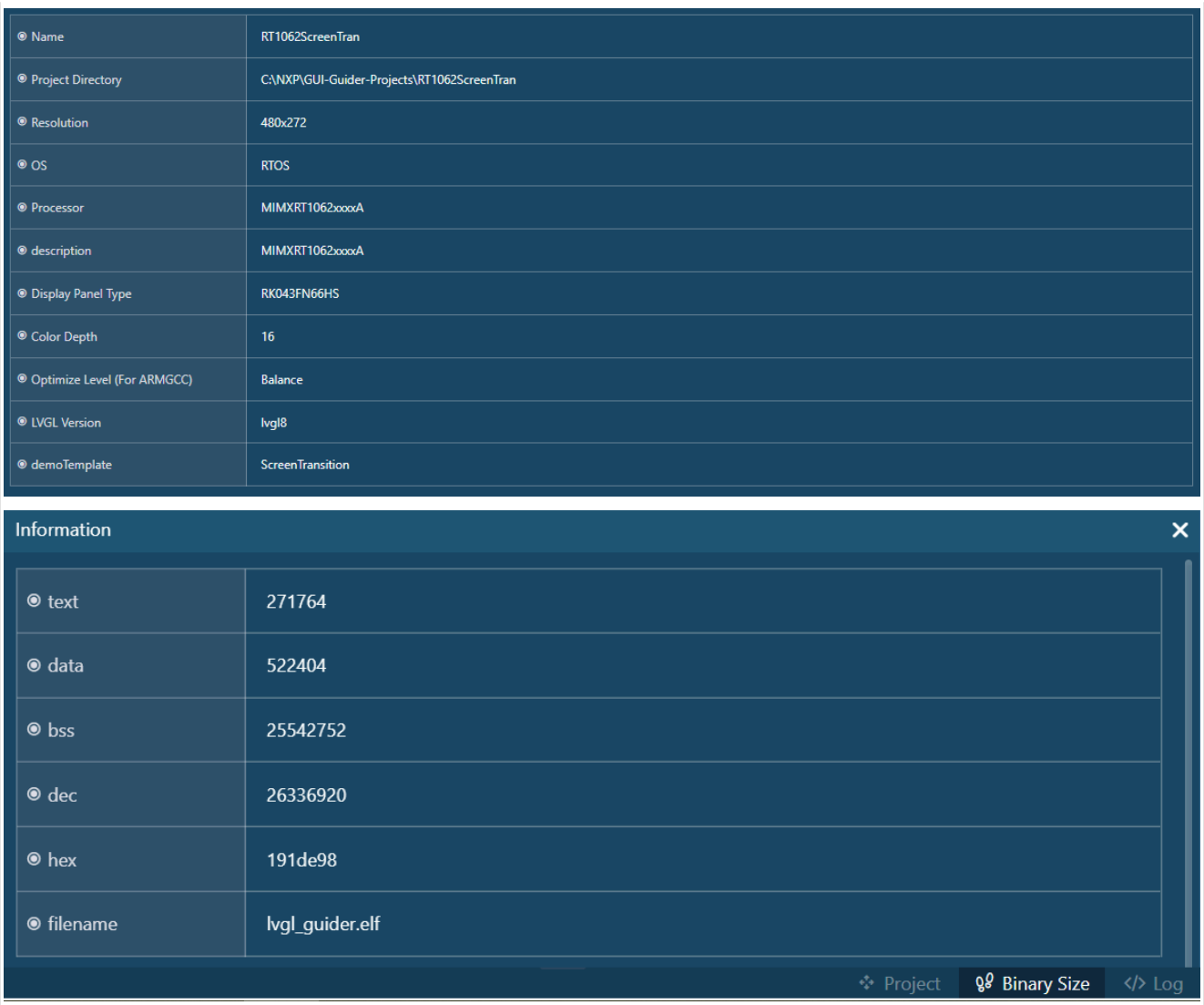


Figure 31. Project log, information, and memory monitor

Typically:

- The flash consumed by the GUI application is text + data.
- The RAM consumed by the application is data + bss.

Note:

- *Only MCUXpresso IDE supports memory display.*
- *The project does not support "Run Target" when simulator is selected as board template.*

3.13 Tileview usage

Tileview is implemented as a standard widget in GUI Guider. You can design the GUI in tileview by drag and drop operation.

To use the **tileview** widget, perform the following steps.

1. Drag the tileview widget to the editor.

Note: *If you are unable to find the widget, type the name of the widget in the search field and press Enter. The widget name appears in the search results.*

2. To add a page in the **Attributes** group on the right, click the **+** icon.

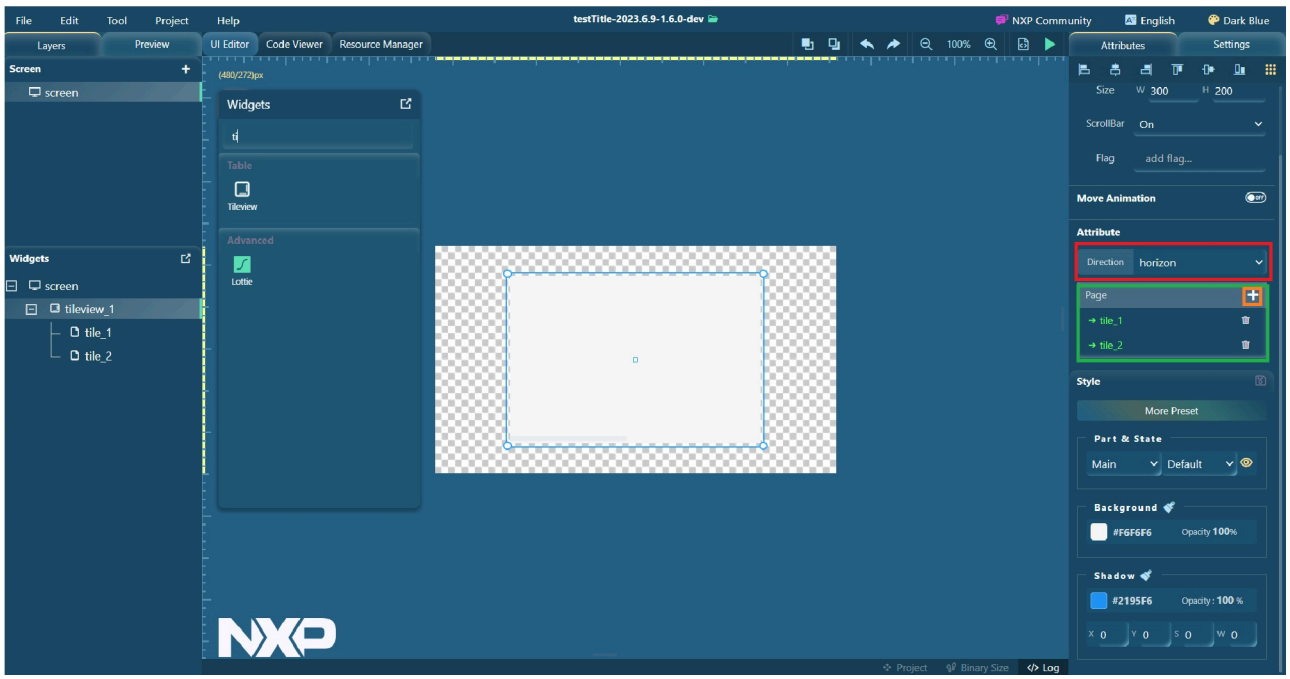


Figure 32. Adding a page

3. Select the **tile_1** tab.
4. Drag a button widget to the **tileview** widget.

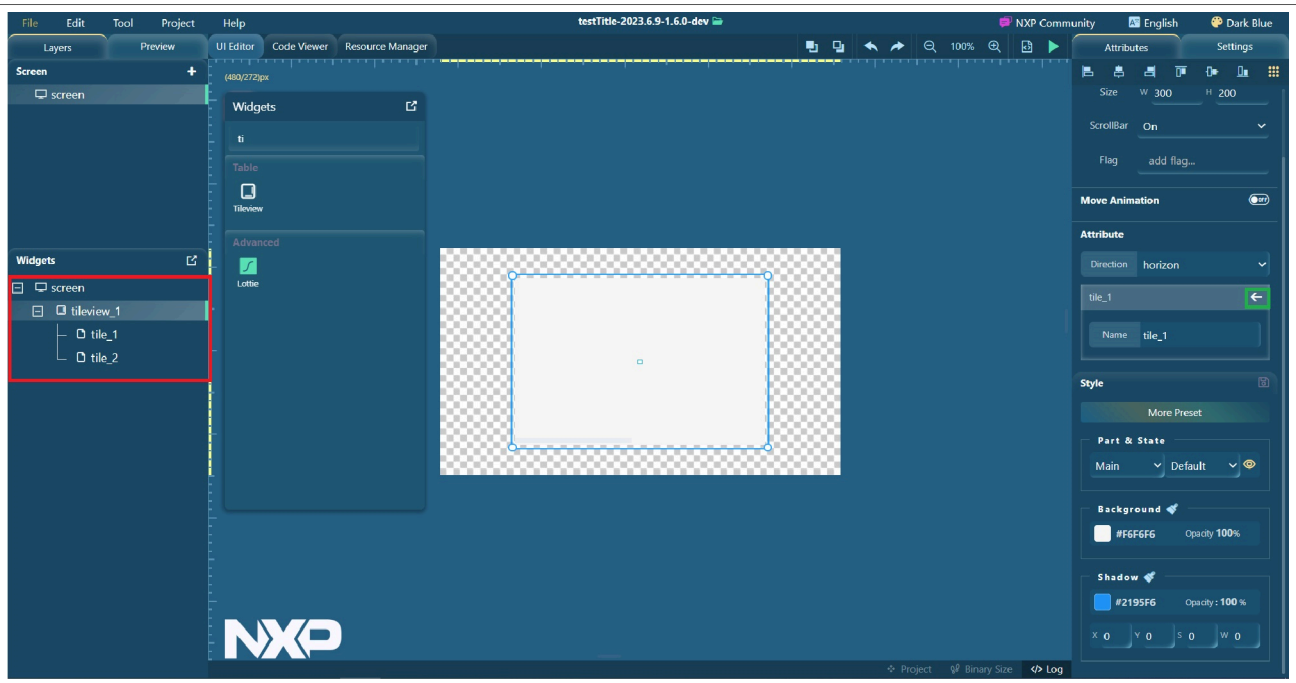


Figure 33. Button widget

5. Select the **tile_2** tab.
6. Drag an **arc** widget to the tileview widget.

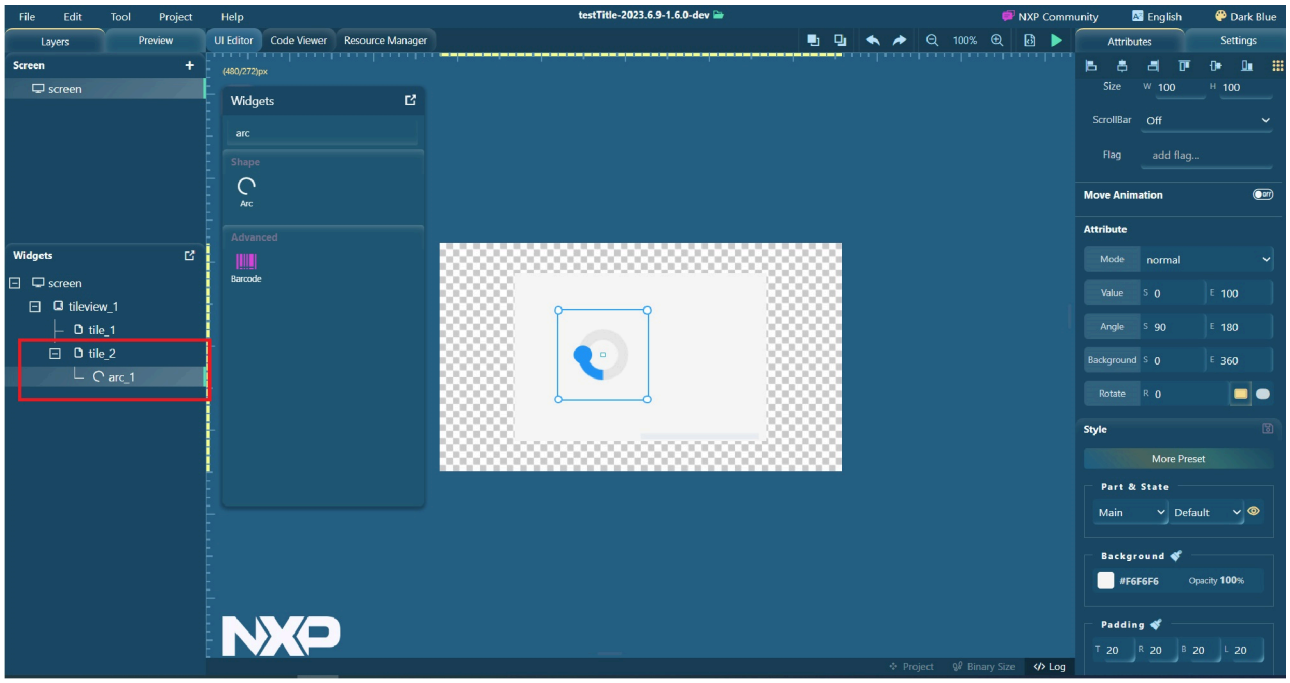
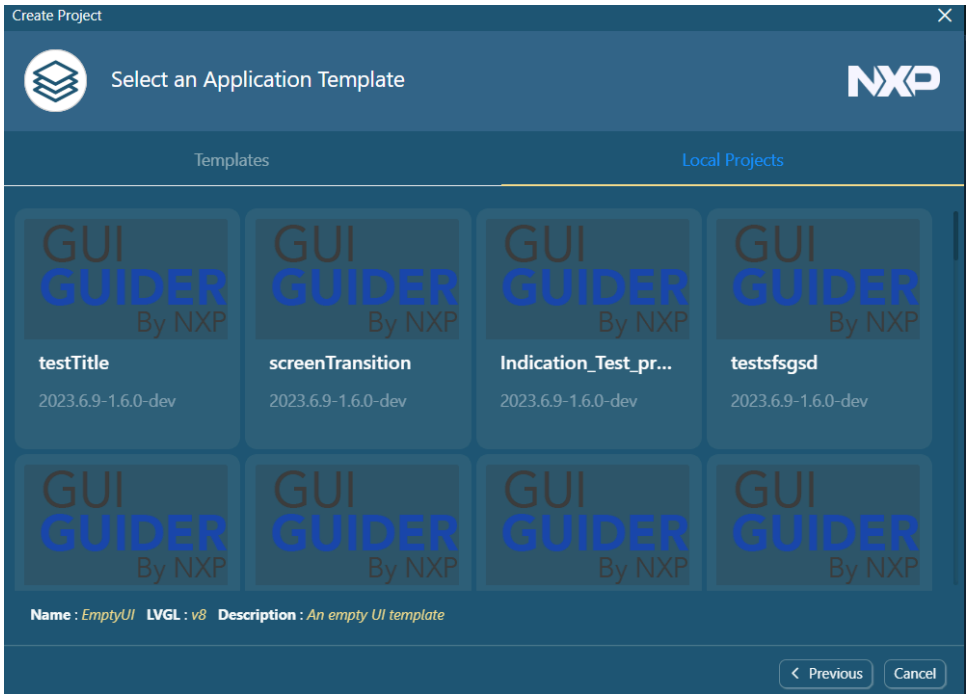


Figure 34. Arc widget

3.14 GUI auto-scaling

The auto-scaling function in the GUI Guider application resizes the GUI to adapt the display of a different size. The auto-scaling function is useful when you want to reuse an application designed based on a particular display size. The function can support new project based on application template and local project.

Note: *If there is a hard-coded size in the custom code, the position and the size-related code must be adjusted manually in the custom code.*



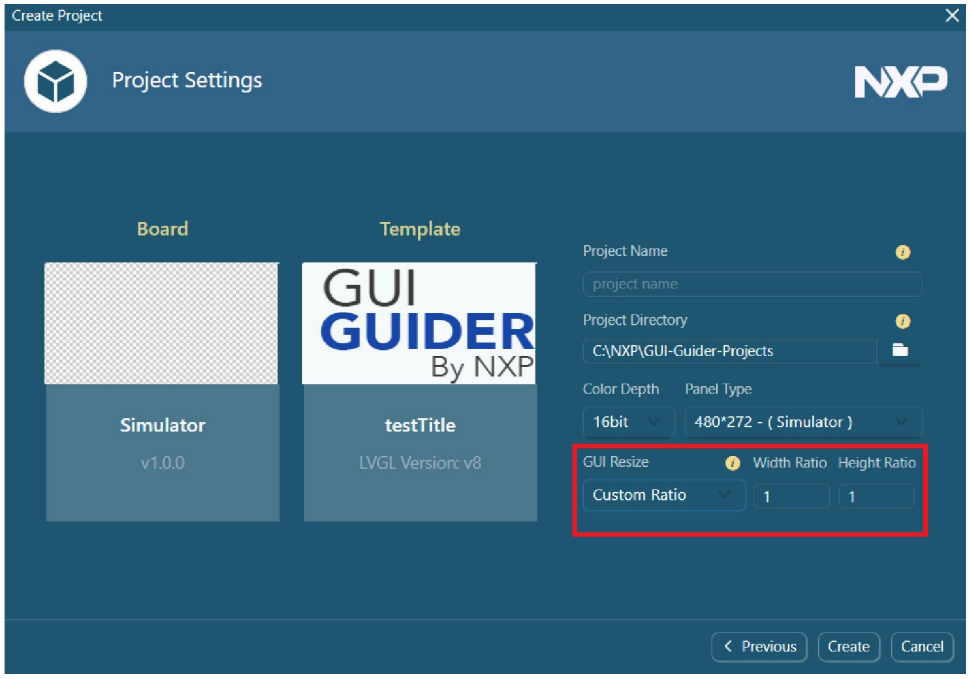


Figure 35. Customize panel size

3.15 Event usage

Events are triggered when an action is received. Next, we demonstrate how to add events conveniently.

1. Select the widget and click the right mouse button.

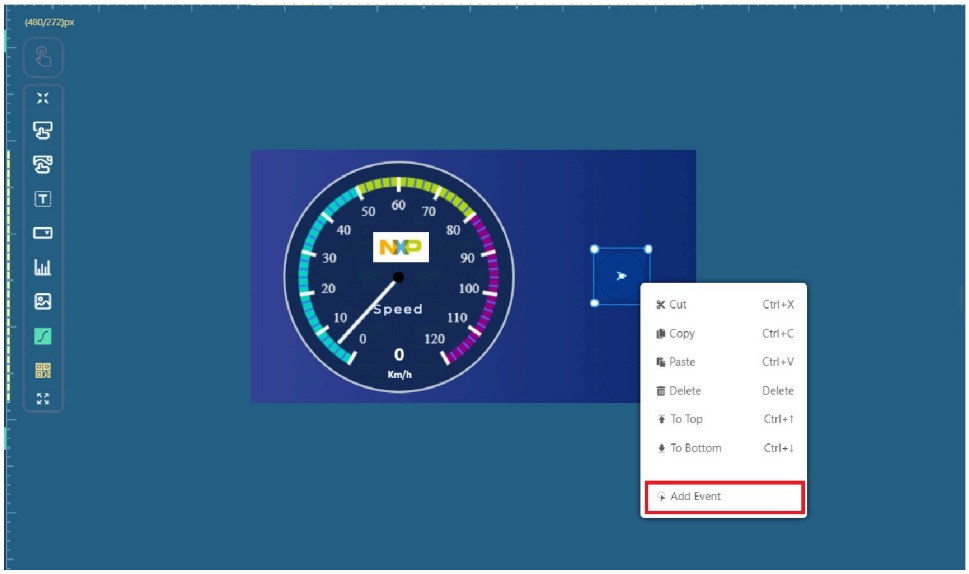


Figure 36. Add event

2. Click the trigger. Then, select the target widgets.
   Note: *Multiple widgets can be selected as a trigger object.*

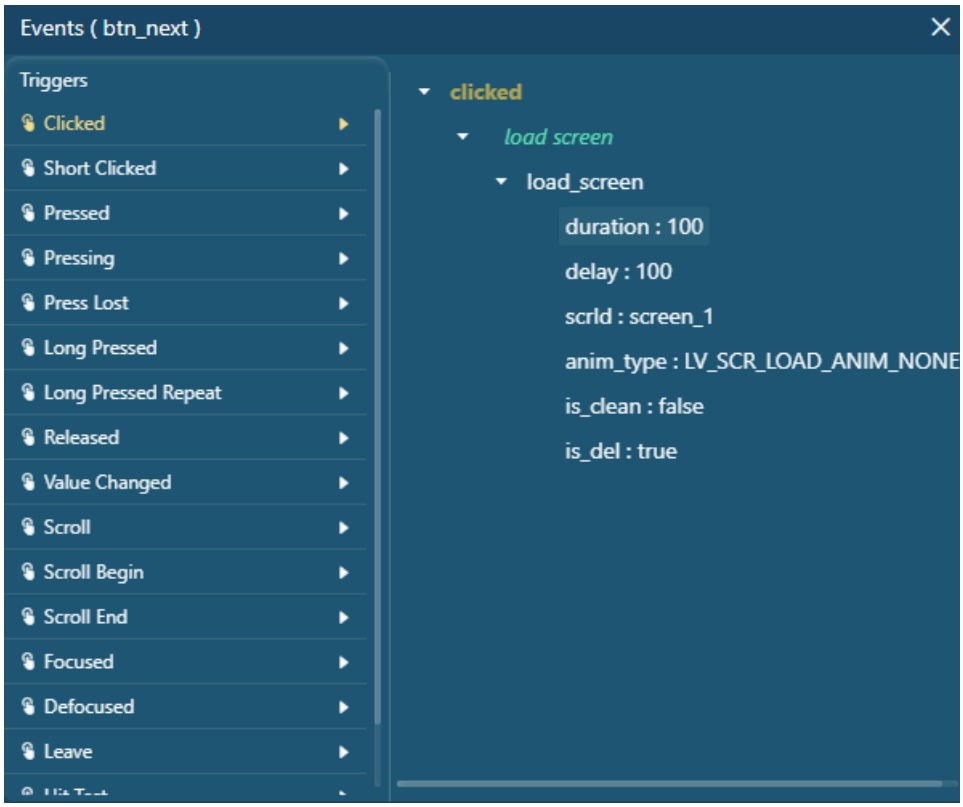


Figure 37. Select target widgets

3. Select the actions.

Note: *Support for selecting multiple actions. The action list also varies depending on the selected widget.*

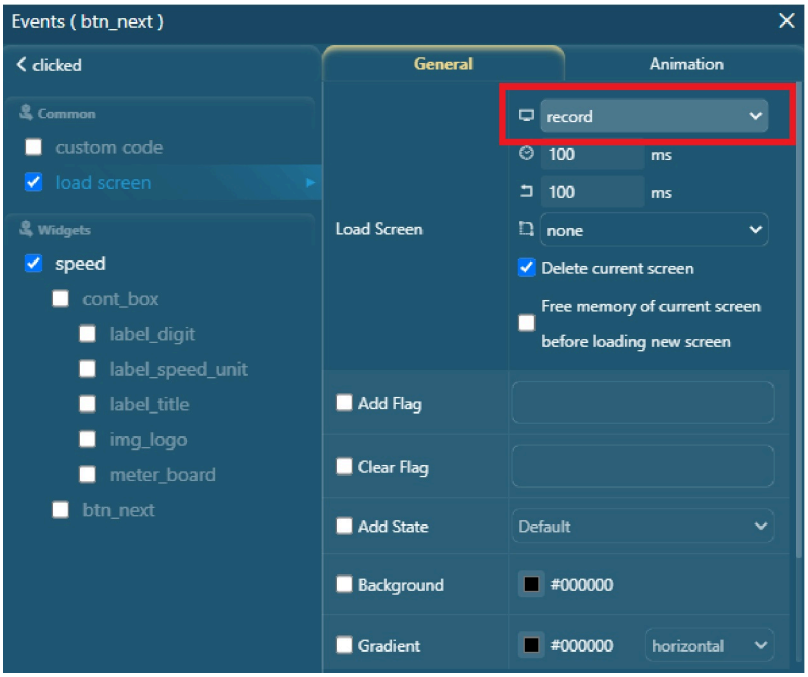


Figure 38. Select actions

3.16 Resource window

Table 4 lists the options in the **Resource** window.

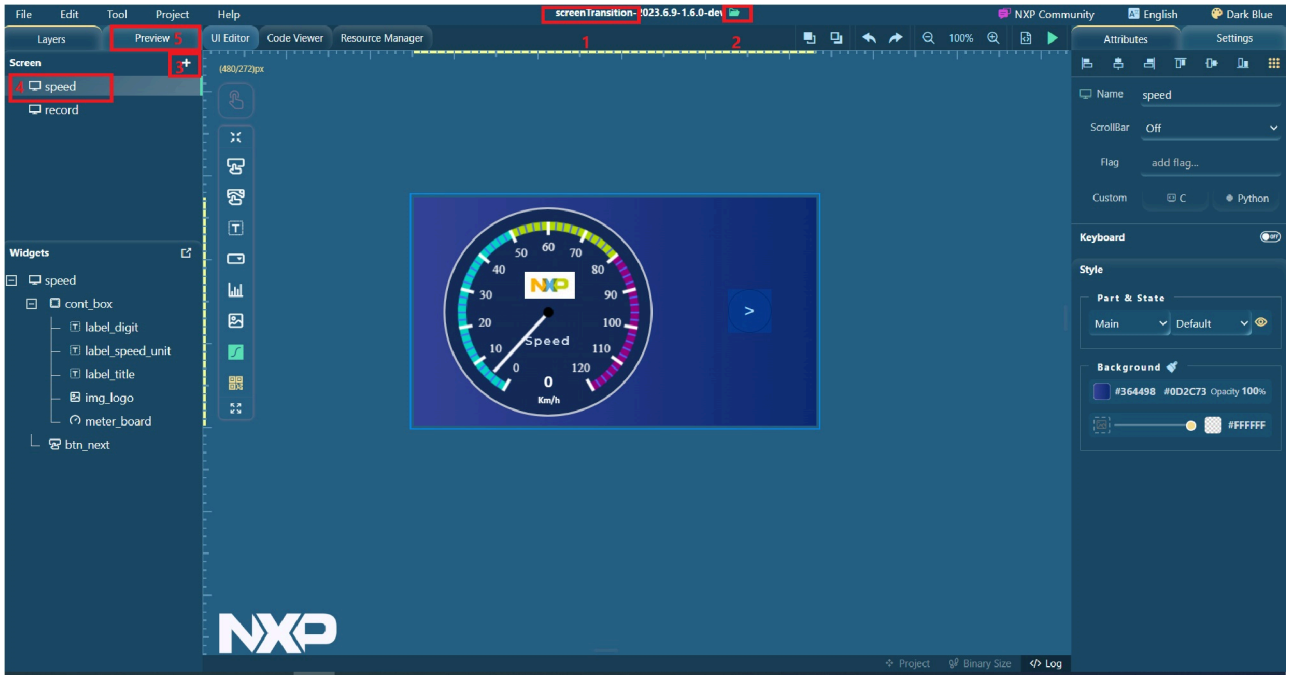


Figure 39. Resource window

Table 4. Resource window

Label	Description
1	The name of current project
2	Open the project folder with File Explorer
3	Add new screen
4	The name of current screen
5	Go to preview mode

3.17 Import resource

Table 5 lists the options in the **Import** resource window.

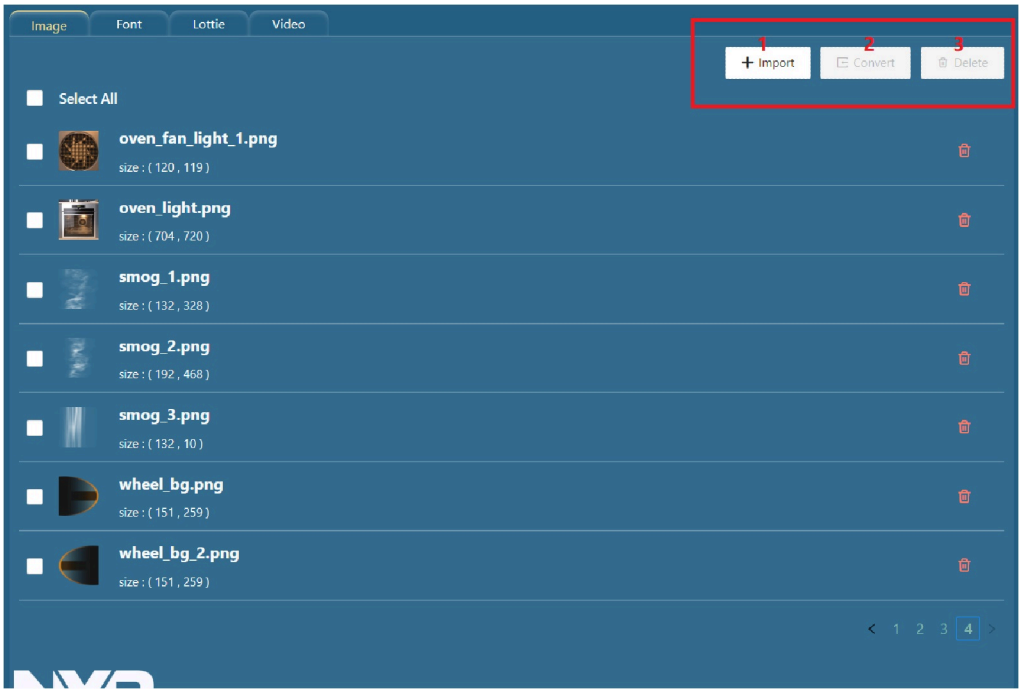


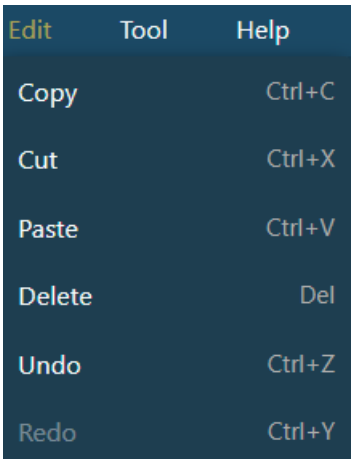
Figure 40. Import resource

Table 5. Import resource

Label	Description
1	Import image button
2	Convert images to bin file
3	Delete button

3.18 Shortcut function

Table 6 lists the shortcut functions.



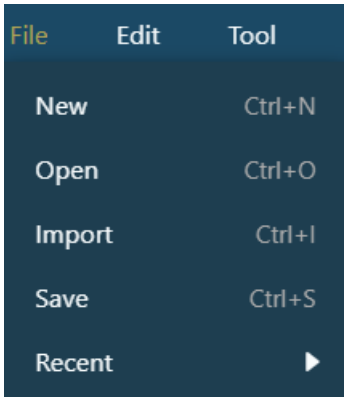


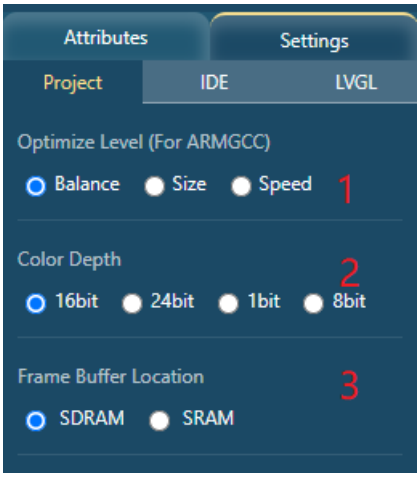
Figure 41. Shortcut function

Table 6. Shortcut functions

Function name	Shortcut
New project	Ctrl + N
Open project	Ctrl + O
Import project	Ctrl + I
Save	Ctrl + S
Copy	Ctrl + C
Paste	Ctrl + V
Delete	Del
Undo	Ctrl + Z
Redo	Ctrl + Y

3.19 Project setting

Table 7 lists the options in the **Project setting** window.



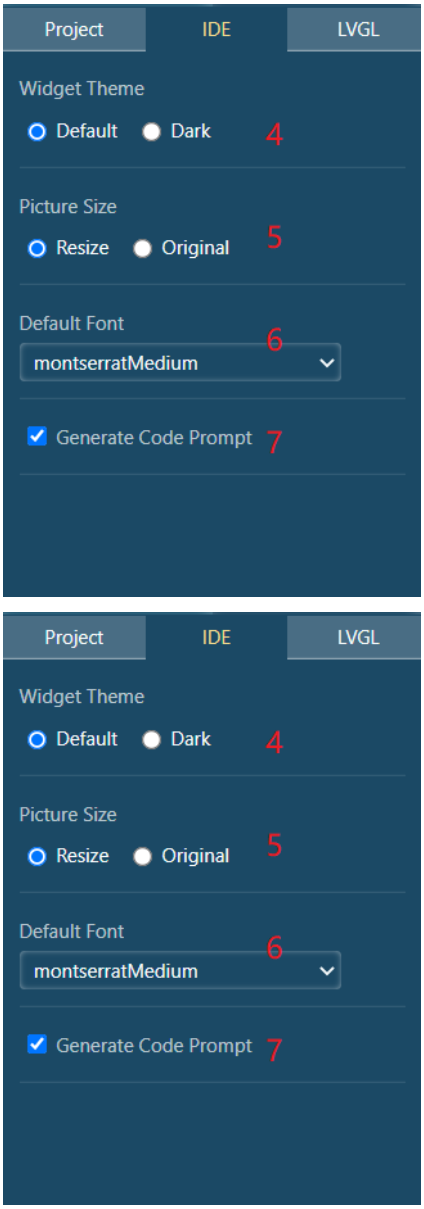


Figure 42. Project setting

Table 7. Project setting window

Label	Description
1	Select optimization level (Only support NXP target)
2	Select color depth for display
3	Select frame buffer region (Only MIMXRT1062xxxxA support)
4	Select widget theme
5	Set the image widget default size
6	Set the project default font
7	Enable the generate code prompt

Table 7. Project setting window*...continued*

Label	Description
8	Enable PXP or VGLITE
9	Set the default display refresh period
10	Enable the real-time performance monitoring
11	Enable the real-time memory monitor
12	Set the image binary download base address
13	Set the size of memory allocated for LVGL application usage

3.20 IDE setting

Table 8 lists the options in the **IDE setting** window.

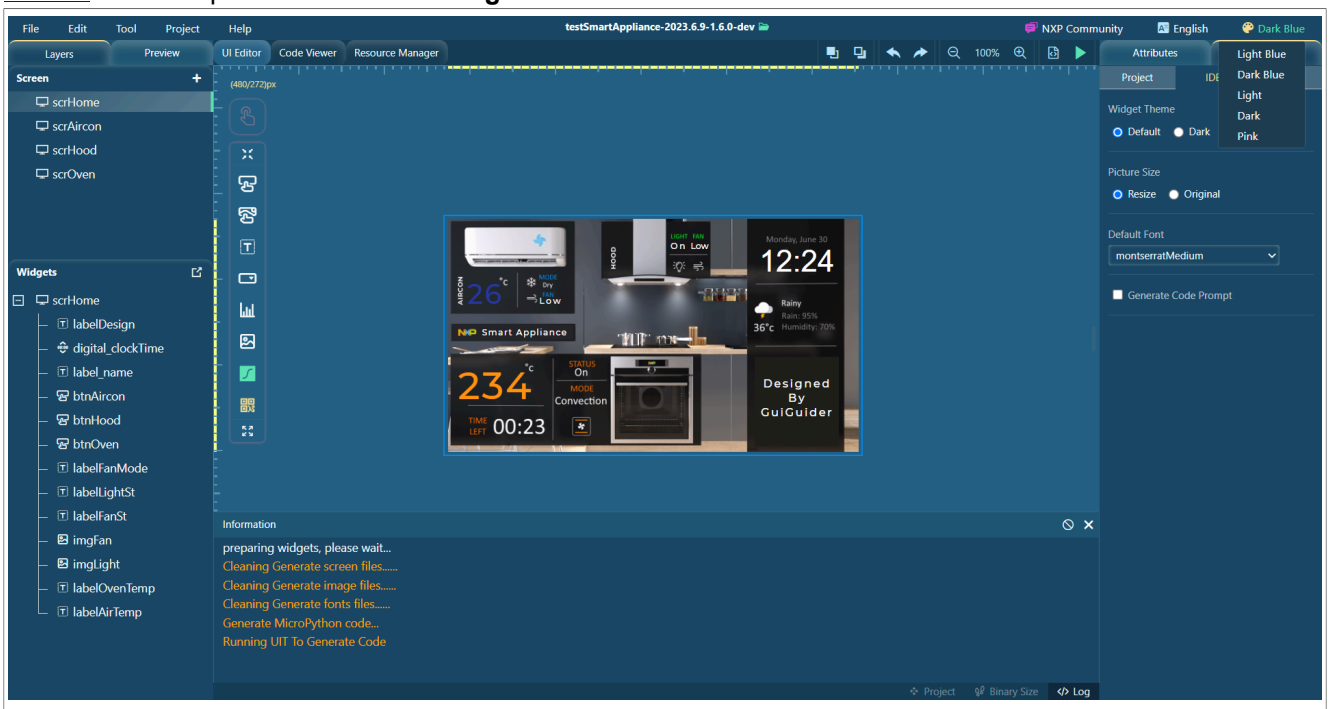


Figure 43. IDE setting

Table 8. IDE setting window

Item name	Option
Language	English and Chinese
Theme	Light Blue, Dark Blue, Light, and Dark, Pink

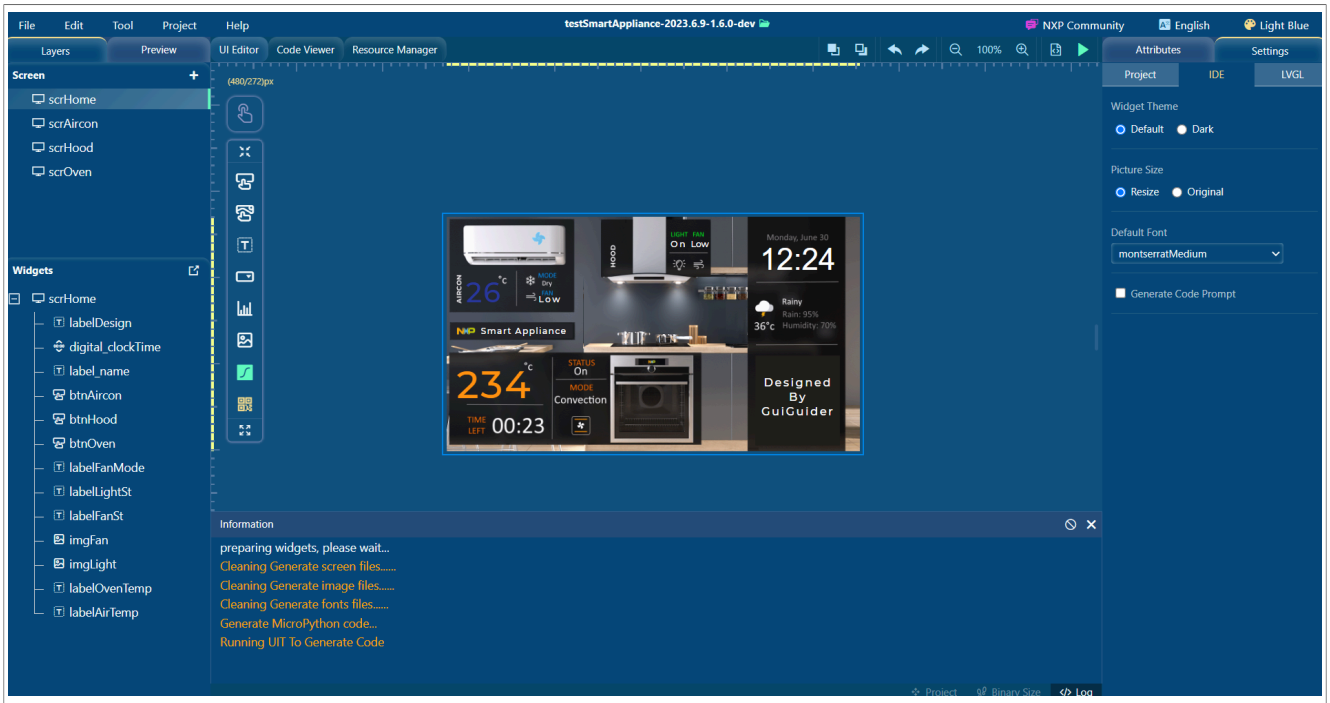


Figure 44. Light blue theme

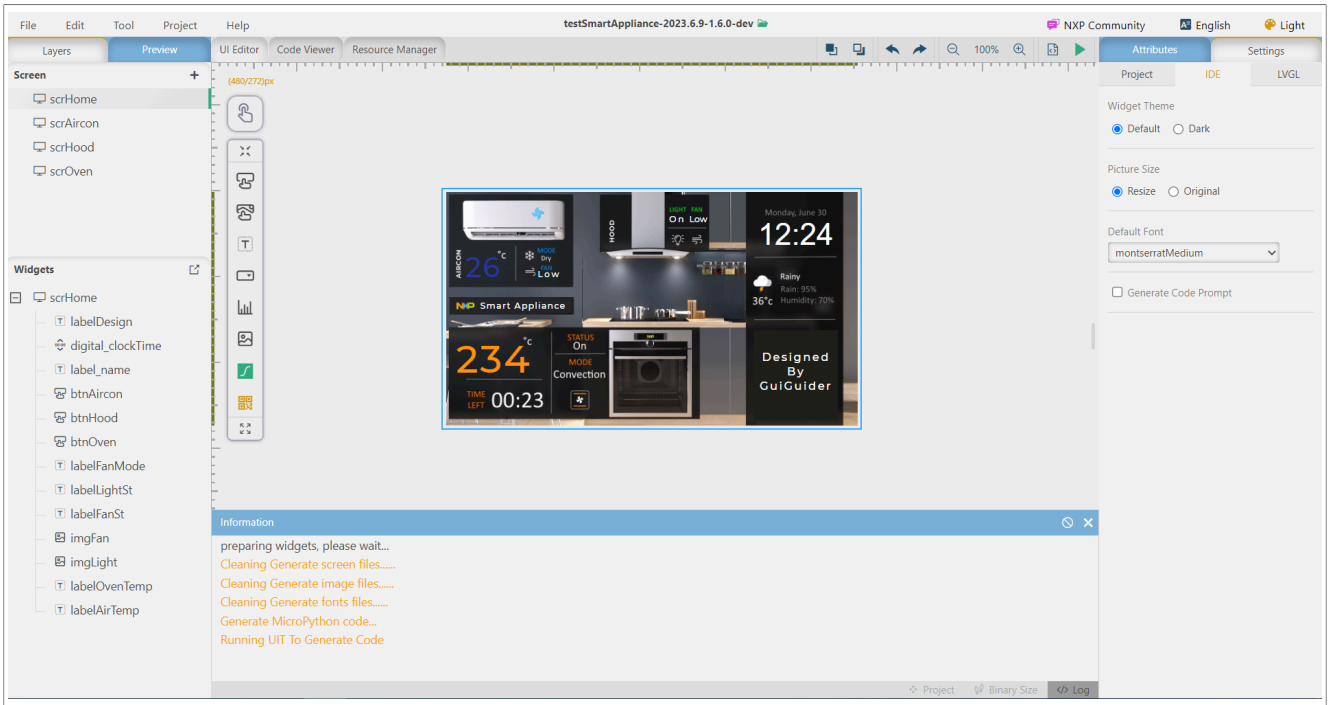


Figure 45. Light theme

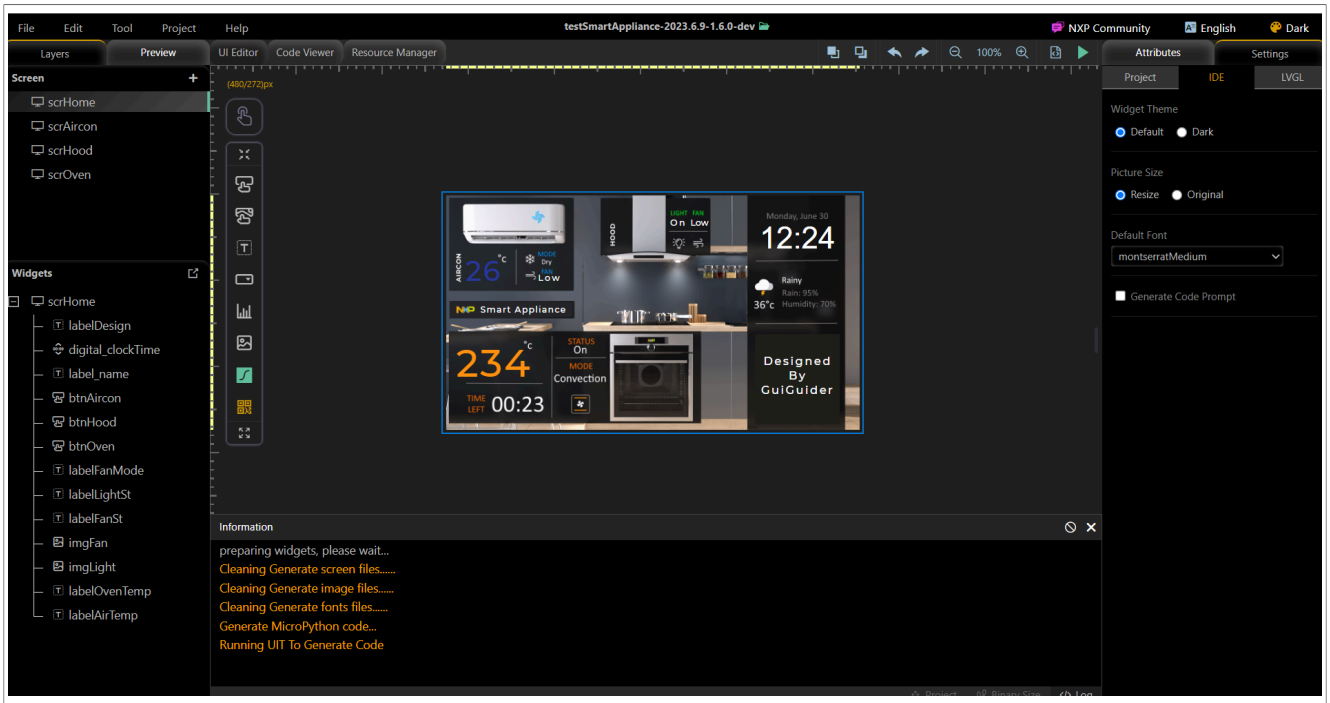


Figure 46. Dark theme

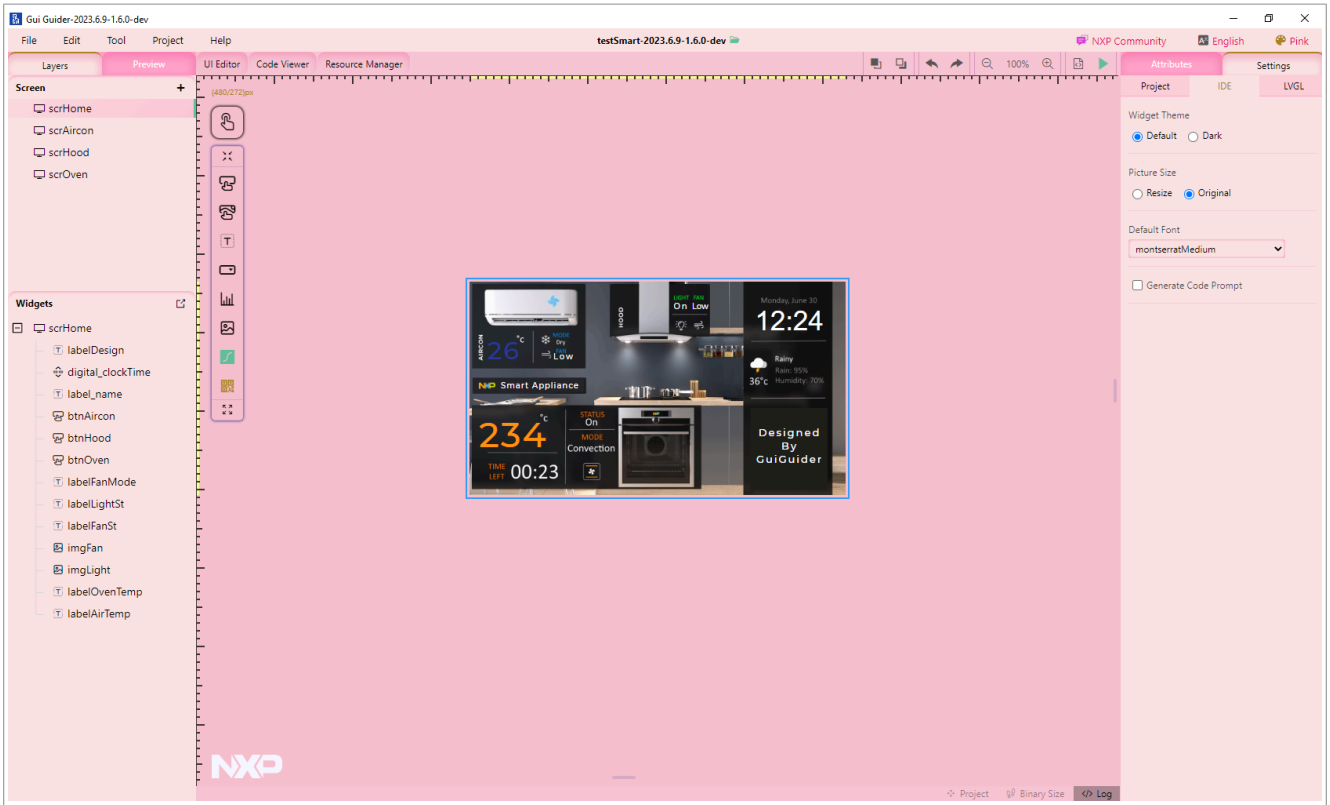


Figure 47. Pink theme

3.21 Screen setting

Figure 48 lists the options in the screen setting window.

Figure 48. Screen setting

Table 9. Screen setting

Label	Description
1	Enable the keyboard for all textareas in the current screen
2	Set the keyboard font style
3	Set the Chinese input mode
4	Set the Chinese character set type
5	Set the screen background style. Support the background image.
6	Set the custom code

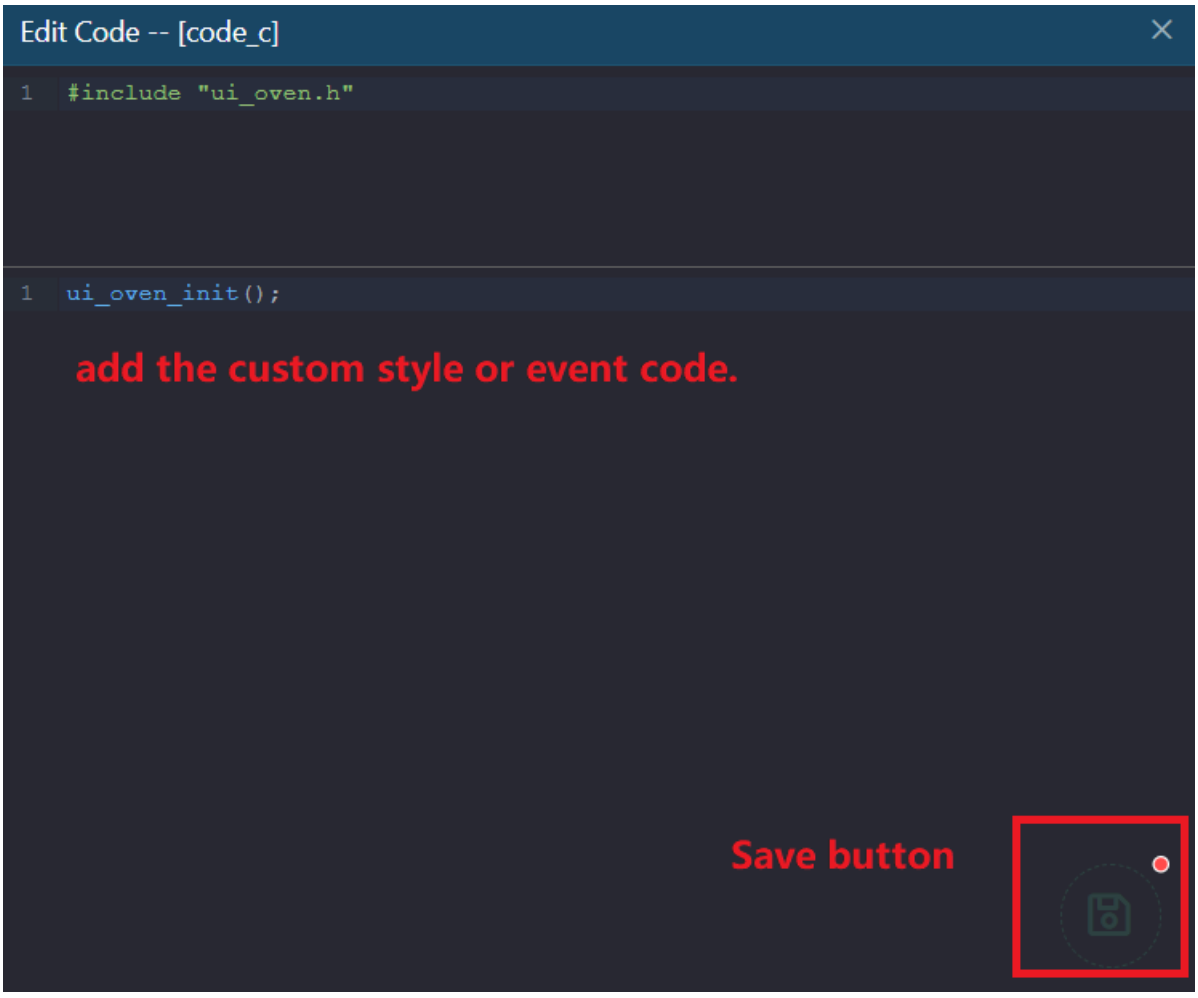


Figure 49. Edit the customer code

3.22 Horizontal/vertical widgets distribution

Figure 50 shows how to distribute widgets evenly.

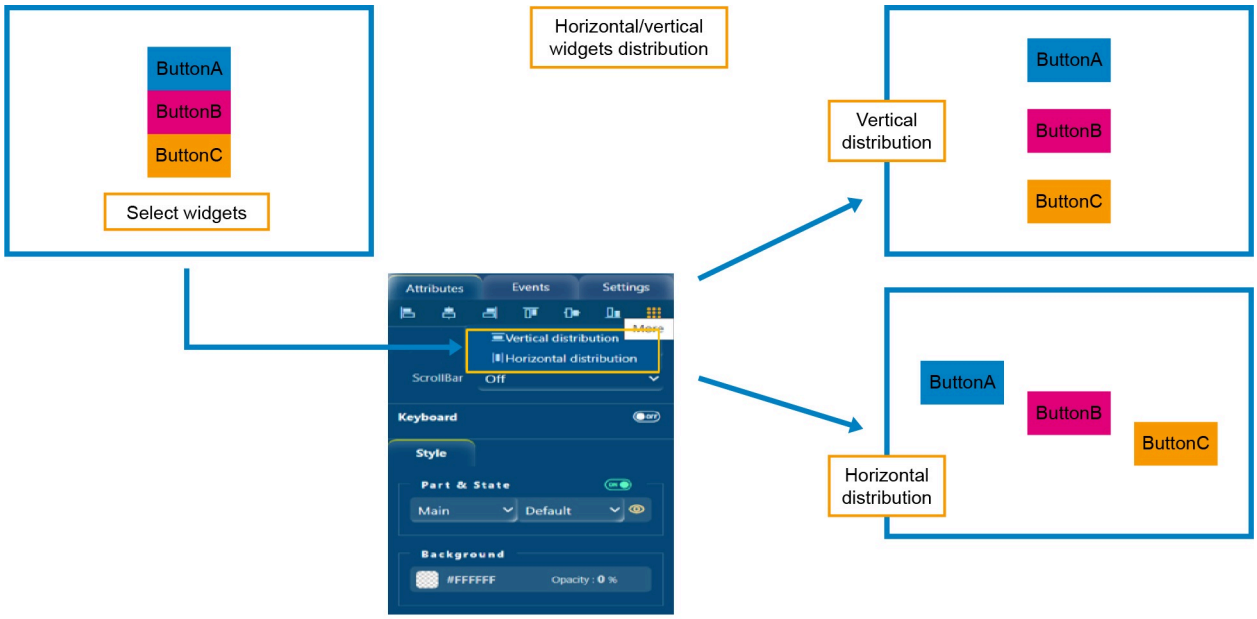


Figure 50. Distributing widgets evenly

Note: *The default is to distribute the entire editor. If you want to adjust the editor position, you can use this function.*

3.23 Version control for project upgrade

From GUI Guider v1.6.0 release. We have added version control for the project upgrade.

- GUI Guider can only upgrade projects created by the last major version and related minor version.
  For example, GUI Guider v1.6.x can import project created by GUI Guider v1.5.x.
  A message box opens when GUI Guider v1.6.0 imports a project created by GUI Guider v1.4.1 or older version.

Figure 51. Update to latest version of GUI Guider

- GUI Guider cannot import projects created by newer GUI Guider version.
  For example, GUI Guider v1.5.1 cannot import project created by GUI Guider v1.6.0.
  A message box opens when GUI Guider imports a project created by a new version.

Figure 52. Update software version

3.24 Preset style usage

Using default preset style

Click the **More Preset** button. It lists the default style of this widget. Select one to apply.

Note: *Use the default preset style.*

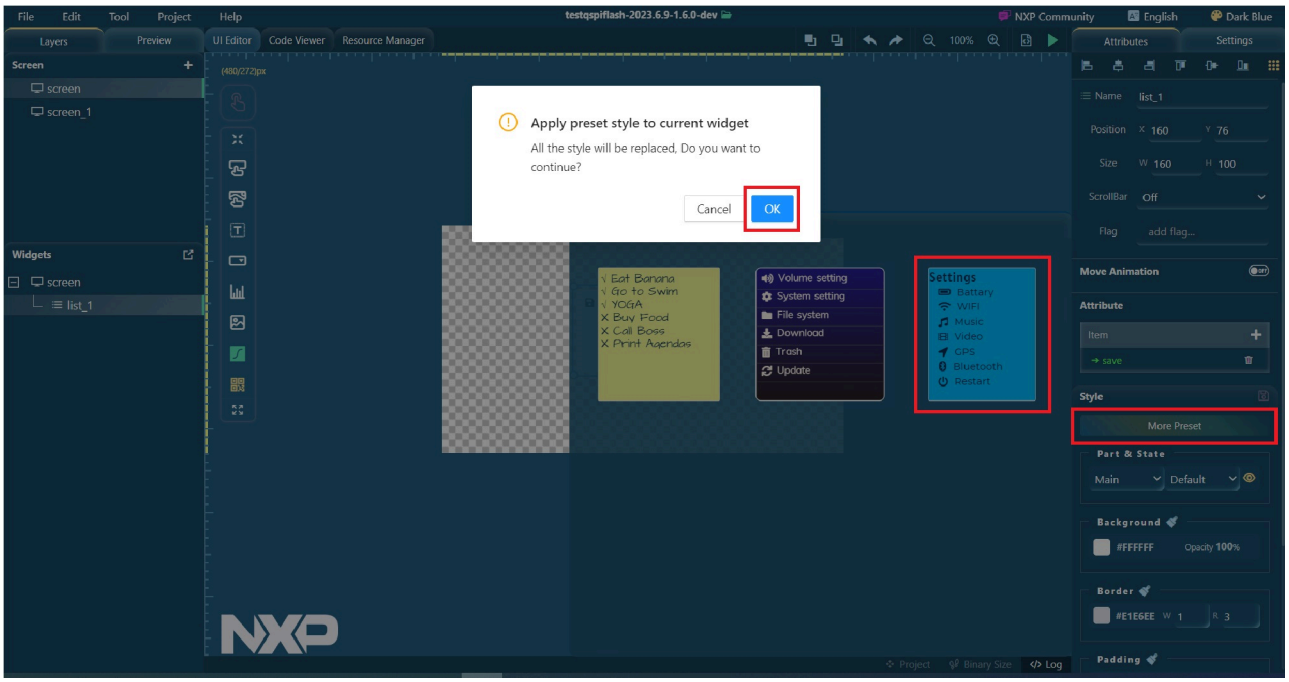


Figure 53. Default preset style

Saving your own preset style

When you want to save your own preset style for easy design, click the **OK** button.

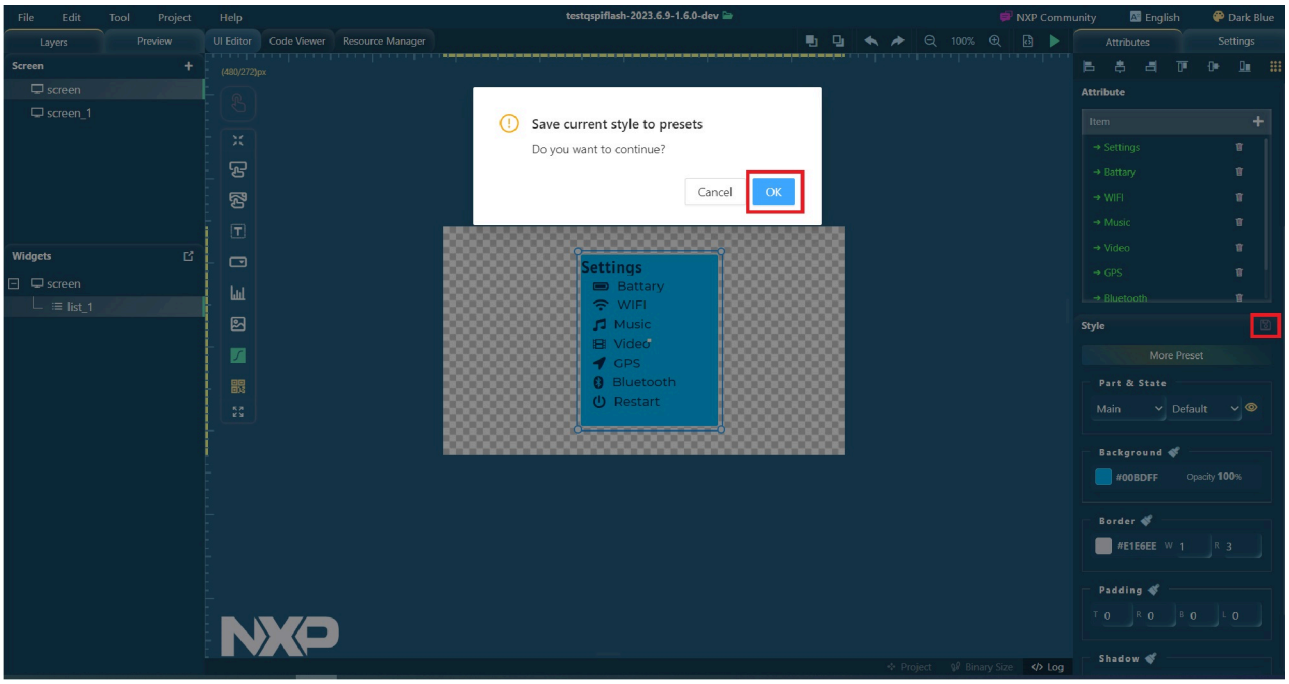


Figure 54. Saving preset style

3.25 Install offline template package

If you cannot connect to the network normally, install the offline templates:

1. Download the corresponding version of the offline template package named <offline-template.zip> from the NXP official website.
2. Unzip the offline package to the GUI Guider installation path, for example: `C:\nxp\GUI-Guider-1.6.0-GA\environment`.
   Note: Must be placed under the environment directory.

4 Widget details

This chapter describes the GUI Guider widgets. Table 10 lists the common properties in all the widgets.

Table 10. Common properties

Property	v7	v8	Description
Flag	N/A	General Setting > Flag	Set the flag
Name	General Setting > Name	General Setting > Name	Default name: Generated by the widget type and ID; Must begin with a letter; Must be at least three characters long; Can only include letter, number, and underscore.
Position (x,y)	General Setting > Position	General Setting > Position	Position of widget, including x and y-coordinate; x should be a value between 0 and width of screen; y should be a value between 0 and height of screen.
Size (W,H)	General Setting > Size	General Setting > Size	Size of widget; Set the width and height of the widget.
Scrollbar	N/A	General Setting > Scrollbar	The scrollbar option for widgets: OFF, ON, ACTIVE, AUTO
Shadow color	N/A	General Setting > Shadow color	Set the shadow color
Shadow opacity	N/A	General Setting > Shadow opacity	Set the shadow opacity
Shadow spread	N/A	General Setting > Shadow spread	To use a larger or smaller rectangle as base, make the shadow calculation
Shadow width	N/A	General Setting > Shadow width	Set the width of the shadow in pixels
Shadow position (x, y)	N/A	General Setting > Shadow position	Set an offset on the shadow in pixels

4.1 3Dimg

3D animation widget can rotate a given image along with x-axis, y-axis, z-axis, or combined.

Figure 55. 3D animation widget in v7

Figure 56. 3D animation widget in v8

Table 11 lists the properties of the 3D image widget.

Table 11. 3Dimg properties

Property	v7	v8	Description
Image Path	Attribute > Image Path	Attribute > Image Path	Add the image files
Interval	Attribute > Interval	Attribute > Interval	Time between two frames
Repeat Count	Attribute > Repeat Count	Attribute > Repeat Count	Animation repeat time. If the value is -1, the animation repeats infinite times.
Axis x, y, z	Attribute > Axis	Attribute > Axis	Rotation matrix over x,y, z axis is between 0 and 360. x is the animation image horizontal rotation degree, y is the animation image vertical rotation degree, z is the animation image lateral rotation degree.
Frame number	Attribute > Frame number	Attribute > Frame number	The number of pictures converted and the value must be between 0 and 1000
Reverse	N/A	Attribute > Reverse	Play reverse
auto play	N/A	Attribute > auto play	Set the play status when the screen loads
play back	N/A	Attribute > play back	Set the play back

4.2 Analog clock

The analog clock is a dynamic widget based on the meter.

Figure 57. Analog clock widget in v8

Table 12 lists the properties of the analog clock widget.

Table 12. Analog clock properties

Property	v8	Description
gap	Attribute > gap	N/A
Hour Tick width & Length, color	Attribute > Hour Tick width & Length, color	Tick width is less than 10 and Tick length is less than 20
Minutes Tick width & Length, color	Attribute > Minutes Tick width & Length, color	Tick width is less than 10 and Tick length is less than 20
Hour, Minute, Second	Attribute > Hour, Minute, Second	N/A
NeedleType & Value	Attribute > NeedleType & Value	N/A
Needle width & length & Color	Attribute > Needle width & length & Color	Needle width is less than 10 and Needle length is less than 20
Image path	Attribute > Image Path	
X & Y, W & H	Attribute > X & Y, W & H	Needle width is less than 10 and Needle length is less than 20
State	Part and State > Main > State	N/A
Disable	Part and State > Main > Disable	N/A
Background color	Part and State > Main > Background color	N/A
Opacity	Part and State > Main > Opacity	max: 255
Background gradient direction	Part and State > Main > Background gradient direction	N/A
Background image	Part and State > Main > bg image	Set the background image with widget size
State	Part and State > Digit > State	N/A
Disable	Part and State > Digit > Disable	N/A
Font color	Part and State > Digit > Font color	N/A

Table 12. Analog clock properties...*continued*

Property	v8	Description
Font size, font family	Part and State > Digit > Font size, font family	N/A

4.3 Animation image

The animation image widget supports to produce animation based on the image series or the GIF image.

Figure 58. Animation image in v7

Figure 59. Animation image in v8

Table 13 lists the properties of the animation image widget.

Table 13. Animation image properties

Property	v7	v8	Description
Interval	Attribute > Interval	Attribute > Interval	Time between two frames
Repeat Count	Attribute > Repeat Count	Attribute > Repeat Count	Animation repeat time
Start callback function	Attribute > Start callback function	Attribute > Start callback function	Set the playback-customized start callback function
Ready callback function	Attribute > Ready callback function	Attribute > Ready callback function	Set the playback-customized ready callback function
Image Path	Attribute > Image Path	Attribute > Image Path	Add the image files
Reverse	N/A	Attribute > Reverse	Play reverse
auto play	N/A	Attribute > auto play	Set the play status when the screen loaded
play back	N/A	Attribute > play back	Set the play back

Note: *The callback function name must begin with a letter or an underscore, must be at least three characters long, can only include letter, number, and underscore.*

Limitation: *The animation image does not support LPC54628 and LPC54S018.*

4.4 Arc

The arc consists of a background and a foreground arc. Both can have start and end angles and thickness.

Figure 60. Arc in v7

Figure 61. Arc in v8

Table 14 lists the properties of the arc widget.

Table 14. Arc properties

Property	v7	v8	Description
Model	Attribute > Model	Attribute > Model	Normal, symmetrical, reverse
Value	Attribute > Value	Attribute > Value	Start value and end value
Angle	Attribute > Angle	Attribute > Angle	Set the arc indicator start and end angle
Background angle	Attribute > Background angle	Attribute > Background angle	Set the arc Indicator background start and end angle
rotate	Attribute > rotate	Attribute > rotate	N/A
Line cap	Attribute > Line cap	Attribute > Line cap	Set the style of Line cap, butt, or round
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of main part: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity of main part: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color in main part, vertical, or horizontal

Table 14. Arc properties...*continued*

Property	v7	v8	Description
Line color	Part and State > Main > Line color	Part and State > Main > Line color	Line color: it can be set by color picker or input RGB value
Padding left, right, top bottom	Part and State > Main > Padding left, right, top bottom	Part and State > Main > Padding left, right, top bottom	Padding for the width: the value should be between 1 and 200
Line width	Part and State > Main > Line width	Part and State > Main > Line width	Line width: the values should be between 0 and 20
state	Part and State > Indicator > state	Part and State > Indicator > state	Style of Indicator part: it can be defined by one state or more states
Disable	Part and State > Indicator > Disable	Part and State > Indicator > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Line color	Part and State > Indicator > Line color	Part and State > Indicator > Line color	Indicator Line color: it can be set by color picker or input RGB value
Line width	Part and State > Indicator > Line width	Part and State > Indicator > line width	Indicator Line width: the values should be between 0 and 20
state	Part and State > Knob > state	Part and State > Knob > state	Style of knob part: it can be defined by one state or more states
Disable	Part and State > Knob > Disable	Part and State > Knob > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Knob padding	Part and State > Knob > Line color	Part and State > Knob > Line color	Knob Line color: it can be set by color picker or input RGB value
background color	Part and State > Knob > size	Part and State > Knob > size	Knob size: the values must be between 0 and 20
Background gradient direction	Part and State > Knob > Background gradient direction	Part and State > Knob > Background gradient direction	Gradient direction of background color in knob part, vertical, or horizontal.
Opacity	Part and State > Knob > opacity	Part and State > Knob > opacity	Background opacity of Knob part: the value should be between 0 and 255

4.5 Bar

The bar object has a background and an indicator on it. The width of the indicator is set according to the current value of the bar.

Vertical bars can be created if the width of the object is smaller than its height.

Not only end, but the start value of the bar can be set, which changes the start position of the indicator.

Figure 62. Bar in v7

Figure 63. Bar in v8

Table 15 lists the properties of the bar widget.

Table 15. Bar properties

Property	v7	v8	Description
Animtime	Attribute > Animtime	Attribute > Animation time	The animation time of Bar value
Animation mode	N/A	Attribute > Animation mode	The animation mode, normal, and symmetrical
Bar value	Attribute > Bar value	Attribute > Bar value	Can set value of the Bar widget
state	Part and State > Main > state	Part and State > Main > state	Style of main part: defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of main part: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity of main part: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color in main part, vertical, or horizontal
Background image	N/A	Part and State > Main > bg image	Set the background image with widget size
Radius	Part and State > Main > Radius	Part and State > Main > Radius	Radius of Border: 0-200
state	Part and State > Indicator > state	Part and State > Indicator > state	Style of active part: it can be defined by one state or more states
Disable	Part and State > Indicator > Disable	Part and State > Indicator > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Indicator > Background color	Part and State > Indicator > Background color	Background color of active part: it can be set by color picker or input RGB value
Opacity	Part and State > Indicator > Opacity	Part and State > Indicator > Opacity	Background opacity of active part: the value should be between 0 and 255

Table 15. Bar properties*...continued*

Property	v7	v8	Description
Background gradient direction	Part and State > Indicator > Background gradient direction	Part and State > Indicator > Background gradient direction	Gradient direction of background color in main part, vertical, or horizontal
Background image	N/A	Part and State > Indicator > bg image	Set the background image with widget size

4.6 Barcode

The barcode automatically adjusts the length according to the entered text.

Figure 64. Barcode in v8

Table 16 lists the properties of the barcode widget.

Table 16. Barcode properties

Property	v8	Description
text	Attribute > text	Set the barcode show text
state	Part and state > main > state	N/A
Disable	Part and state > main > disable	N/A
Background	Part and state > main > background	N/A

4.7 Button

The buttons are simple rectangle-like objects. They are derived from Containers so the layout and fit are also available. They can be enabled to automatically transition to the checked state on click.

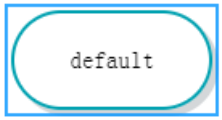


Figure 65. Button in v7

Figure 66. Button in v8

Table 17 lists the properties of the button widget.

Table 17. Button properties

Property	v7	v8	Description
Text, text color	Attribute > Text, text color	Attribute > Text, text color	Text color: it can be set by color picker or input RGB value
Toggle	Attribute > Toggle	Attribute > Toggle	Enable or disable the toggle button
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Background Image	N/A	Part and State > Main > bg image	Set the background image with widget size
Font color	Part and State > Main > font color	Part and State > Main > font color	N/A
Font size	Part and State > Main > font size	Part and State > Main > font size	N/A
align	Part and State > Main > align	Part and State > Main > align	Left, center, right
Border width	Part and State > Main > Border width	Part and State > Main > Border width	Width of border line: the value can be 1 to 5
Border color	Part and State > Main > Border color	Part and State > Main > Border color	Color of border: it can be set by color picker or input RGB value
Border opacity	Part and State > Main > Border opacity	Part and State > Main > Border opacity	Border opacity: the value should be between 0 and 255
Border radius	Part and State > Main > Border radius	Part and State > Main > Border radius	Radius of Border: 0-200

4.8 Button matrix

The button matrix objects can display multiple buttons in rows and columns. The main reasons for wanting to use a button matrix instead of a container and individual button objects are:

- The button matrix is simpler to use for grid-based button layouts.
- The button matrix consumes less memory per button.

Figure 67. Button matrix in v7

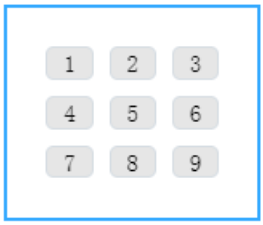


Figure 68. Button matrix in v8

Table 18 lists the properties of the button matrix.

Table 18. Button matrix properties

Property	v7	v8	Description
button	Attribute > button item	Attribute > button	N/A
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Background Image	N/A	Part and State > Main > bg image	Set the background image with widget size
Radius	Part and State > Main > Radius	Part and State > Main > Border Radius	Radius of Border: 0-200
Border color	Part and State > Main > Border color	Part and State > Main > Border color	Color of border: it can be set by color picker or input RGB value
Border width	Part and State > Main > Border width	Part and State > Main > Border width	Width of border line: the value should be between 1 and 5
Padding top, bottom, left, right	Part and State > Main > Padding top, bottom, left, right	Part and State > Main > Padding top, bottom, left, right	Padding for the width: the value should be between 1 and 200

Table 18. Button matrix properties...*continued*

Property	v7	v8	Description
Padding inner	Part and State > Main > Padding inner	N/A	Padding for the Button space
Padding row & column	N/A	Part and State > Main > Padding row & column	Row and column for Items group
state	Part and State > Items > state	Part and State > Items > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Items > Disable	Part and State > Items > Disable	Enable or disable a state: the custom settings are invalidated when a state is disabled
Text color	Part and State > Items > Text color	Part and State > Items > Font color	Color for the text
Font family, font size	Part and State > Items > Font family, font size	Part and State > Items > Font family, font size	Font family and size settings: the size can be a value between 0 and 100
Background color	Part and State > Items > Background color	Part and State > Items > Background color	Background color of widget: it can be set by color picker or input RGB value
Background gradient direction	Part and State > Items > Background gradient direction	Part and State > Items > Background gradient direction	Gradient direction of background color: vertical or horizontal
Opacity	Part and State > Items > Opacity	Part and State > Items > Opacity	Background opacity: the value should be between 0 and 255
Border color	Part and State > Items > Border color	Part and State > Items > Border color	Color of border: it can be set by color picker or input RGB value
Border width	Part and State > Items > Border width	Part and State > Items > Border width	N/A
Radius	Part and State > Items > Radius	Part and State > Items > Border Radius	Radius of Border: 0-8

4.9 Calendar

The calendar object is a classic calendar which can show the name of the days, and highlight the user-defined dates or current day.

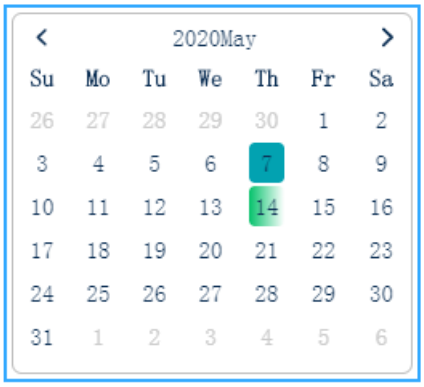


Figure 69. Calendar in v7

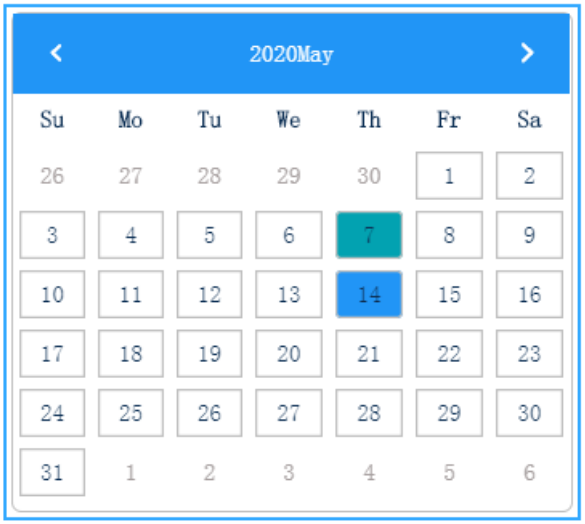


Figure 70. Calendar in v8

Table 19 lists the properties of animation image widget.

Table 19. Calendar properties

Property	v7	v8	Description
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Border color	Part and State > Main > Border color	Part and State > Main > Border color	Color of border: it can be set by color picker or input RGB value
Border width	Part and State > Main > Border width	Part and State > Main > Border width	Width of border line: value can be 1 or 2
state	Part and State > Header > state	Part and State > header > state	Style of header part: it can be defined by one state or more states
Disable	Part and State > Header > Disable	Part and State > header > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.

Table 19. Calendar properties*...continued*

Property	v7	v8	Description
Text color	Part and State > Header > Text color	Part and State > header > Font color	Text color in head part: it can be set by color picker or input RGB value.
Font family, font size	Part and State > Header > Font family, font size	Part and State > header > Font family, font size	Font family and size settings in the calendar header: the size can be a value between 0 and 100
Letter spacing	Part and State > Header > Letter spacing	N/A	The spacing size between letters in the header part
Background color	N/A	Part and State > header > Background color	Background color of header part: it can be set by color picker or input RGB value
Opacity	N/A	Part and State > header > Opacity	Background opacity of header part: the value should be between 0 and 255
Background gradient direction	N/A	Part and State > header > Background gradient direction	Gradient direction of background color in head part: vertical or horizontal
state	Part and State > Week > state	N/A	Style of day part: it can be defined by one state or more states
Disable	Part and State > Week > Disable	N/A	Enable or disable a state of day part. The custom settings are invalidated when a state is disabled
Text color	Part and State > Week > Text color	N/A	Text color in day part: it can be set by color picker or input RGB value
Font family, font size	Part and State > Week > Font family, font size	N/A	Font family and size settings in the calendar day part: the size can be a value between 0 and 100
state	Part and State > Date > state	N/A	Style of date part: it can be defined by one state or more states
Disable	Part and State > Date > Disable	N/A	Enable or disable a state of date part. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Date > Text color	N/A	Text color in date part: it can be set by color picker or input RGB value
Font family, font size	Part and State > Date > Font family, font size	N/A	Font family and size settings in the calendar date part: the size can be a value between 0 and 100

Table 19. Calendar properties*...continued*

Property	v7	v8	Description
Background color	Part and State > Date > Background color	N/A	Background color of date part: it can be set by color picker or input RGB value
Opacity	Part and State > Date > Opacity	N/A	Background opacity of date part: the value should be between 0 and 255
Background gradient direction	Part and State > Date > Background gradient direction	N/A	Gradient direction of background color in date part: vertical or horizontal
state	N/A	Part and State > Disabled > state	Style of disabled part: it can be defined by one state or more states
Disable	N/A	Part and State > Days in other month > disabled	Enable or disable a state of disabled part. The custom settings are invalidated when a state is disabled.
Background color	N/A	Part and State > Days in other month > Background color	Background color of disabled part: it can be set by color picker or input RGB value
Opacity	N/A	Part and State > Days in other month > Opacity	The background opacity of the next month or last month date
Background gradient direction	N/A	Part and State > Days in other month > Background gradient direction	Gradient direction of background color in disabled part, vertical, or horizontal
Font color	N/A	Part and State > Days in other month > Font color	Text color in disabled part: it can be set by color picker or input RGB value
Font family, font size	N/A	Part and State > Days in other month > Font family, font size	Font family and size settings in the calendar disabled part: the size can be a value between 0 and 100
state	N/A	Part and State > Days in current month > state	Style of current month: it can be defined by one state or more states
Disable	N/A	Part and State > Days in current month > Disabled	Enable or disable a state of month part. The custom settings are invalidated when a state is disabled.
Background color	N/A	Part and State > Days in current month > Background color	Background color of current month date: it can be set by color picker or input RGB value
Opacity	N/A	Part and State > Days in current month > Opacity	The background opacity of current month date
Background gradient direction	N/A	Part and State > Days in current month > Background gradient direction	Gradient direction of background color in current

Table 19. Calendar properties*...continued*

Property	v7	v8	Description
			month date: vertical or horizontal
Border color	N/A	Part and State > Days in current month > Border color	Border color of current month date: it can be set by color picker or input RGB value
Border width	N/A	Part and State > Days in current month > Border width	Border width of current month date: the value can be 1 or 2
Font color	N/A	Part and State > Days in current month > Font color	Text color of current month date: it can be set by color picker or input RGB value
Font family, font size	N/A	Part and State > Days in current month > Font family, font size	Font family and size settings for current month date: the size can be a value between 0 and 100
state	N/A	Part and State > weekday names > state	Style of week part: it can be defined by one state or more states
Disable	N/A	Part and State > weekday names > disabled	Enable or disable a state of week part. The custom settings are invalidated when a state is disabled.
Font color	N/A	Part and State > weekday names > Font color	Text color of week part: it can be set by color picker or input RGB value
Font family, font size	N/A	Part and State > weekday names > Font family, font size	Font family and size settings for week part: the size can be a value between 0 and 100
state	N/A	Part and State > Today > state	Style of today: it can be defined by one state or more states
Disable	N/A	Part and State > Today > Disabled	Enable or disable a state of today. The custom settings are invalidated when a state is disabled.
Background color	N/A	Part and State > Today > Background color	Background color of today: it can be set by color picker or input RGB value
Opacity	N/A	Part and State > Today > Opacity	The background opacity of today
Background gradient direction	N/A	Part and State > Today > Background gradient direction	Gradient direction of background color for today: vertical or horizontal
Font color	N/A	Part and State > Today > Font color	Text color of today: it can be set by color picker or input RGB value

Table 19. Calendar properties...*continued*

Property	v7	v8	Description
Font family, font size	N/A	Part and State > Today > Font family, font size	Font family and size settings for today: the size can be a value between 0 and 100
state	N/A	Part and State > Highlight day > state	Style of highlight part: it can be defined by one state or more states
Disable	N/A	Part and State > Highlight day > Disabled	Enable or disable a state of highlight part. The custom settings are invalidated when a state is disabled.
Background color	N/A	Part and State > Highlight day > Background color	Background color of highlight part: it can be set by color picker or input RGB value
Opacity	N/A	Part and State > Highlight day > Opacity	The background opacity of highlight date
Background gradient direction	N/A	Part and State > Highlight day > Background gradient direction	Gradient direction of background color for highlight date: vertical or horizontal
Font color	N/A	Part and State > Highlight day > Font color	Text color of highlight date: it can be set by color picker or input RGB value
Font family, font size	N/A	Part and State > Highlight day > Font family, font size	Font family and size settings for highlight date: the size can be a value between 0 and 100

4.10 Canvas

A canvas inherits from Image where the user can draw anything. Rectangles, texts, images, and lines arcs can be drawn here using the drawing engine of LVGL. Besides some "effects" can be applied as well like rotation, zoom, and blur.

Figure 71. Canvas in v7

Figure 72. Canvas in v8

Table 20 lists the properties of the canvas widget.

Table 20. Canvas properties

Property	v7	v8	Description
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > disable	Part and State > Main > disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255

4.11 Carousel

The carousel widget can display two or more pieces of content in a carousel format.

The following is the usage example of carousel widget.

1. Drag the carousel widget into the editor.

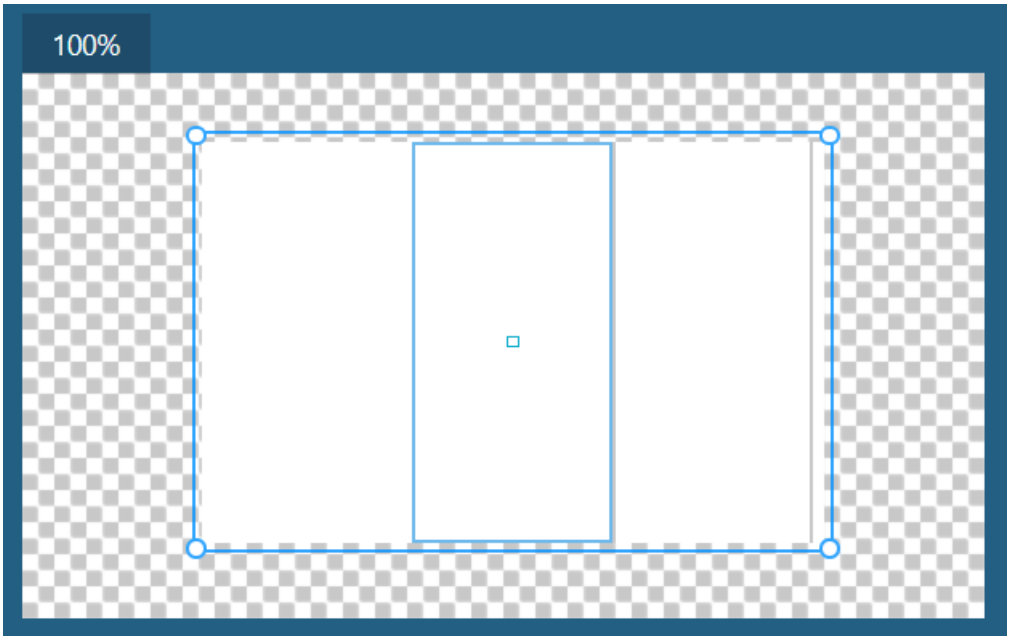


Figure 73. Drag carousel widget

2. Set the page width and page number in the attribute setting window.

Figure 74. Attribute setting window

3. Navigate to a page by clicking the resource tree.

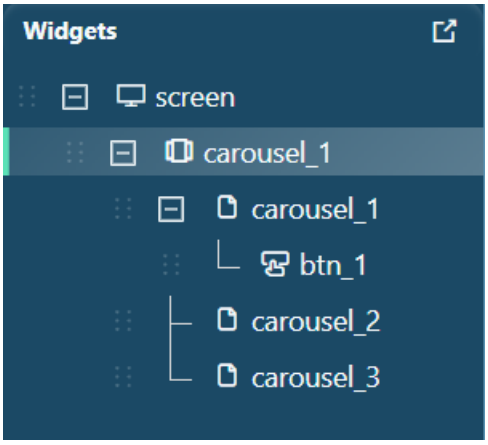


Figure 75. Resource tree

4. Drag the widget into the carousel page and set widget attributes.

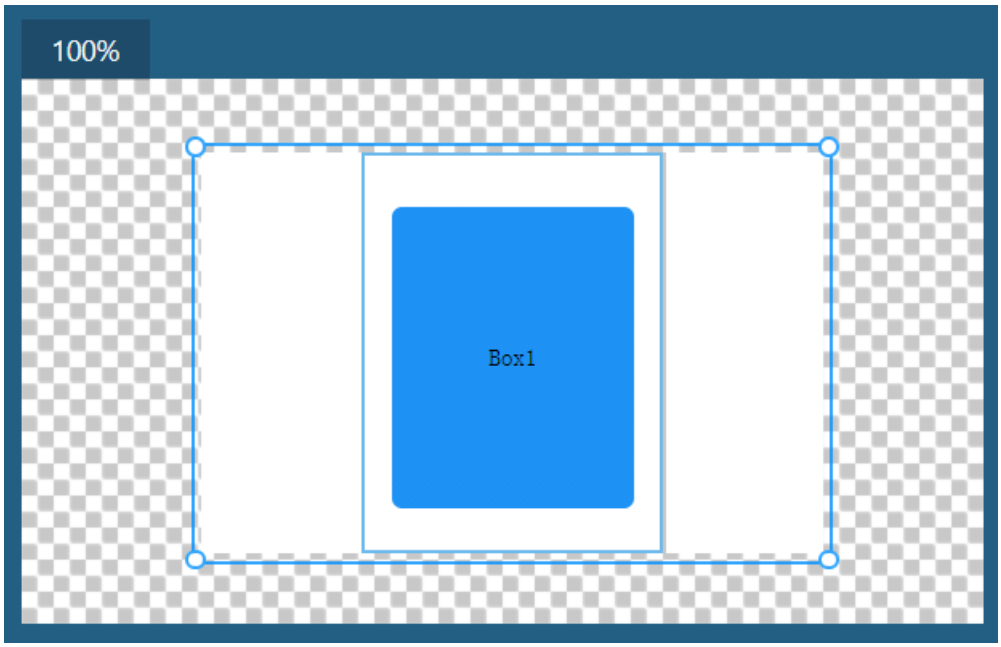


Figure 76. Set widget attributes

5. Repeat step 4 for each page of the carousel widget.
6. Run the project. The pages are displayed in a carousel format.

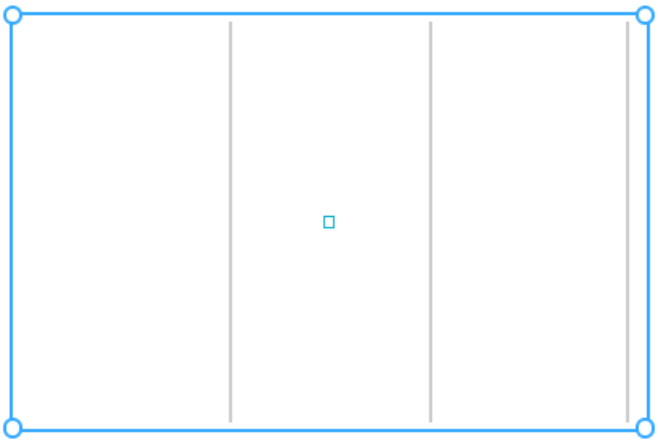


Figure 77. Carousel in v8

Table 21 lists the properties of the carousel widget.

Table 21. Carousel properties

Property	v8	Description
width	Attribute > width	The page width
Page	Attribute > add page	Add the multiple pages
state	Part and State > Main > state	Style of main part: it can be defined by one state or more states

Table 21. Carousel properties...*continued*

Property	v8	Description
Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
background color	Part and State > Main > background color	Background color of widget: it can be set by color picker or input RGB value
Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
state	Part and State > Scrollbar > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Scrollbar > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
background color	Part and State > Scrollbar > background color	Scrollbar color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Scrollbar > Opacity	Scrollbar opacity: the value should be between 0 and 255

4.12 Chart

The charts are a basic object to visualize data points. They support *Line* charts (connect points with lines and/or draw points on them) and *Column* charts.

Charts also support division lines, x y axis, axis ticks, and texts on ticks. The number of chart points must be 10.

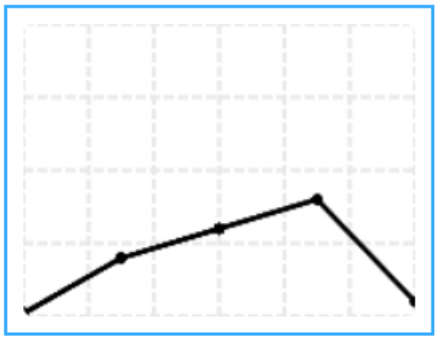


Figure 78. Chart in v7

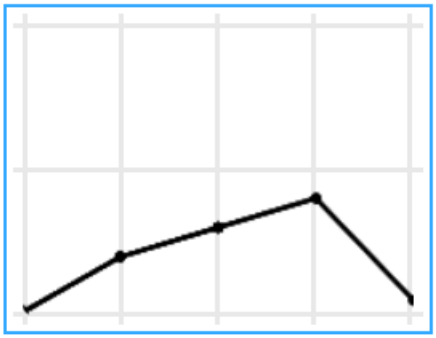


Figure 79. Chart in v8

Table 22 lists the properties of the chart widget.

Table 22. Chart properties

Property	v7	v8	Description
Line numbers row and column	Attribute > Line numbers row and column	Attribute > Line numbers row and column	Line of chart: row line and column line of chart
Range	Attribute > Range	Attribute > Range	Value range of the chart: the min value is 0; There is no max value limit.
Chart type	Attribute > Chart type	Attribute > Chart type	Type of chart: it includes line and bar
Chart data	Attribute > Chart data	Attribute > Chart type	Data of the chart: the length of data is point count
state	Part and State > Main > state	Part and State > Main > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state of today. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color for highlight date: vertical or horizontal
state	Part and State > Lines > state	N/A	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Lines > Disable	N/A	Enable or disable a state of today. The custom settings

Table 22. Chart properties...*continued*

Property	v7	v8	Description
			are invalidated when a state is disabled
Line color	Part and State > Lines > Line color	Part and State > Main > Line color	Color of background line
Line opacity	Part and State > Lines > Line opacity	Part and State > Main > Line opacity	Background line opacity: the value should be between 0 and 255
Line width	Part and State > Lines > Line width	Part and State > Main > Line width	Background line width: the value should be between 0 and 4

4.13 Checkbox

The checkbox objects are built from a Button background which contains a Button *bullet* and a Label to realize a classical checkbox.

Figure 80. Checkbox in v7

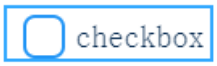


Figure 81. Checkbox in v8

Table 23 lists the properties of the canvas widget.

Table 23. Checkbox properties

Property	v7	v8	Description
Text	Attribute > Text	Attribute > Text	Text for checkbox
state	Part and State > Main > state	Part and State > Main > state	Style of highlight part: it can be defined by one state or more states
Text color	Part and State > Main > Text color	Part and State > Main > Font color	Color of the text
Font famil, font size	Part and State > Main > Font famil, font size	Part and State > Main > Font famil, font size	Text font setting: includes font family and font size
Letter spacing	Part and State > Main > Letter spacing	Part and State > Main > Letter spacing	The spacing size between letters in the Text
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state of today. The custom settings are invalidated when a state is disabled.

Table 23. Checkbox properties...*continued*

Property	v7	v8	Description
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color for highlight date: vertical or horizontal
Radius	Part and State > Main > Radius	Part and State > Main > Radius	Radius of Border: 0-200
state	Part and State > indicator > state	Part and State > indicator > state	Style of highlight part: it can be defined by one state or more states
Background color	Part and State > indicator > Background color	Part and State > indicator > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > indicator > Opacity	Part and State > indicator > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > indicator > Background gradient direction	Part and State > indicator > Background gradient direction	Gradient direction of background color for highlight date: vertical or horizontal
Border color	Part and State > indicator > Border color	Part and State > indicator > Border color	Border color of widget: it can be set by color picker or input RGB value
Border width	Part and State > indicator > Border width	Part and State > indicator > Border width	Border width: The value should be between 0 and 4
Radius	Part and State > indicator > Radius	Part and State > indicator > Radius	Radius of Border: 0-200

4.14 Color picker

As its name implies, the *Color picker* helps select the color. The *Hue*, *Saturation*, and *Value* of the color can be selected after each other. The widget has two forms: circle (disc) and rectangle. In both forms, when long pressing the object, the color picker changes to the next parameter of the color (hue, saturation or value). The double-click resets the current parameter.

Figure 82. Color picker in v7

Figure 83. Color picker in v8

Table 24 lists the properties of the color picker widget.

Table 24. Color picker properties

Property	v7	v8	Description
state	Part and State > Main > state	Part and State > Main > state	Size of widget: set the width and height of the widget
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Style of main part: it can be defined by one state or more states
Scale width	Part and State > Main > Scale width	Part and State > Main > Scale width	Scale width of the color picker: 0-50
Type	Part and State > Main > Type	N/A	Color picker type: Disc and Rect

4.15 Container

The containers are essentially a basic object with layout and automatic sizing features.

Figure 84. Container in v7

Figure 85. Container in v8

Table 25 lists the properties of the container widget.

Table 25. Container properties

Property	v7	v8	Description
Remove all style	General Setting > Remove all style	General Setting > Remove all style	Enabling this item removes all custom added style
state	Part and State > Main > state	Part and State > Main > state	Style of main: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state of month part. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Border color	Part and State > Main > Border color	Part and State > Main > Border color	Color of border: it can be set by color picker or input RGB value
Border opacity	Part and State > Main > Border opacity	Part and State > Main > Border opacity	Opacity of border line: it can be set by the slider
Border width	Part and State > Main > Border width	Part and State > Main > Border width	Width of Border: max:10
Padding top, bottom, left, right	Part and State > Main > Padding top, bottom, left, right	Part and State > Main > Padding top, bottom, left, right	Padding for the width: the value should be between 1 and 200
Radius	Part and State > Main > Radius	Part and State > Main > Border Radius	Radius of Border: 0-200

4.16 Date text box

A date text box is a widget that allows users to select a date in the calendar and display the date in the label.

Figure 86. Date text box in v8

Table 26 lists the properties of the data text box widget.

Table 26. Date text box properties

Property	v8	Description
Datetext	Attribute > Datetext	Can select by calendar
Disable	Part and State > Main > Disable	N/A
Background color	Part and State > Main > Background color	N/A
Opacity	Part and State > Main > Opacity	N/A
Background gradient direction	Part and State > Main > Background gradient direction	N/A
Font color	Part and State > Main > Font color	N/A
Font size, font family	Part and State > Main > Font size, font family	N/A
Letter spacing	Part and State > Main > Letter spacing	N/A
Padding top, left, right	Part and State > Main > Padding top, left, right	N/A

4.17 Digital clock

The digital clock is a dynamic widget based on the label.

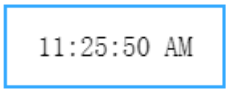


Figure 87. Digital clock widget in v8

Table 27 lists the properties of the digital clock widget.

Table 27. Digital clock properties

Property	v8	Description
Initial Time	Attribute > Initial Time	Initial time format is 00:00:00
Show Second	Attribute > Second	N/A
Use AM/PM	Attribute > AM/PM	N/A
State	Part and State > Main > State	N/A
Disable	Part and State > Main > Disable	N/A
Font color	Part and State > Main > Font color	N/A
Font family, font size	Part and State > Main > Font family, font size	N/A

Table 27. Digital clock properties...*continued*

Property	v8	Description
Letter spacing	Part and State > Main > Letter spacing	max:100
Background color	Part and State > Main > Background color	N/A
Opacity	Part and State > Main > Opacity	N/A
Background gradient direction	Part and State > Main > Background gradient direction	max: 255
Radius	Part and State > Main > Radius	max: 100

4.18 Drop-down list

The drop-down list allows the user to select one value from a list.

The drop-down list is closed by default and displays a single value or a predefined text. Click the drop-down list and select an option. When the user selects a new value, the list is deleted.

Figure 88. Drop-down list in v7

Figure 89. Drop-down list in v8

Table 28 lists the properties of the drop-down list widget.

Table 28. Drop-down list properties

Property	v7	v8	Description
Draw arrow	Attribute > arrow	Attribute > arrow	Set whether to add a drop-down arrow
Text	Attribute > Text	Attribute > Text	The contents of each row in the list
Add list	Attribute > Add item	Attribute > Add item	To add a list
state	Part and State > Main > state	Part and State > Main > state	Style of main: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state of month part. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Main > Text color	Part and State > Main > Font color	Font color in the header: it can be set by color picker or input RGB value
Font family, font size	Part and State > Main > Font family, font size	Part and State > Main > Font family, font size	Font family and size settings in the header part: the size can be a value between 0 and 100
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value

Table 28. Drop-down list properties...*continued*

Property	v7	v8	Description
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Border color	Part and State > Main > Border color	Part and State > Main > Border color	Color of border: it can be set by color picker or input RGB value
Border width	Part and State > Main > Border width	Part and State > Main > Border width	Width of the border: max:4
Radius	Part and State > Main > Radius	Part and State > Main > Radius	Radius of the border: 0-200
Padding top, left, right	Part and State > Main > Padding top, left, right	Part and State > Main > Padding top, left, right	Padding for the width: the value should be between 1 and 200
state	Part and State > Selected > state	Part and State > Selected > state	Style of selected part: it can be defined by one state or more states
Disable	Part and State > Selected > Disable	Part and State > Selected > Disable	Enable or disable a state: the custom settings are invalidated when a state is disabled
Text color	Part and State > Selected > Text color	Part and State > Selected > Font color	Font color in the selected item: it can be set by color picker or input RGB value
Font family, font size	Part and State > Selected > Font family, font size	Part and State > Selected > Font family, font size	Font family and size settings in the selected item: the size can be a value between 0 and 100
Background color	Part and State > Selected > Background color	Part and State > Selected > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Selected > Opacity	Part and State > Selected > Opacity	Background opacity in the selected item: the value should be between 0 and 255
Background gradient direction	Part and State > Selected > Background gradient direction	Part and State > Selected > Background gradient direction	Gradient direction of background color: vertical or horizontal
Border color	Part and State > Selected > Border color	Part and State > Selected > Border color	Color of the selected item border: it can be set by color picker or input RGB value
Border width	Part and State > Selected > Border width	Part and State > Selected > Border width	width of the selected item Border: max:4
Radius	Part and State > Selected > Radius	Part and State > Selected > Radius	Radius of the selected item Border: 0-200
Padding top, bottom, left, right	Part and State > Selected > Padding top, bottom, left, right	Part and State > Selected > Padding top, bottom, left, right	Padding for the width: the value should be between 1 and 20
state	Part and State > List > state	Part and State > List > state	Style of listed part: it can be defined by one state or more states
Disable	Part and State > List > Disable	Part and State > List > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	Part and State > List > Text color	Part and State > List > Text color	Font color in other unselected items: it can be set by color picker or input RGB value

Table 28. Drop-down list properties*...continued*

Property	v7	v8	Description
Font family, font size	Part and State > List > Font family, font size	Part and State > List > Font family, font size	Font family and size settings in other unselected items: the size can be a value between 0 and 100
Background color	Part and State > List > Background color	Part and State > List > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > List > Opacity	Part and State > List > Opacity	Background opacity in other unselected items: the value should be between 0 and 255
Background gradient direction	Part and State > List > Background gradient direction	Part and State > List > Background gradient direction	Gradient direction of background color: vertical or horizontal
Border color	Part and State > List > Border color	Part and State > List > Border color	Color of drop-down part border. it can be set by color picker or input RGB value
Border width	Part and State > List > Border width	Part and State > List > Border width	Width of drop-down part. Border: max:4
Radius	Part and State > List > Radius	Part and State > List > Radius	Radius of drop-down part. Border: 0-200
Padding top, left, right	Part and State > List > Padding top, left, right	Part and State > List > Padding top, left, right	Padding for the width: the value should be between 1 and 200
List height	N/A	Part and State > List > List Height	The height of the drop-down part
state	N/A	Part and State > scrollbar > state	Style of scroll bar: it can be defined by one state or more states
Disable	N/A	Part and State > scrollbar > Disable	Enable or disable a state: the custom settings are invalidated when a state is disabled
Background color	N/A	Part and State > scrollbar > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	N/A	Part and State > scrollbar > Opacity	Background opacity in other unselected items: the value should be between 0 and 255
Background gradient direction	N/A	Part and State > scrollbar > Background gradient direction	Gradient direction of background color: vertical or horizontal

4.19 Gauge

The gauge is a meter with scale labels and one or more needles.

Figure 90. Gauge in v7

Table 29 lists the properties of the drop-down list widget.

Table 29. Gauge properties

Property	v7	Description
Dial Major & Dial Minor	Attribute > Major & Minor	The value of the major and minor
Min value & Max value	Attribute > Min & Max	The value of the start and stop
Image Needle	Attribute > Image Needle	To set the needle image
Angle	Attribute > Angle	To set the angle value
needles color & value	Attribute > needles color & value	The value of needles color
Critical	Attribute > Critical	The value of the critical
state	Part and State > Main > state	Style of head part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Color	Part and State > Main > Color	Font color: It can be set by color picker or input RGB value
Font family, font size	Part and State > Main > Font family, font size	Font family and size settings in the main part: the size can be a value between 0 and 100
Letter space	Part and State > Main > Letter space	To set the letter space of the value
Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
padding	Part and State > Main > padding	The padding of the number and line
Line color	Part and State > Main > Line color	The line color: it can be set by color picker or input RGB value

Table 29. Gauge properties*...continued*

Property	v7	Description
Line opacity	Part and State > Main > Line opacity	The line opacity: 0-255
Line width	Part and State > Main > Line width	The line width: 0-20
Scale width	Part and State > Main > Scale width	The scale line width: 0-21
Scale grad color	Part and State > Main > Scale grad color	The scale grad color: it can be set by color picker or input RGB value
Scale end color	Part and State > Main > Scale end color	The scale end color: it can be set by color picker or input RGB value
Scale border width	Part and State > Main > Scale border width	The start scale border line width: 0-30
Scale end border width	Part and State > Main > Scale end border width	The end scale border width: 0-30
Scale end line width	Part and State > Main > Scale end line width	The end scale border line width: 0-6
state	Part and State > Major > state	Style of head part: it can be defined by one state or more states
Disable	Part and State > Major > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Line color	Part and State > Major > Line color	The major line color
Line opacity	Part and State > Major > Line opacity	The major line opacity: 0-255
Line width	Part and State > Major > Line width	The major line width: 0-20
Scale width	Part and State > Major > Scale width	The major scale width: 0-30
Scale grad color	Part and State > Major > Scale grad color	The scale grad color: it can be set by color picker or input RGB value
Scale end color	Part and State > Major > Scale end color	The scale end color: it can be set by color picker or input RGB value
Scale end line width	Part and State > Major > Scale end line width	max:6
state	Part and State > Needle > state	Style of needle part: it can be defined by one state or more states
Disable	Part and State > Needle > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Needle > Background color	Background color of needle: it can be set by color picker or input RGB value
Opacity	Part and State > Needle > Opacity	Background opacity. The value should be between 0 and 255.
Background gradient direction	Part and State > Needle > Background gradient direction	Gradient direction of background color: vertical or horizontal

Table 29. Gauge properties...*continued*

Property	v7	Description
Line opacity	Part and State > Needle > Line opacity	The opacity of the needle: 0-255
Line width	Part and State > Needle > Line width	The line width of the needle: 0-20
size	Part and State > Needle > size	The center pointer size of the needle: 0-20

4.20 Image

The images are the basic object to display from the flash (as arrays) or externally as files. Images can display symbols (LV_SYMBOL_...) too.

Using the Image decoder interface custom image formats can be supported as well.

Figure 91. Image in v7

Figure 92. Image in v8

Table 30 lists the properties of the image widget.

Table 30. Image properties

Property	v7	v8	Description
Color format	Attribute > Color format	Attribute > Color format	True Color is for RGB image and True Color Alpha is for ARGB image
Rotate center	Attribute > Rotate center	Attribute > Rotate X,Y	Rotate center of widget. The pivot point of the rotation.
Rotate angle	Attribute > Rotate angle	Attribute > Rotate angle	Rotate angle of widget. The angle to rotate the widget.
Image Path	Attribute > Image Path	Attribute > Image Path	Image path of widget. Choose an image.
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states

Table 30. Image properties...*continued*

Property	v7	v8	Description
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Filter color	Part and State > Main > Filter color	Part and State > Main > Filter color	Filter color: a color can be mixed with every pixel of image
Filter opacity	Part and State > Main > Filter opacity	Part and State > Main > Filter opacity	Filter color opacity: the value should be between 0 and 255

4.21 Image button

The image button is very similar to the simple "Button" object. The only difference is that it displays user-defined images in each state instead of drawing a rectangle. See the Button section for details before reading this section.

Figure 93. Image button in v7

Figure 94. Image button in v8

Table 31 lists the properties of the image button widget.

Table 31. Image button properties

Property	v7	v8	Description
Text	Attribute > Text	Attribute > Text	Text of widget: text showed on the widget
Toggle	Attribute > Toggle	Attribute > Toggle	Toggle of widget: the button could be toggled or not
Released picture	Attribute > Released picture	Attribute > Released picture	Released picture of widget: the image when widget is released
Pressed picture	Attribute > Pressed picture	Attribute > Pressed picture	Pressed picture of widget: the image when widget is pressed
Checked released picture	Attribute > Checked released picture	Attribute > Checked released picture	Checked released picture of widget: the image when widget is checked and released
Checked pressed picture	Attribute > Checked pressed picture	Attribute > Checked pressed picture	Checked pressed picture of widget: the image when widget is checked and pressed
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states

Table 31. Image button properties...*continued*

Property	v7	v8	Description
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Main > Text color	Part and State > Main > Font color	Color of font: it can be set by color picker or input RGB value
Font family & font size	Part and State > Main > Font family & font size	Part and State > Main > Font family & font size	Font family and size settings for today: the size can be a value between 0 and 10
Font Align	Part and State > Main > Font Align	Part and State Main > Font Align	Left, center, right
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Filter color (image recolor)	Part and State > Main > Filter color	Part and State > Main > Filter color	Filter color: a color can be mixed with every pixel of image
Filter opacity	Part and State > Main > Filter opacity	Part and State > Main > Filter opacity	Filter color opacity: the value should be between 0 and 255

4.22 Label

A label is the basic object type that is used to display text.

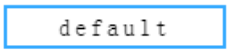


Figure 95. Label in v7

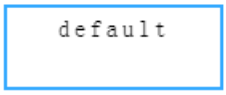


Figure 96. Label in v8

Table 32 lists the properties of the label widget.

Table 32. Label properties

Property	v7	v8	Description
Text	Attribute > Text	Attribute > Text	Text of widget: text showed on widget
Long Mode	N/A	Attribute > Mode	Long mode of widget: By default, the width and height of the label is set to `LV_SIZE_CONTENT`. Therefore the size of the label is automatically expanded to the text size. Otherwise, if the width or height are explicitly set (using, for example, `lv_obj_set_width` or a layout), the lines wider than the label's width can be manipulated according to several long mode policies.
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states

Table 32. Label properties...*continued*

Property	v7	v8	Description
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Main > Text color	Part and State > Main > Font color	Color of font: it can be set by color picker or input RGB value
Font family, font size	Part and State > Main > Font family, font size	Part and State > Main > Font family, font size	Font family and size settings for today: the size can be a value between 0 and 100
Font Align	Part and State > Main > Font Align	Part and State Main > Font Align	Left, center, right
letter spacing	Part and State > Main > letter spacing	Part and State > Main > letter spacing	Letter space: the space between letters, a value between 0 and 100
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	The background opacity
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Background Image	N/A	Part and State > Main > bg image	Set the background image with widget size
Padding top, bottom	Part and State > Main > Padding top, bottom	Part and State > Main > Padding top, bottom	Padding in top and bottom side: the value should be between 1 and 200
Padding left, right	Part and State > Main > Padding left, right	Part and State > Main > Padding left, right	Padding in left and right side: the value should be between 1 and 200
Radius	Part and State > Main > Radius	Part and State > Main > Radius	Radius of widget

4.23 LED

The LED is a rectangle-like (or circle) object. Its brightness can be adjusted. With lower brightness, the colors of the LED become darker.

Figure 97. LED in v7

Figure 98. LED in v8

Table 33 lists the properties of the LED widget.

Table 33. LED properties

Property	v7	v8	Description
Bright	Attribute > Bright	N/A	Brightness of widget
LED Color	N/A	Attribute > LED Color	Color of widget: it can be set by color picker or input RGB value

4.24 Line

The line object helps draw straight lines between a set of points.

Figure 99. Line in v7

Figure 100. Line in v8

Table 34 lists the properties of the line widget.

Table 34. Line properties

Property	v7	v8	Description
Line start	Attribute > Line start	N/A	Start point of the line
Line end	Attribute > Line end	N/A	End point of the line
line_point	Attribute > Line point	Attribute > Line point	Points connected in the line
Add points	Attribute > add points	Attribute > add points	Can add multiple points
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state: the custom settings are invalidated when a state is disabled
Line color	Part and State > Main > Line color	Part and State > Main > Line color	Line color: it can be set by color picker or input RGB value
Line width	Part and State > Main > Line width	Part and State > Main > Line width	N/A
Line rounder	Part and State > Main > Line rounded	Part and State > Main > Line rounded	Enable line rounding function

4.25 Line meter

The line meter object consists of some radial lines which draw a scale. Setting a value for the Line meter changes the color of the scale lines proportionally.

Figure 101. Line meter in v7

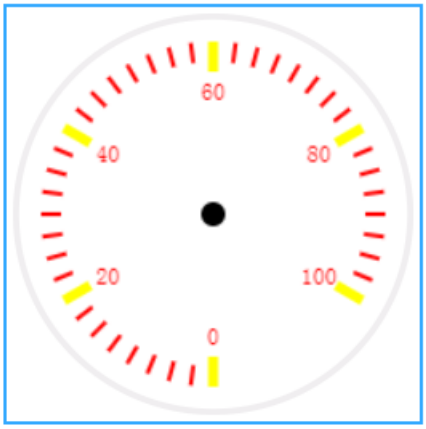


Figure 102. Line meter renamed as Meter in v8

Table 35 lists the properties of the line meter widget.

Table 35. Line meter properties

Property	v7	Description
Min & Max	Attribute > Min & Max	
Line	Attribute > Line	
Angle	Attribute > Angle	
Offset	Attribute > Offset	
state	Part and State > Main > state	
Disable	Part and State > Main > Disable	

Table 35. Line meter properties...*continued*

Property	v7	Description
Background color	Part and State > Main > Background color	
Opacity	Part and State > Main > Opacity	max:255
Background gradient direction	Part and State > Main > Background gradient direction	
Radius	Part and State > Main > Radius	
padding top, bottom, left, right	Part and State > Main > padding top, bottom, left, right	max:20
Line color	Part and State > Main > Line color	
Line opacity	Part and State > Main > Line opacity	max:255
Line width	Part and State > Main > Line width	
Scale color	Part and State > Main > Scale color	
Scale width	Part and State > Main > Scale width	

4.26 List

The lists are built from a background Page and Buttons on it. The "Button" contain an optional icon-like Image (which can be a symbol too) and a Label. Scrolling capability is included for lists that exceed the defined size.

Figure 103. in v7

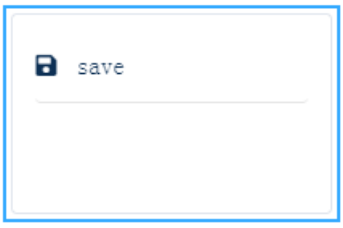


Figure 104. in v8

Table 36 lists the properties of the list widget.

Table 36. List properties

Property	v7	v8	Description
Symbol	Attribute > items > Symbol	Attribute > items > Symbol	Symbol which is used as the button icon
image path	Attribute > items > Image path	Attribute > items > Image path	Image which is used as the button icon
Text	Attribute > items > Text	Attribute > items > Text	Text which is used as the button description
image size	Attribute > items > image width height	Attribute > items > image width, height	Example: '20, 20'
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Border color	Part and State > Main > Border color	Part and State > Main > Border color	Color of border: it can be set by color picker or input RGB value
Border width	Part and State > Main > Border width	Part and State > Main > Border width	max:50
Radius	Part and State > Main > Radius	Part and State > Main > Radius	max:2000
Padding top	Part and State > Main > Padding top	Part and State > Main > Padding top	max:200
Padding left, right	Part and State > Main > Padding left, right	Part and State > Main > Padding left, right	max:200
Background color	N/A	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	N/A	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	N/A	Part and State > Main > Background gradient direction	vertical or horizontal
state	Part and State > Scrollbar > state	Part and State > Scrollbar > state	Style of scroll part: it can be defined by one state or more states
Disable	Part and State > Scrollbar > Disable	Part and State > Scrollbar > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Scrollbar > Background color	Part and State > Scrollbar > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Scrollbar > Opacity	Part and State > Scrollbar > Opacity	max:255
Background gradient direction	Part and State > Scrollbar > Background gradient direction	Part and State > Scrollbar > Background gradient direction	Vertical or horizontal
state	Part and State > Buttons > state	Part and State > item text > state	Style of list part: it can be defined by one state or more states

Table 36. List properties...*continued*

Property	v7	v8	Description
Disable	Part and State > Buttons > Disable	Part and State > item text > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Buttons > Text color	Part and State > item text > Font color	Text color: it can be set by color picker or input RGB value
Font family, font size	Part and State > Buttons > Font family, font size	Part and State > item text > Font family, font size	Font family and size settings: the size can be a value between 0 and 100
Background color	Part and State > Buttons > Background color	Part and State > item text > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Buttons > Opacity	Part and State > item text > Opacity	max: 255
Background gradient direction	Part and State > Buttons > Background gradient direction	Part and State > item text > Background gradient direction	Vertical or horizontal
state	N/A	Part and State > Button > state	N/A
Disable	N/A	Part and State > Button > Disable	N/A
background	N/A	Part and State > Button > background	N/A
font	N/A	Part and State > Button > font	N/A
border	N/A	Part and state > Button > border	N/A
padding	N/A	Part and state > Button > padding	N/A

4.27 Lottie

It is a light-weight implementation of animations by loading Lottie JSON files.

Figure 105. Lottie in v8

Table 37 lists the properties of the lottie widget.

Table 37. Lottie properties

Property	v8
Json file	Attribute > json file
Disable	Part and State > Main > Disable
Background color	Part and State > Main > Background color
Background gradient direction	Part and State > Main > Background gradient direction

4.28 Menu

The menu widget can be used to create multi-level menus. It handles the traversal between pages automatically.

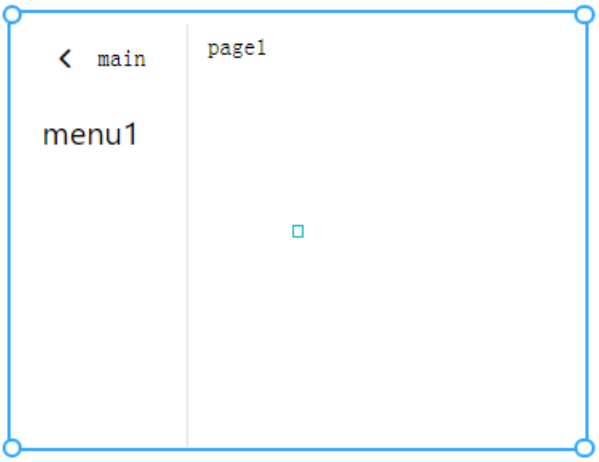


Figure 106. Menu in v8

Table 38 lists the properties of the menu widget.

Table 38. Menu properties

Property	v8	Description
title	Attribute > title	Add the title for widgets
mode	Attribute > mode	Top fixed, Top unfixed, Bottom fixed
Root back button	Attribute > Root back button	Enable the root back button
Enable page title	Attribute > Enable page title	Enable the page title display
Menu in side	Attribute > Menu in side	Enable the menu in side
state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
background color	Part and State > Main > background color	Background color of widget: it can be set by color picker or input RGB value
Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal

Table 38. Menu properties*...continued*

Property	v8	Description
Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
state	Part and State > Header > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Header > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
font color	Part and State > Header > font color	Set the Header font color
font family & size	Part and State > Header > font family & size	Set the Header font family and size
state	Part and State > Header back btn > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Header back btn > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
font color	Part and State > Header back btn > font color	Set the Header back btn font color
font size	Part and State > Header back btn > font size	Set the Header back btn font size
state	Part and State > Sider header > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Sider header > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
font color	Part and State > Sider header > font color	Set the Sider header font color
font family & size	Part and State > Sider header > font family & size	Set the Sider header font family and size
state	Part and State > Sider back btn > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Sider back btn > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
font color	Part and State > Sider back btn > font color	Set the Sider back btn font color
font size	Part and State > Sider back btn > font size	Set the Sider back btn font size
state	Part and State > Page > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Page > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
background color	Part and State > Page > background color	Background color of widget: it can be set by color picker or input RGB value

Table 38. Menu properties...*continued*

Property	v8	Description
Background gradient direction	Part and State > Page > Background gradient direction	Gradient direction of background color: vertical or horizontal
Opacity	Part and State > Page > Opacity	Background opacity: the value should be between 0 and 255
state	Part and State > Sub page > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Sub page > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
background color	Part and State > Sub page > background color	Background color of widget: it can be set by color picker or input RGB value
Background gradient direction	Part and State > Sub page > Background gradient direction	Gradient direction of background color: vertical or horizontal
Opacity	Part and State > Sub page > Opacity	Background opacity: the value should be between 0 and 255
state	Part and State > Btn > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Btn > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
background color	Part and State > Btn > background color	Background color of widget: it can be set by color picker or input RGB value
Background gradient direction	Part and State > Btn > Background gradient direction	Gradient direction of background color: vertical or horizontal
Opacity	Part and State > Btn > Opacity	Background opacity: the value should be between 0 and 255
font color	Part and State > Btn > Font color	Set the Btn font color

4.29 Message box

The message boxes act as pop-ups. They are built from a background Container, a Label, and a Button matrix for buttons.

The text is broken into multiple lines automatically (has `LV_LABEL_LONG_MODE_BREAK`) and the height is set automatically to involve the text and the buttons (`LV_FIT_TIGHT` fit vertically).

Figure 107. Message box in v7

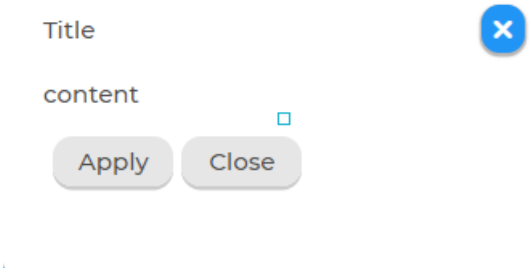


Figure 108. Message box in v8

Table 39 lists the properties of the message box widget.

Table 39. Message box properties

Property	v7	v8	Description
Mbx Button	Attribute > Mbx Button	N/A	Button label in message box
Mbox Text	Attribute > Mbox Text	Attribute > Mbox Text	Message box texts
Mbox Title	N/A	Attribute > Mbox Title	Message box title
Button width, height	N/A	Attribute > Button width, height	Button width, height
Show close btn	N/A	Attribute > Show close btn	The message box can be closed automatically after delay milliseconds with an animation
state	Part and State > Main > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Main > Text color	N/A	Text color in main part: it can be set by color picker or input RGB value
Font family, font size	Part and State > Main > Font family, font size	N/A	Font family and size settings: the size can be a value between 0 and 100
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of main part: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	max: 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Vertical or horizontal
Border color	Part and State > Main > Border color	Part and State > Main > Border color	Border color
Border width	Part and State > Main > Border width	Part and State > Main > Border width	v7max: 4, v8max: 1
Radius	Part and State > Main > Radius	Part and State > Main > Radius	v7max: 20,v8max: 8
state	Part and State > Button background > state	N/A	Style of button bar part: it can be defined by one state or more states
Disable	Part and State > Button background > Disable	N/A	Enable or disable a state. The custom settings are invalidated when a state is disabled.

Table 39. Message box properties*...continued*

Property	v7	v8	Description
Background color	Part and State > Button background > Background color	N/A	Background color of button bar part: it can be set by color picker or input RGB value
Opacity	Part and State > Button Bar > Opacity	N/A	max: 255
Background gradient direction	Part and State > Button background > Background gradient direction	N/A	Vertical or horizontal
Border color	Part and State > Button background > Border color	N/A	Border color
Border width	Part and State > Button background > Border width	N/A	max: 4
Radius	Part and State > Button background > Radius	N/A	max: 20
state	Part and State > Button > state	Part and State > btns > state	Style of button part: it can be defined by one state or more states
Disable	Part and State > Button > Disable	Part and State > btns > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Button > Text color	Part and State > btns > Font color	Text color in button label: it can be set by color picker or input RGB value
Font family, font size	Part and State > Button > Font family, font size	Part and State > btns > Font family, font size	Font family and size settings in the button label: the size can be a value between 0 and 100
Background color	Part and State > Button > Background color	Part and State > btns > Background color	Background color of button part: it can be set by color picker or input RGB value
Opacity	Part and State > Button > Opacity	Part and State > btns > Opacity	max: 255
Background gradient direction	Part and State > Button > Background gradient direction	Part and State > btns > Background gradient direction	Vertical or horizontal
Border color	Part and State > Button > Border color	Part and State > btns > Border color	Border color
Border width	Part and State > Button > Border width	Part and State > btns > Border width	max: 4
Radius	Part and State > Button > Radius	Part and State > btns > Radius	v7max: 20, v8max: 8
state	N/A	Part and State > Title > state	Style of title part: it can be defined by one state or more states
Disable	N/A	Part and State > Title > Disable	Enable or disable a state: The custom settings are invalidated when a state is disabled
Text color	N/A	Part and State > Title > Font color	Font color in title: It can be set by color picker or input RGB value
Font family, font size	N/A	Part and State > Title > Font family, font size	Font family and size settings in the title: the size can be a value between 0 and 100

Table 39. Message box properties...*continued*

Property	v7	v8	Description
Line space & Letter space	N/A	Part and State > Title > Line space & Letter space	Line space and letter space
state	N/A	Part and State > Content > state	Style of content part: it can be defined by one state or more states
Disable	N/A	Part and State > Content > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	N/A	Part and State > Content > Font color	Font color in content: it can be set by color picker or input RGB value
Font family, font size	N/A	Part and State > Content > Font family, font size	Font family and size settings in the content: the size can be a value between 0 and 100
Line space & Letter space	N/A	Part and State > Content > Line space & Letter space	Line space and letter space

4.30 QR code

It generates a QR code based on the input text, typically used for storing URLs or information.

Figure 109. QR code in v8

Table 40 lists the properties of the QR code widget.

Table 40. QR code properties

Property	v8
text	Attribute > text
State	Part and State > Main
Disable	Part and State > Main > Disable
Background color	Part and State > Main > Background color
Background gradient direction	Part and State > Main > Background gradient direction

4.31 Radio button

The radio button allows user to choose only one of a predefined set of mutually exclusive options.

Figure 110. Radio button in v8

Table 41 lists the properties of the QR code widget.

Table 41. Radio button properties

Property	v8	Description
item	Attribute > add item	Add the item for widgets
state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
background color	Part and State > Main > background color	Background color of widget: it can be set by color picker or input RGB value
Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
border color	Part and State > Main > border color	Set the border color
border opacity	Part and State > Main > border opacity	set the opacity of the widget border
border width	Part and State > Main > border width	set the border width
border radius	Part and State > Main > border radius	set the border radius
padding	Part and State > Main > padding	top, right, bottom, left
state	Part and State > Button > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Button > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
background color	Part and State > Button > background color	Button color of widget: it can be set by color picker or input RGB value
Background gradient direction	Part and State > Button > Background gradient direction	Gradient direction of button color: vertical or horizontal
Opacity	Part and State > Button > Opacity	Button opacity: the value should be between 0 and 255
font color	Part and State > Button > font color	Set the button font color
font family & size	Part and State > Button > font family & size	Set the button font family and size
state	Part and State > indicator > state	Style of main part: it can be defined by one state or more states

Table 41. Radio button properties...*continued*

Property	v8	Description
Disable	Part and State > indicator > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
background color	Part and State > indicator > background color	Indicator color of widget: it can be set by color picker or input RGB value
Background gradient direction	Part and State > indicator > Background gradient direction	Gradient direction of indicator color: vertical or horizontal
Opacity	Part and State > indicator > Opacity	Indicator opacity: the value should be between 0 and 255
border color	Part and State > indicator > border color	Set the indicator border color
border opacity	Part and State > indicator > border opacity	Set the indicator border opacity
border width	Part and State > indicator > border width	Set the indicator border radius
border radius	Part and State > indicator > border radius	Set the indicator border radius

4.32 Meter

The meter widget can visualize data in flexible ways. In can show arcs, needles, ticks lines, and labels.

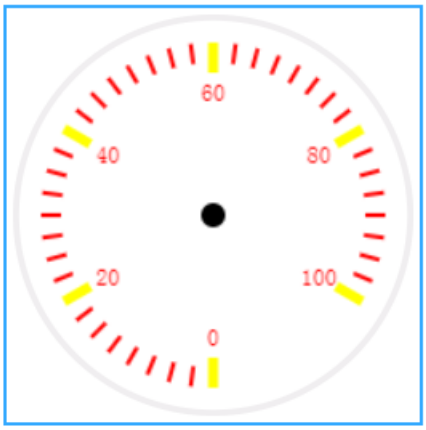


Figure 111. Line meter renamed as Meter in v8

Table 42 lists the properties of the meter widget.

Table 42. Meter properties

Property	v8	Description
Add Dial	Attribute > Add dial	Add multiple dials
Label gap	Attribute > Label gap	Gap between label and radial lines
Tick count & width	Attribute > Tick count & width	Tick counter and width
Tick length & Color	Attribute > Tick length & Color	Tick length and color

Table 42. Meter properties*...continued*

Property	v8	Description
Major enable	Attribute > Major enable	Make some "normal" ticks major ticks
Major index & width	Attribute > Major index & width	major ticket index and width
Major length & Color	Attribute > Major length & Color	major ticket length and color
Range enable	Attribute > Range enable	Set the value and angular range of a scale
Start angle	Attribute > Start angle	Start angles
Angle range	Attribute > Angle range	Angle range
Range min & max	Attribute > Range min & max	Range min and max
Needle add	Attribute > Needle add	Add needle
Needle image add	Attribute > Needle image add	Set image as needle background
Arcs add	Attribute > Arcs add	Add arcs
Scale Lines add	Attribute > Scale Lines add	Add scale lines
state	Part and State > Main > state	Style of the main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Background color of main part: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	max: 255
Background gradient direction	Part and State > Main > Background gradient direction	Vertical or horizontal
state	Part and State > digit > state	Style of digit part: it can be defined by one state or more states
Disable	Part and State > digit > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
font color	Part and State > digit > font color	Font color in digit part: it can be set by color picker or input RGB value
font size, font family	Part and State > digit > font size, font family	Font family and size settings in the digit part: the size can be a value between 0 and 100

4.33 Roller

The roller allows you to select one option from more with scrolling.

Figure 112. Roller in v7

Figure 113. Roller in v8

Table 43 lists the properties of the roller widget.

Table 43. Roller properties

Property	v7	v8	Description
Direction	Attribute > direction	Attribute > direction	Roller mode: Normal mode (roller ends at the end of the options), Infinite mode (roller can be scrolled forever)
Row text	Attribute > Row text	Attribute > Row text	Roller option items, for example, 1,2,3,4,5
Row	Attribute > Row	Attribute > Row	Roller option count
state	Part and State > Background > state	Part and State > Main > state	Style of main part: it can be defined by one state or more states
Disable	Part and State > Background > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Font color	Part and State > Background > Font color	Part and State > Background > Font color	Font color: it can be set by color picker or input RGB value
Font size	Part and State > Background > Font size	Part and State > Background > Font size	N/A

Table 43. Roller properties...*continued*

Property	v7	v8	Description
Font family	Part and State > Background > Font family	Part and State > Background > Font family	N/A
Background color	Part and State > Background > Background color	Part and State > Main > Background color	Background color: it can be set by color picker or input RGB value
Opacity	Part and State > Background > Opacity	Part and State > Main > Opacity	max: 255
Background gradient direction	Part and State > Background > Background gradient direction	Part and State > Main > Background gradient direction	Vertical or horizontal
Border color	Part and State > Background > Border color	Part and State > Main > Border color	Border color
Border width	Part and State > Background > Border width	Part and State > Main > Border width	max: 2
Radius	Part and State > Background > Radius	Part and State > Main > Radius	Radius
state	Part and State > Selected > State	Part and State > Selected > state	Style of indicator part: it can be defined by one state or more states
Disable	Part and State > Selected > Disable	Part and State > Selected > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Selected > Line color	Part and State > Selected > Line color	Line color
Opacity	Part and State > Selected > Opacity	Part and State > Selected > Opacity	max: 255
Background gradient direction	Part and State > Selected > Background gradient direction	Part and State > Selected > Background gradient direction	Vertical or horizontal
Font size & family	Part and State > Selected > Font size & family	Part and State > Selected > Font size & family	N/A

4.34 Slider

The slider object looks like a Bar supplemented with a knob. The knob can be dragged to set a value. The slider can be vertical or horizontal.

Figure 114. Slider in v7

Figure 115. Slider in v8

Table 44 lists the properties of the slider widget.

Table 44. Slider properties

Property	v7	v8	Description
Max& Init Value	Attribute > Max& Init Value	Attribute > Max& Init Value	To set an initial value in special range value (Min: 0, Max: 100)
state	Part and State > Main > state	Part and State > Main > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Background image	N/A	Part and State > Main > bg image	Set the background image with widget size
Border color	Part and State > Main > Border color	N/A	Color of border: it can be set by color picker or input RGB value
Border opacity	Part and State > Main > Border opacity	N/A	Background opacity of head part: the value should be between 0 and 255
Border Radius	Part and State > Main > Border Radius	N/A	Radius of Border: 0-200
Outline color	N/A	Part and State > Main > Outline color	Color of Outline: it can be set by color picker or input RGB value
Outline opacity	N/A	Part and State > Main > Outline opacity	Outline opacity: the value should be between 0 and 255
Outline width	N/A	Part and State > Main > Outline width	Border width of outline: the value can be 1 or 5
Outline Radius	N/A	Part and State > Main > Outline Radius	Radius of outline: 0-200
state	Part and State > Indicator > state	Part and State > Indicator > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Indicator > Disable	Part and State > Indicator > Disable	Enable or disable a state: the custom settings are invalidated when a state is disabled
Background color	Part and State > Indicator > Background color	Part and State > Indicator > Background color	Background color of widget: it can be set by color picker or input RGB value

Table 44. Slider properties...*continued*

Property	v7	v8	Description
Opacity	Part and State > Indicator > Opacity	Part and State > Indicator > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Indicator > Background gradient direction	Part and State > Indicator > Background gradient direction	Gradient direction of background color: vertical or horizontal
Background image	N/A	Part and State > Main > bg image	Set the background image with widget size
state	Part and State > Knob > state	Part and State > Knob > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Knob > Disable	Part and State > Knob > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Knob > Background color	Part and State > Knob > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Knob > Opacity	Part and State > Knob > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Knob > Background gradient direction	Part and State > Knob > Background gradient direction	Gradient direction of background color: vertical or horizontal
Background image	N/A	Part and State > Main > bg image	Set the background image with widget size

4.35 Spangroup

A spangroup is the object that is used to display rich text. Different from the label object, spangroup can render text styled with different fonts, colors, and sizes into the spangroup object.

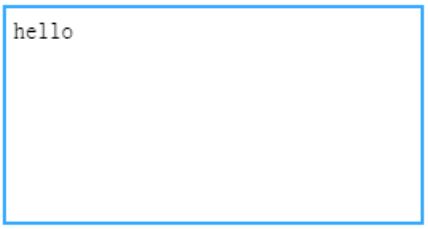


Figure 116. Spangroup in v8

Table 45 lists the properties of the spangroup widget.

Table 45. Spangroup properties

Property	v8	Description
Text	Attribute > Text	The object that is used to display rich text
Text align	Attribute > Text align	Set the span group to a different align mode (left/right/center/auto)

Table 45. Spangroup properties...*continued*

Property	v8	Description
Mode	Attribute > Mode	Set the span group to different mode (Fixed/Expand/Break)
items	Attribute > items	Add one new item of Text
font color	Attribute > font color	Text color in disabled part: it can be set by color picker or input RGB value
Font family, font size	Attribute > Font family, font size	Font family and size settings in the window content: the size can be a value between 0 and 100
state	Part and State > Main > state	State of header part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Background color of Symbol part: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Background opacity of Symbol part: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color in Symbol part: vertical or horizontal
Border color	Part and State > Main > Border color	Border color in ticks part: it can be set by color picker or input RGB value
Border width	Part and State > Main > Border width	Width of border line: value can be one value from 0 to 1
padding top, bottom, left, right	Part and State > Main > padding top, bottom, left, right	The padding value of top, bottom, left, and right; value can be one value from 0 to 200

4.36 Spinbox

The spinbox contains a number as text which can be increased or decreased by *Keys* or API functions. Under the hood, the spinbox is a modified Text area.

Figure 117. Spinbox in v7

Figure 118. Spinbox in v8

Table 46 lists the properties of the spinbox widget.

Table 46. Spinbox properties

Property	v7	v8	Description
Digit	Attribute > Digit	Attribute > Digit	Sets the number format
state	Part and State > Main > state	Part and State > Main > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Main > Text color	Part and State > Main > Font color	Text color in head part: it can be set by color picker or input RGB value
Font size, font family	Part and State > Main > Font size, font family	Part and State > Main > Font size, font family	Font family and size settings in the calendar header: The size can be a value between 0 and 100
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Border color	Part and State > Main > Border color	Part and State > Main > Border color	Color of border: it can be set by color picker or input RGB value
Border width	Part and State > Main > Border width	Part and State > Main > Border width	Border width: the value can be 1 or 5
Radius	Part and State > Main > Radius	Part and State > Main > Radius	Radius of Border: 0-200
state	Part and State > Cursor > state	Part and State > Cursor > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Cursor > Disable	Part and State > Cursor > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Font size, font family	Part and State > Cursor > Font size, font family	Part and State > Cursor > Font size, font family	Font family and size settings in the calendar header: the size can be a value between 0 and 100
Background color	Part and State > Cursor > Background color	Part and State > Cursor > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Cursor > Opacity	Part and State > Cursor > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Cursor > Background gradient direction	Part and State > Cursor > Background gradient direction	Gradient direction of background color: vertical or horizontal
state	Part and State > Buttons > state	Part and State > Button > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Buttons > Disable	Part and State > Button > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.

Table 46. Spinbox properties...*continued*

Property	v7	v8	Description
Font size, font family	Part and State > Buttons > Font size, font family	Part and State > Button > Font size, font family	Font family and size settings in the calendar header: the size can be a value between 0 and 100
Background color	Part and State > Buttons > Background color	Part and State > Button > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Buttons > Opacity	Part and State > Button > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Buttons > Background gradient direction	Part and State > Button > Background gradient direction	Gradient direction of background color: vertical or horizontal
Border color	Part and State > Buttons > Border color	Part and State > Button > Border color	Color of border: it can be set by color picker or input RGB value
Border width	Part and State > Buttons > Border width	Part and State > Button > Border width	Border width: the value can be 1 or 5
Radius	Part and State > Buttons > Radius	Part and State > Button > Radius	Radius of Border: 0-200

4.37 Spinner

The spinner object is a spinning arc over a border.

Figure 119. Spinner in v7

Figure 120. Spinner in v8

Table 47 lists the properties of the spinner widget.

Table 47. Spinner properties

Property	v7	v8	Description
Length	Attribute > Length	Attribute > Length	Sets the length of the spinning arc in degrees: the max: 359
Time	Attribute > Time	Attribute > Time	Sets the spin time in milliseconds
state	Part and State > Main > state	Part and State > Main > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
padding top, bottom, left, right	Part and State > Main > padding top, bottom, left, right	Part and State > Main > padding top, bottom, left, right	Padding of the scale: 0-200
Line color	Part and State > Main > Line color	Part and State > Main > Arc color	Color of Line: it can be set by color picker or input RGB value
Line width	Part and State > Main > Line width	Part and State > Main > Arc width	Line width: the value can be 1 or 20
Line rounded	Part and State > Main > Line rounded	Part and State > Main > Line rounded	Enable the line rounded
state	Part and State > indicator > state	Part and State > indicator > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > indicator > Disable	Part and State > indicator > Disable	Enable or disable a state: the custom settings are invalidated when a state is disabled
Line color	Part and State > indicator > Line color	Part and State > indicator > Arc color	Color of Line: it can be set by color picker or input RGB value
Line width	Part and State > indicator > Line width	Part and State > indicator > Arc width	Line width: the value can be 1 or 20
Line rounded	Part and State > Main > Line rounded	Part and State > Main > Line rounded	Enable the line rounded

4.38 Switch

The switch can be used to turn on/off something. It looks like a little slider.

Figure 121. Switch in v7

Figure 122. Switch in v8

Table 48 lists the properties of the switch widget.

Table 48. Switch properties

Property	v7	v8	Description
Animtime	Attribute > Animtime	N/A	Set the time of animations, when the switch changes state
state	Part and State > Main > state	Part and State > Main > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Background image	N/A	Part and State > Main > bg image	Set the background image with widget size
Radius	Part and State > Main > Radius	Part and State > Main > Radius	Radius of Border: 0-200
state	Part and State > Indicator > state	Part and State > Indicator > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Indicator > Disable	Part and State > Indicator > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Indicator > Background color	Part and State > Indicator > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Indicator > Opacity	Part and State > Indicator > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Indicator > Background gradient direction	Part and State > Indicator > Background gradient direction	Gradient direction of background color: vertical or horizontal
Background image	N/A	Part and State > Main > bg image	Set the background image with widget size
Radius	Part and State > Indicator > Radius	Part and State > Indicator > Radius	Radius of Border: 0-200
state	Part and State > Knob > state	Part and State > Knob > state	Style of highlight part: it can be defined by one state or more states
Disable	Part and State > Knob > Disable	Part and State > Knob > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.

Table 48. Switch properties...*continued*

Property	v7	v8	Description
Background color	Part and State > Knob > Background color	Part and State > Knob > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Knob > Opacity	Part and State > Knob > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Knob > Background gradient direction	Part and State > Knob > Background gradient direction	Gradient direction of background color: vertical or horizontal

4.39 Table

The tables, as usual, are built from rows, columns, and cells containing texts.

The Table object is lightweight because only the texts are stored. No real objects are created for cells but they are drawn on the fly.

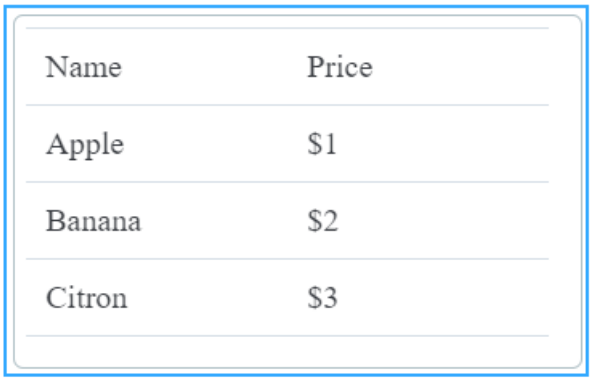


Figure 123. Table in v7

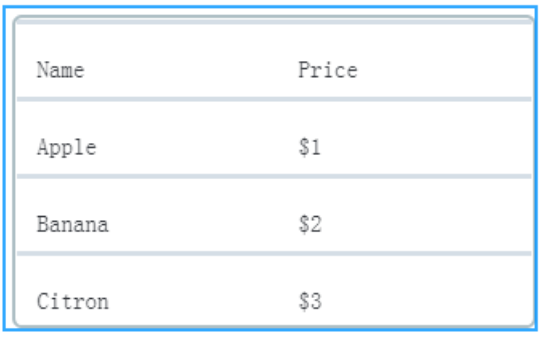


Figure 124. Table in v8

Table 49 lists the properties of the table widget.

Table 49. Table properties

Property	v7	v8	Description
Column and row	Attribute > Column and row	Attribute > Column and row	Column number and row number of table: they should be one value from 1 to 300
Column and row content	Attribute > Column and row content	Attribute > Column and row content	Content of column and row: the contents of each row and column are separated by commas
state	Part and State > main > state	Part and State > main > state	State of main part: it can be defined by one state or more states
Disable	Part and State > main > Disable	Part and State > main > Disable	Enable or disable a state, the custom settings are invalidated when a state is disabled.
Font color	Part and State > main > Font color	N/A	Text color of item: it can be set by color picker or input RGB value
Font family & size	Part and State > main > Font family & size	N/A	N/A
Background color	Part and State > main > Background color	Part and State > main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > main > Opacity	Part and State > main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > main > Background gradient direction	Part and State > main > Background gradient direction	Gradient direction of background color: vertical or horizontal
border color	Part and State > main > border color	Part and State > main > border color	Color of border: it can be set by color picker or input RGB value
border width	Part and State > main > border width	Part and State > main > border width	Width of border line: value can be one value from 0 to 2
padding top, bottom, left, right	Part and State > main > padding top, bottom, left, right	Part and State > main > padding top, bottom, left, right	The padding value of top, bottom, left, and right; value can be one value from 0 to 200
state	Part and State > items > state	Part and State > items > state	State of items part: it can be defined by one state or more states
Disable	Part and State > items > Disable	Part and State > items > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
border color	Part and State > items > Border color	Part and State > items > Border color	Color of item border: it can be set by color picker or input RGB value
Border width	Part and State > items > Border width	Part and State > items > Border width	Width of item border line: value can be one value from 0 to 2
Background color	N/A	Part and State > items > Background color	Background color of items part: it can be set by color picker or input RGB value
Opacity	N/A	Part and State > items > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	N/A	Part and State > items > Background gradient direction	Gradient direction of background color: vertical or horizontal
Font color	N/A	Part and State > items > Font color	Text color of item: it can be set by color picker or input RGB value
Font family, font size	N/A	Part and State > items > Font family, font size	Font family and size settings of item content: the size can be a value between 0 and 100

4.40 Tab view

The tab view object is used to organize content in tabs.

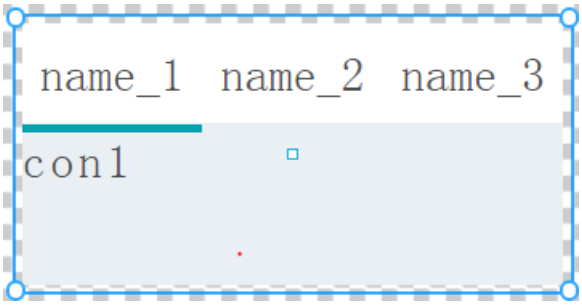


Figure 125. Tab in v7

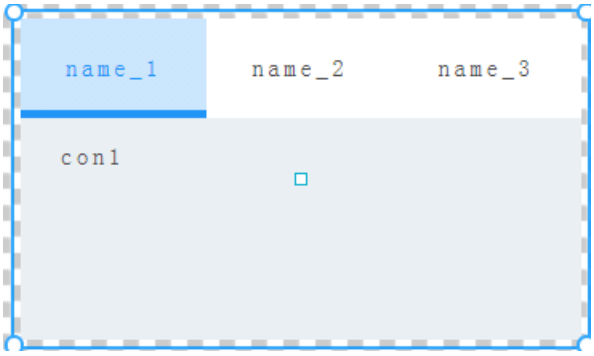


Figure 126. Tab in v8

Table 50 lists the properties of the tab view widget.

Table 50. Tab view properties

Property	v7	v8	Description
Animation	Attribute > Animation	N/A	Animation time of tab view when a new tab is loaded: the value should be one value from 0 to 3000
Contents	Attribute > Contents	Attribute > Contents	The title and content of tab page
Tab Height	N/A	Attribute > Tab size	The height of Tab title part
Tab Position	N/A	Attribute > Tab Position	The position of tab: the value can be top, bottom, left, and right
state	Part and State > Main > state	Part and State > Main > state	State of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled
Text color	Part and State > Main > Text color	Part and State > Main > Text color	Content text color in each tab page: it can be set by color picker or input RGB value
Font family, font size	Part and State > Main > Font family, font size	Part and State > Main > Font family, font size	Font family and size settings of tab content: the size can be a value between 0 and 100
Letter spacing	Part and State > Main > Letter spacing	Part and State > Main > Letter spacing	The letter space: the space can be a value between 0 and 100

Table 50. Tab view properties*...continued*

Property	v7	v8	Description
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of main part: it can be set by color picker or input RGB value
Background Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
border color	Part and State > Main > border color	Part and State > Main > border color	Color of border: it can be set by color picker or input RGB value
border width	Part and State > Main > border width	Part and State > Main > border width	Width of border line: value can be one value from 0 to 5
border opacity	Part and State > Main > border opacity	Part and State > Main > border opacity	border opacity: the value should be between 0 and 255
state	Part and State > Indic > state	N/A	State of indic part: it can be defined by one state or more states
Disable	Part and State > Indic > Disable	N/A	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Indic > Background color	N/A	Background color of Indic part: it can be set by color picker or input RGB value
Opacity	Part and State > Indic > Opacity	N/A	Indic opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Indic > Background gradient direction	N/A	Gradient direction of Indic background color: vertical or horizontal
state	Part and State > Tab main > state	Part and State > Tab > state	State of Tab part: it can be defined by one state or more states
Disable	Part and State > Tab main > Disable	Part and State > Tab > Disable	Enable or disable a state: the custom settings are invalidated when a state is disabled
Background color	Part and State > Tab main > Background color	Part and State > Tab > Background color	Background color of Tab part: it can be set by color picker or input RGB value
Opacity	Part and State > Tab main > Opacity	Part and State > Tab > Opacity	Tab Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Tab main > Background gradient direction	Part and State > Tab > Background gradient direction	Gradient direction of background color: vertical or horizontal
Border width	Part and State > Tab main > Border width	Part and State > Tab > Border width	Width of Tab border line: value can be one value from 0 to 5
border color	Part and State > Tab main > Border color	Part and State > Tab > Border color	Color of border: it can be set by color picker or input RGB value
Board size	Part and State > Tab main > Board size	Part and State > Tab > Board size	Board width and board radius

Table 50. Tab view properties...*continued*

Property	v7	v8	Description
state	Part and State > Tab > state	Part and State > items > state	State of Button part: it can be defined by one state or more states
Disable	Part and State > Tab > Disable	Part and State > items > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Tab > Text color	N/A	Text color in Button part: it can be set by color picker or input RGB value
Letter spacing	Part and State > Tab > Letter spacing	N/A	The letter space: the space can be a value between 0 and 100
Background color	N/A	Part and State > items > Background color	Background color of Button part: it can be set by color picker or input RGB value
Background Opacity	N/A	Part and State > items > Opacity	Opacity of Button part: the value should be between 0 and 255
Background gradient direction	N/A	Part and State > items > Background gradient direction	Gradient direction of Button part background color: vertical or horizontal
border color	N/A	Part and State > items > border color	Color of button border: it can be set by color picker or input RGB value
border width	N/A	Part and State > items > border width	Width of button border line: the value can be one value from 0 to 5
border opacity	N/A	Part and State > items > border opacity	Border opacity: the value should be between 0 and 255

4.41 Text area

The text area is a Page with a Label and a cursor on it. Texts or characters can be added to it. Long lines are wrapped and when the text becomes long enough the Text area can be scrolled.

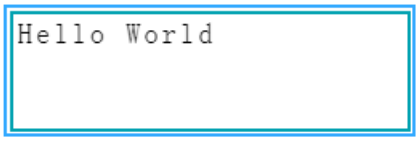


Figure 127. Text area in v7

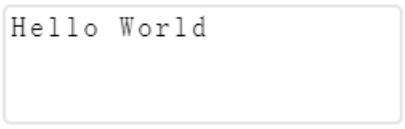


Figure 128. Text area in v8

Table 51 lists the properties of the text area widget.

Table 51. Text area properties

Property	v7	v8	Description
Text	Attribute > Text	Attribute > Text	Widget text
Keyboard	Attribute > Keyboard	Attribute > Keyboard	Enable the input keyboard
Chinese input	N/A	Attribute > Chinese input	Enable the Chinese input
state	Part and State > Main > state	Part and State > Main > state	State of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	N/A	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	N/A	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	N/A	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Font	N/A	Part and State > Main > Align	Set the alignment of the text
Font color	Part and State > Main > Font color	Part and State > Main > Font color	Text color in main part: it can be set by color picker or input RGB value
Font family, font size	Part and State > Main > Font family, font size	Part and State > Main > Font family, font size	Font family and size settings in the window content: the size can be a value between 0 and 100
Letter spacing	Part and State > Main > Letter spacing	Part and State > Main > Letter spacing	The letter space: the space can be a value between 0 and 100
Border color	Part and State > Main > Border color	Part and State > Main > Border color	Color of border: it can be set by color picker or input RGB value
Border width	Part and State > Main > Border width	Part and State > Main > Border width	Width of border line: value can be one value from 0 to 5
Radius	Part and State > Main > Radius	Part and State > Main > Radius	Radius of Border: 0-200
state	Part and State > scrollbar > state	Part and State > scrollbar > state	State of Scrollable part: it can be defined by one state or more states
Disable	Part and State > scrollbar > Disable	Part and State > scrollbar > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > scrollbar > Background color	Part and State > scrollbar > Background color	Background color of Scrollable part: it can be set by color picker or input RGB value
Opacity	Part and State > scrollbar > Opacity	Part and State > scrollbar > Opacity	Scrollable opacity: the value should be between 0 and 255
Background gradient direction	Part and State > scrollbar > Background gradient direction	Part and State > scrollbar > Background gradient direction	Gradient direction of background color: vertical or horizontal

4.42 Text progress bar

The text progress bar displays the progress by a percent number which can include a custom number of decimals.

Figure 129. Text progress bar in v8

Table 52 lists the properties of the text progress bar widget.

Table 52. Text progress bar properties

Property	v8	Description
Range	Attribute > textprogress	N/A
Step	Attribute > Step	N/A
Initial value	Attribute > Initial value	N/A
Decimals	Attribute > Decimals	N/A
State	Part and State > Main	N/A
Disable	Part and State > Main > Disable	N/A
Background color	Part and State > Main > Background color	N/A
Opacity	Part and State > Main > Opacity	N/A
Background gradient direction	Part and State > Main > Background gradient direction	N/A
Font color	Part and State > Main > Font color	N/A
Font size, font family	Part and State > Main > Font size, font family	N/A
Letter spacing	Part and State > Main > Letter spacing	N/A
Padding top, bottom, left, right	Part and State > Main > Padding top, bottom, left, right	N/A

4.43 Tileview

The Tileview is a container object where its elements (called *tiles*) can be arranged in a grid form. By swiping, the user can navigate between the tiles.

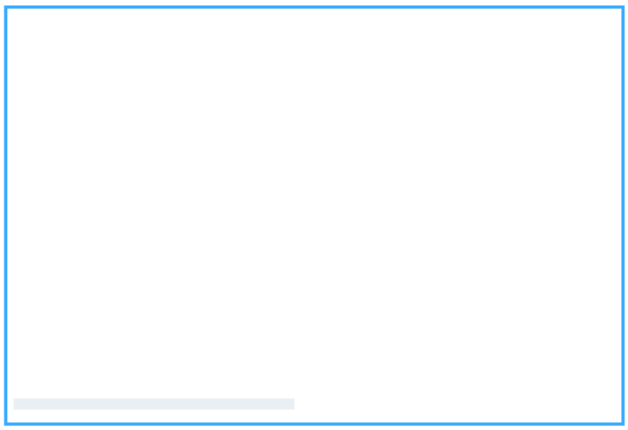


Figure 130. Tileview in v7

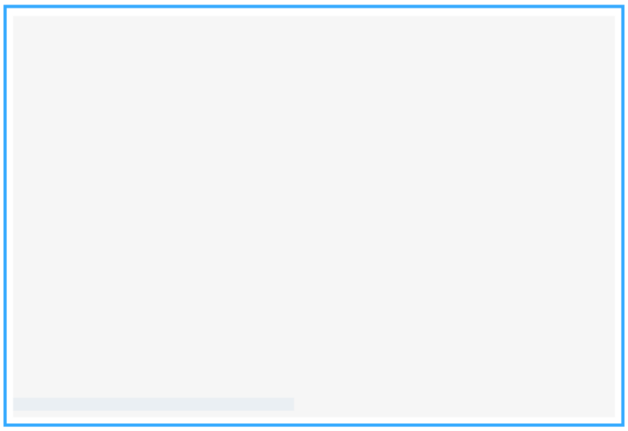


Figure 131. Tileview in v8

Table 53 lists the properties of the tileview widget.

Table 53. Tileview properties

Property	v7	v8	Description
Animation	Attribute > Animation	N/A	Animation time of widget when a tile is loaded: the value should be one value from 0 to 3000
Direction	Attribute > Direction	Attribute > Direction	The direction to change the tile: it can be horizon or vertical
Page	Attribute > Page, Name	Attribute > Page, Name	Add new tile and set tile title
state	Part and State > Main > state	Part and State > Main > state	State of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state: the custom settings are invalidated when a state is disabled
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value

Table 53. Tileview properties*...continued*

Property	v7	v8	Description
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Radius	Part and State > Main > Radius	Part and State > Main > Radius	Radius of Border: 0-200
state	Part and State > Flash > state	N/A	State of Flash part: it can be defined by one state or more states
Disable	Part and State > Flash > Disable	N/A	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Flash > Background color	N/A	Background color of Flash part: it can be set by color picker or input RGB value
Opacity	Part and State > Flash > opacity	N/A	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Flash > Background gradient direction	N/A	Gradient direction of background color: vertical or horizontal
Radius	Part and State > Flash > Radius	N/A	Border Radius of Flash part: 0-200
state	Part and State > scrollbar > state	Part and State > scrollbar > state	State of Scrollable part: it can be defined by one state or more states
Disable	Part and State > scrollbar > Disable	Part and State > scrollbar > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > scrollbar > Background color	Part and State > scrollbar > Background color	Background color of Scrollable part: it can be set by color picker or input RGB value
Opacity	Part and State > scrollbar > Opacity	Part and State > scrollbar > Opacity	Background opacity of Scrollable part: the value should be between 0 and 255
Background gradient direction	Part and State > scrollbar > Background gradient direction	Part and State > scrollbar > Background gradient direction	Gradient direction of background color: vertical or horizontal

4.44 Video

It can play video files of *.h264 format, which can be converted from other formats using FFmpeg.

Figure 132. Video in v8

Table 54 lists the properties of the video widget.

Table 54. Video properties

Property	v8	Description
video file	Attribute > videoFile	Only supports h264 file

4.45 Window

The window is container-like objects built from a header with a title, a button, and a content area.

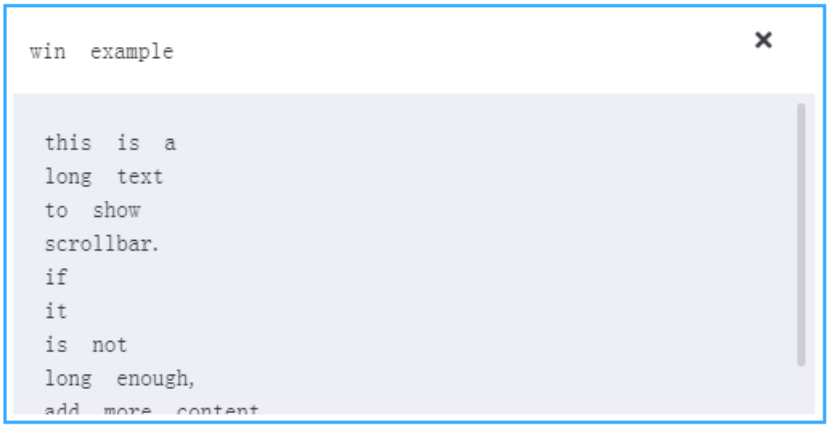


Figure 133. Window in v7

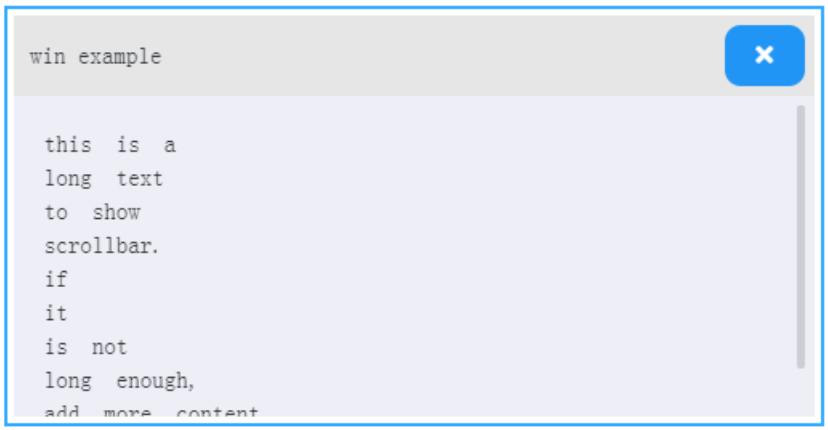


Figure 134. Window in v8

Table 55 lists the properties of the window widget.

Table 55. Window properties

Property	v7	v8	Description
Head size	N/A	Attribute > Height	Header height
Title	Attribute > Title	Attribute > Title	The title of window
Text	Attribute > Text	Attribute > Text	The detailed content text of window
BTNS	Attribute > Button > image path, image size, symbol	Attribute > Button > image path, image size, button size, symbol	Button size is the button width, and image path and image size is the image setting on the button. Symbol defines the symbol on button.
state	Part and State > Main > state	Part and State > Main > state	State of main part: it can be defined by one state or more states
Disable	Part and State > Main > Disable	Part and State > Main > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Background color	Part and State > Main > Background color	Part and State > Main > Background color	Background color of widget: it can be set by color picker or input RGB value
Opacity	Part and State > Main > Opacity	Part and State > Main > Opacity	Background opacity: the value should be between 0 and 255
Background gradient direction	Part and State > Main > Background gradient direction	Part and State > Main > Background gradient direction	Gradient direction of background color: vertical or horizontal
Border color	Part and State > Main > Border color	N/A	Color of border: it can be set by color picker or input RGB value
Border width	Part and State > Main > Border width	N/A	Width of border line: value can be one value from 0 to 12
state	Part and State > Content > state	Part and State > Content > state	State of content part: it can be defined by one state or more states
Disable	Part and State > Content > Disable	Part and State > Content > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.

Table 55. Window properties*...continued*

Property	v7	v8	Description
Text color	Part and State > Content > Text color	Part and State > Content > Text color	Text color in content part: it can be set by color picker or input RGB value
Font size, font family	Part and State > Content > Font size, font family	Part and State > Content > Font size, font family	Font family and size settings in the window content: the size can be a value between 0 and 100
Background color	Part and State > Content > Background color	Part and State > Content > Background color	Background color of content part: it can be set by color picker or input RGB value
Opacity	Part and State > Content > opacity	Part and State > Content > opacity	Background opacity of content part: the value should be between 0 and 255
Background gradient direction	Part and State > Content > Background gradient direction	Part and State > Content > Background gradient direction	Gradient direction of background color in content part: vertical or horizontal
state	Part and State > Header > state	Part and State > Header > state	State of header part: it can be defined by one state or more states
Disable	Part and State > Header > Disable	Part and State > Header > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Text color	Part and State > Header > Text color	Part and State > Header > Text color	Text color in header part: it can be set by color picker or input RGB value
Font size, font family	Part and State > Header > Font size, font family	Part and State > Header > Font size, font family	Font family and size settings in the window content: the size can be a value between 0 and 100
Background color	Part and State > Header > Background color	Part and State > Header > Background color	Background color of header part: it can be set by color picker or input RGB value
Opacity	Part and State > Header > opacity	Part and State > Header > opacity	Background opacity of header part: the value should be between 0 and 255
Background gradient direction	Part and State > Header > Background gradient direction	Part and State > Header > Background gradient direction	Gradient direction of background color in header part: vertical or horizontal
state	Part and State > Buttons > state	Part and State > Button > state	State of Symbol part: it can be defined by one state or more states
Disable	Part and State > Buttons > Disable	Part and State > Button > Disable	Enable or disable a state. The custom settings are invalidated when a state is disabled.
Opacity	Part and State > Buttons > Opacity	Part and State > Button > Opacity	Background opacity of Symbol part: the value should be between 0 and 255
Background color	Part and State > Buttons > Background color	Part and State > Button > Background color	Background color of Symbol part: it can be set by color picker or input RGB value
Background gradient direction	Part and State > Buttons > Background gradient direction	Part and State > Button > Background gradient direction	Gradient direction of background color in Symbol part: vertical or horizontal

5 Event details

The currently supported triggers and actions are listed below. Table 56 shows some frequently used triggers.

Table 56. Common triggers

Label	Trigger name
1	Clicked
2	Short clicked
3	Pressed
4	pressing
5	Press lost
6	Long pressed
7	Long pressed repeat
8	Released
9	Value changed

Table 57 shows triggers which only work for specific widgets.

Table 57. Special trigger

Label	Trigger name
1	Scroll
2	Scroll begin
3	Scroll end
4	Focused
5	Defocused
6	Leave
7	Hit test
8	Key

Table 58 shows triggers which are specific to the screen.

Table 58. Screen-specific triggers

Label	Trigger name
1	Screen loaded
2	Screen unloaded
3	Screen unload start
4	Screen load start
5	Gesture left
6	Gesture right
7	Gesture top
8	Gesture bottom

Table 59 shows all widgets which support the following actions.

Table 59. Common actions

Label	Action name	Description
1	Visibility	Include hide and show
2	Add flag	The flag table is consistent with the attributes
3	Clear flag	The flag table is consistent with the attributes
4	Add state	Set the style state
5	Set text	Set the widget text, font size, family
6	Width, height	Set the size of the widget
7	Position	Set the target widget position
8	Background color, Gradient	Set the background style
9	Opacity	Set the widget background opacity, 0-255
10	Custom code	Add the custom code

Table 60 shows all animation actions.

Table 60. Animation action

Label	Action name	Description
1	Move	Support play time, repeat, type
2	Scale	Dynamically changing widget size
3	Rotate	Supports only image widget
4	Image zoom	Set the zoom size; max value is 300 %

Note: *If the repeat value is -1, the animation runs infinite times.*

6 LVGL hardware acceleration

LVGL is a software library that fully implements and customizes a graphical user interface (drawing, partial screen refresh, input events, and animations). LVGL has software pixel-based draw engine. Several drawing features in LVGL are performed by hardware (HW) accelerators instead of CPU.

To use the CPU time while HW accelerator is running, an RTOS is required to block the LVGL drawing thread and switch to another task, or idle task, where CPU is suspended to save power. The HW accelerators process pixels faster than CPU resulting in a higher frame rendering rate.

GUI Guider can enable and disable the PXP or VGLite accelerator for the devices that support these features.

Note: *It is possible to enable or disable the HW accelerator manually.*

Table 61. LVGL hardware acceleration

Accelerator	i.MX RT1050	i.MX RT1062	i.MX RT1064	i.MX RT1170	i.MX RT1160	i.MX RT595
PXP	√	√	√	√	√	**X**
VGLite	**X**	**X**	**X**	√	√	√

6.1 PXP enablement

Enable the PXP accelerator in GUI Guider.

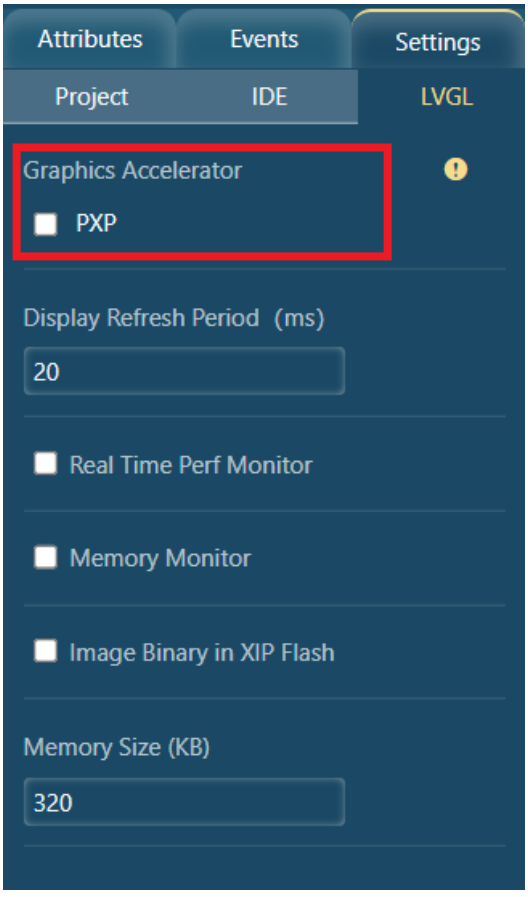


Figure 135. Enable PXP

To enable the PXP accelerator on NXP devices, set the below flag in `lv_conf.h`. This is required as currently only the color format RGB565 (16 bits) is accelerated on NXP devices.

```
#define LV_COLOR_DEPTH 16
```

PXP is a pixel processing HW engine. To check whether PXP is available on your NXP device, see the Reference Manual document or the board configuration.

To enable PXP in LVGL, set the below flags to 1 in `lv_conf.h`.

```
#define LV_USE_GPU 1
#define LV_USE_GPU_NXP_PXP 1
#define LV_USE_GPU_NXP_PXP_AUTO_INIT 1
```

In LVGL, PXP is used to accelerate:

- Area fill + optional transparency
- BLIT (Block image transfer) + optional transparency
- Color keying + optional transparency
- Recoloring (color tint) + optional transparency

6.2 VGLite enablement

Enable the VGLite accelerator in GUI Guider.

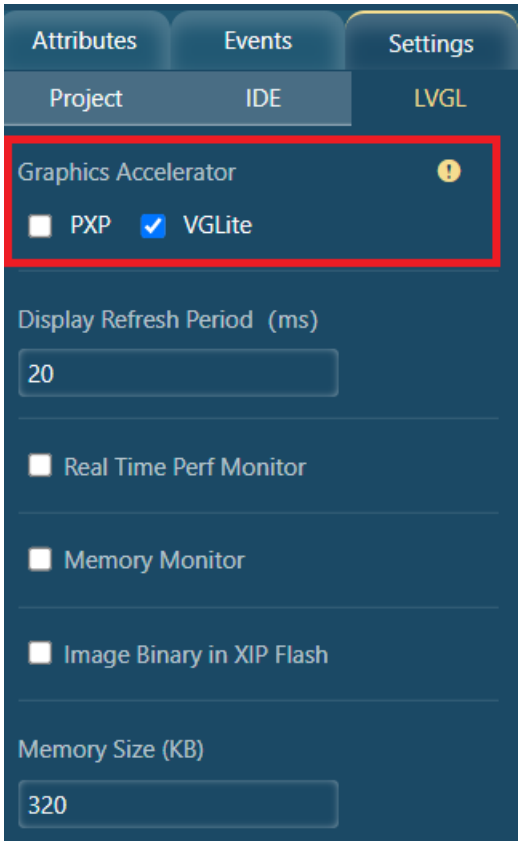


Figure 136. VGLite enablement

To enable the VGLite accelerator on NXP devices, set the below flag in `lv_conf.h`. This is required as currently only the color format RGB565 (16 bits) is accelerated on NXP devices.

```
#define LV_COLOR_DEPTH 16
```

VGLite is an API that uses the vector/raster 2D GPU. To check whether 2D GPU is available on your NXP device, see the Reference Manual document or the board configuration.

To enable VGLite in LVGL, set the below flags to 1 in `lv_conf.h`.

```
#define LV_USE_GPU 1
#define LV_USE_GPU_NXP_VG_LITE 1
```

In LVGL, VGLite is used to accelerate:

- Area fill + optional transparency
- BLIT (Block image transfer) + optional transparency

6.3 Recommendations to improve acceleration

This section lists general and VGLite recommendations to improve acceleration.

6.3.1 General recommendations

As a rule when a hardware accelerator processes many pixels in a single batch, it provides better performance than processing small number of pixels multiple times.

The reasons are:

1. **Caches**: Pixels previously processed by CPU are loaded in cache, and must be cleaned and invalidated. The operation takes a few cycles.
2. **Setup time**: Each time HW is used to process pixels, the associated driver configures HW registers. This operation also takes a few cycles.

Therefore, NXP has defined a threshold for the minimum number of pixels necessary to trig HW acceleration. These thresholds are defined as preprocessor variables.

For PXP, default values are defined in `lv_gpu/lv_gpu_nxp_pxp.h`.

- **LV_GPU_NXP_PXP_BLIT_SIZE_LIMIT**: Size threshold for image BLIT, BLIT with color keying, and BLIT with recolor (OPA > LV_OPA_MAX).
- **LV_GPU_NXP_PXP_BLIT_OPA_SIZE_LIMIT**: Size threshold for image BLIT and BLIT with color keying with transparency (OPA < LV_OPA_MAX).
- **LV_GPU_NXP_PXP_FILL_SIZE_LIMIT**: Size threshold for fill operation (OPA > LV_OPA_MAX).
- **LV_GPU_NXP_PXP_FILL_OPA_SIZE_LIMIT**: Size threshold for fill operation with transparency (OPA < LV_OPA_MAX).

For VGLite, default values are defined `lv_gpu/lv_gpu_nxp_vglite.h`.

- **LV_GPU_NXP_VG_LITE_BLIT_SIZE_LIMIT**: Size threshold for image BLIT (OPA > LV_OPA_MAX).
- **LV_GPU_NXP_VG_LITE_BLIT_OPA_SIZE_LIMIT**: Size threshold for image BLIT with transparency (OPA < LV_OPA_MAX).
- **LV_GPU_NXP_VG_LITE_FILL_SIZE_LIMIT**: Size threshold for fill operation (OPA > LV_OPA_MAX).
- **LV_GPU_NXP_VG_LITE_FILL_OPA_SIZE_LIMIT**: Size threshold for fill operation with transparency (OPA < LV_OPA_MAX).

6.3.2 VGLite recommendations

The 2D GPU behind VGLite has some constraints on the processed buffers:

1. **Address alignment**: Always ensure that the FrameBuffer and pixel buffers are aligned to `LV_ATTRIBUTE_MEM_ALIGN_SIZE`. Use the macro `LV_ATTRIBUTE_MEM_ALIGN` as attribute for statically allocated pixel buffers.
2. **Stride**: Stride is the byte offset between 2 lines of pixels. 2D GPU requires a stride multiple of 16 pixels.

In LVGL: stride = width, so use assets and widgets with a width multiple of 16 pixels.

On platforms like i.MX RT1170 which has both PXP and 2D GPU, prefer 2D GPU as it draws faster than PXP. However, if the GUI contains many pre-rendered semi-transparent images, PXP may be better.

On platforms with only 2D GPU acceleration (VGLite), try to draw widgets rather than using pre-rendered images as widget, as semi-transparent image blitting is not yet accelerated.

7 Performance

The high graphics performance means a high frame rate (FPS) with required graphical effects. This section provides the introduction to enable/disable FPS/CPU usage monitor and the tips on how to improve the graphics performances on NXP MCU devices. i.MX RT595 is used as an example platform for performance optimization.

7.1 Performance monitor enablement

In actual development, if we want to know the performance of the app, perform the following steps:

1. Enable the performance monitor in GUI Guider.
2. Check the real-time performance results in simulator.

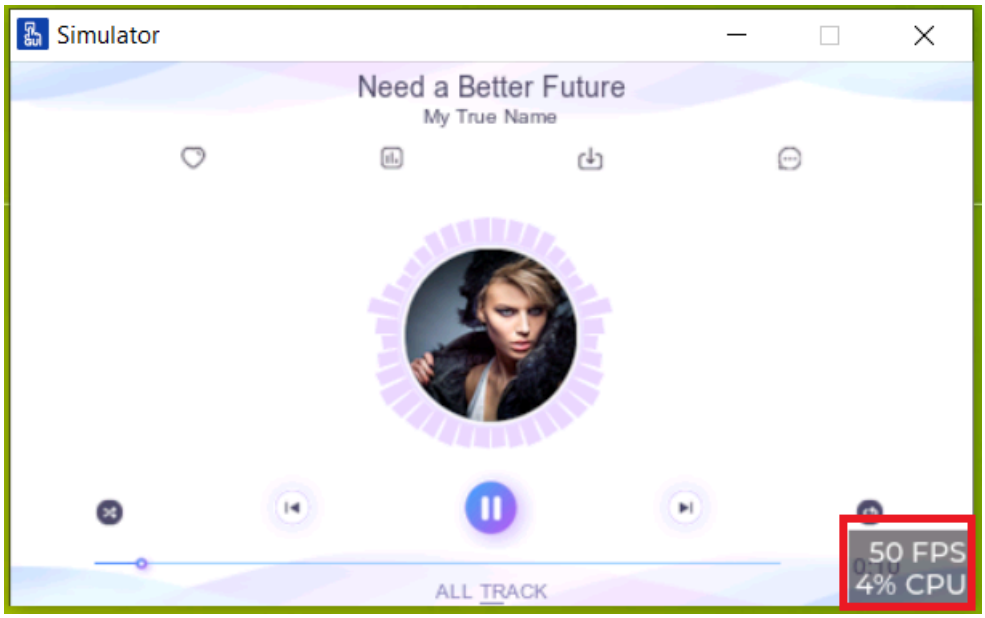


Figure 137. Performance monitor

3. Check the real-time performance results on boards.

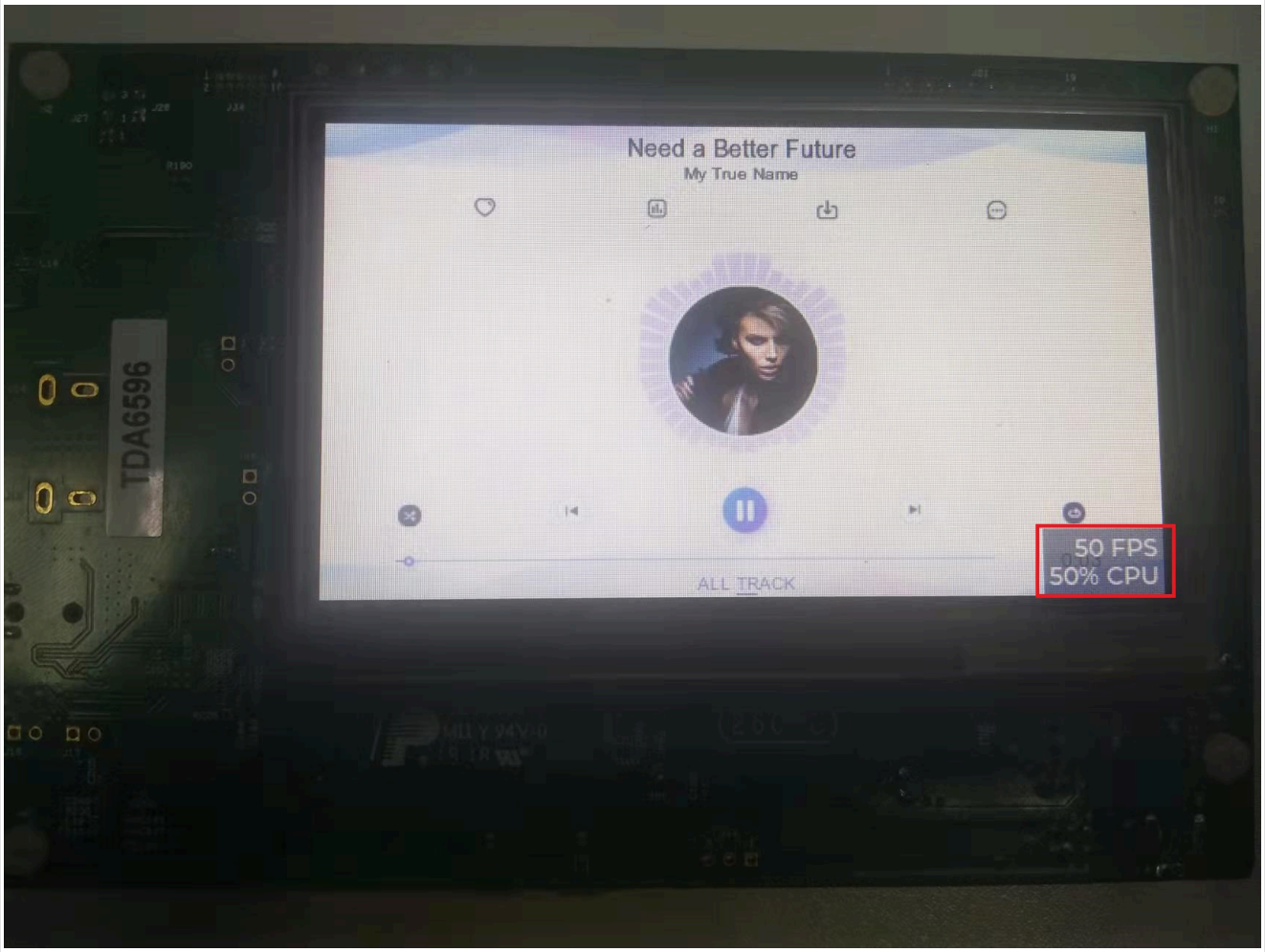


Figure 138. Checking real-time performance

7.2 Tips to improve the performance

Here is a summary of tips to get a good FPS performance using lvgl:

- **Use hardware acceleration**
  The capability of a board with hardware acceleration (PXP or VGLite) is often higher than a board without. Consider using a board with hardware acceleration. For details, see Section 6.
- **Use Internal SRAM**
  The SRAM has better performance than other RAM. If a board has enough SRAM, the SRAM is a preferred place to store the frame buffers and other important data.
- **Use suitable C library**
  The Newlib library has good memcpy performance than the NewlibNano library. The Newlib library is preferred for applications with lots of data copy.
- **Use suitable compiler optimization level**
  In general, the -O2 and -O3 have better performance than other optimization level. GUI Guider can update the optimization level used in the demo example project, as shown in Figure 139.

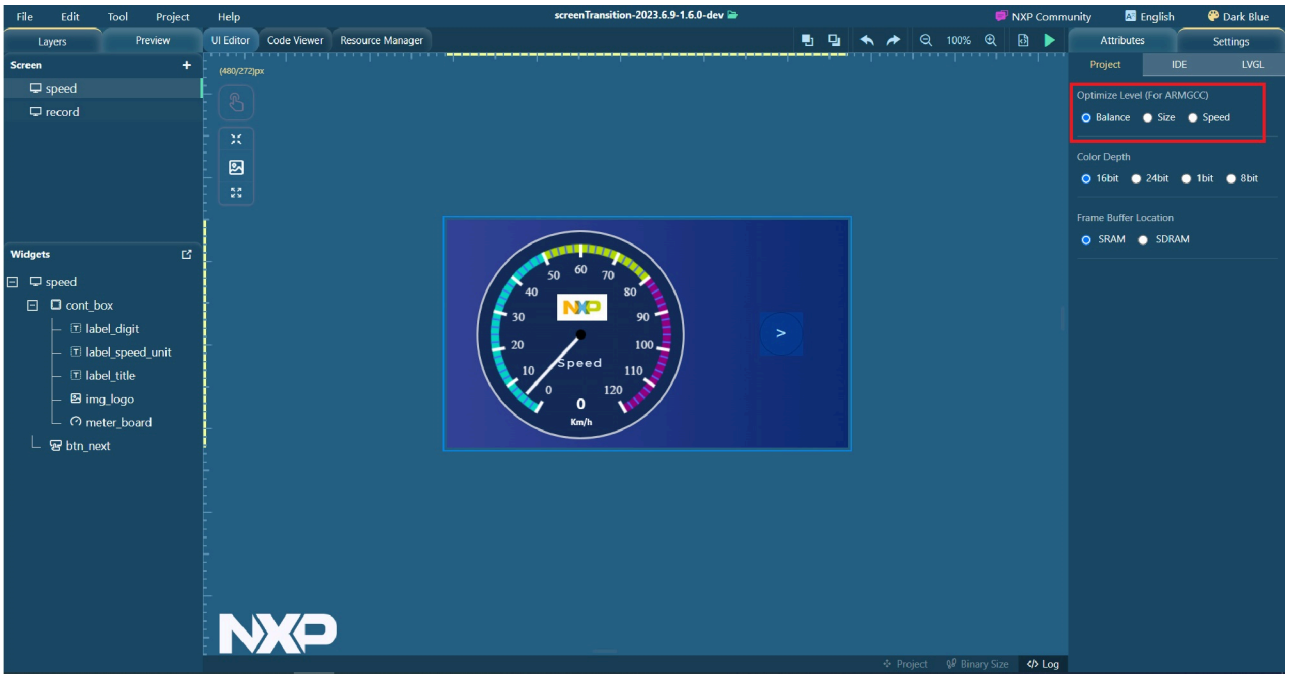


Figure 139. Optimization level

In Figure 139, **Balance** means the -O2 option, **Size** means the -Os option, **Speed** means the -O3 option.

- **Only redraw the changed things**
  Make sure that you only invalidate necessary parts of the display.
- **Adjust display refresh period**
  The display refresh rate is a hard limit for your frame rate. In general, the frame rate is better when the display refresh period is lower. If the refresh rate of the display is 60 Hz, the refresh period is 1 s / 60 = 0.01667 s = 16.67 ms. GUI Guider supports updating the refresh period, shown in Figure 140.

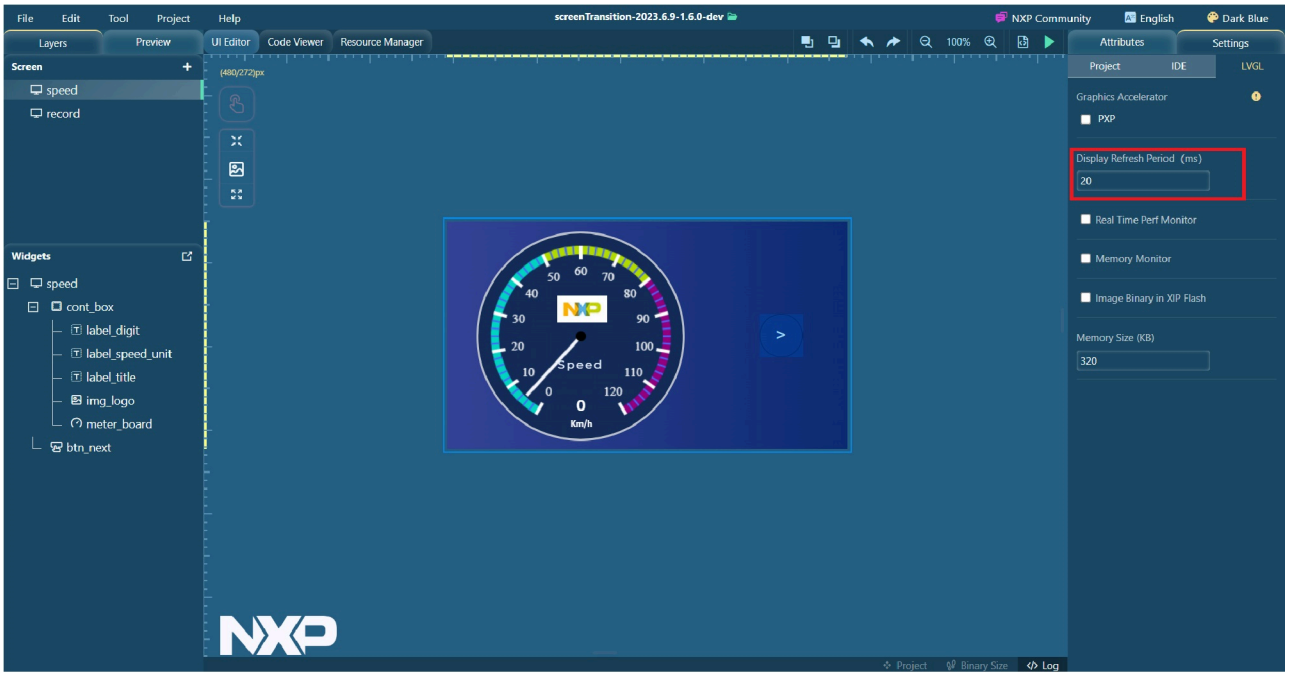


Figure 140. Display refresh rate

7.3 Improve the performance for i.MX RT boards

This section provides information on how to improve the performance on i.MX RT595 when working with MCUXpresso IDE.

7.3.1 Prerequisites

Design a GUI application using the GUI Guider and port the generated LVGL C source file to the template project imported by MCUXpresso IDE.

7.3.2 Improve the performance

The following are several performance optimization methods, which can be selected according to actual needs.

- To use the Release build configuration, -O2 optimization level, and Newlib library, update the MCUXpresso setting. For details, see the MCUXpresso IDE documentation.
- To change the display refresh period, update the following line in `source/lv_conf.h`.

```
#define LV_DISP_DEF_REFR_PERIOD      30      /*[ms]*/
```

  For example, if the refresh rate of the display is 60 Hz, the value can be set to 16.67.
- Enable the hardware VGLite acceleration by changing the following line in `source/lv_conf.h`.

```
#define LV_USE_GPU_NXP_VG_LITE   0     // change to 1 to enable VGLite.
```

- If the NXP "G1120B0MIPI" MIPI Circular Display is selected, the frame buffer can be placed in SRAM. You can update the following lines in `board/display_support.h`.

```
#define DEMO_BUFFER0_ADDR 0x28000000U // i.e. Change to 0x20000000U
#define DEMO_BUFFER1_ADDR 0x28200000U //i.e. Change to 0x20100000U
```

- If the NXP "G1120B0MIPI" MIPI circular display is selected and few images are used. The image arrays can also be placed in the SRAM. To place the image array in SRAM, you can add the following macro definition in `source/lv_conf.h` first.

```
#define LV_ATTRIBUTE_IMG_CONST
__attribute__((section("DataQuickAccess")))
Then updated the C array definition in the Image C source files to add above
 macro:
const LV_ATTRIBUTE_IMG_CONST LV_ATTRIBUTE_MEM_ALIGN
LV_ATTRIBUTE_LARGE_CONST LV_ATTRIBUTE_IMG_XXXXXXXX uint8_t xxxxxxxxxxxx_map[] =
 { … },
LV_ATTRIBUTE_IMG_CONST const lv_img_dsc_t xxxxxxxxxxxxxxxxxx = { … },
```

8 Debug GUI Guider project

MCUXpresso IDE, Keil MDK, and IAR are integrated in GUI Guider which makes it easy to debug GUI application on NXP MCU devices.

8.1 MCUXpresso

To debug the GUI Guider project on MCUXpresso, perform the following steps:

1. Open the link https://mcuxpresso.nxp.com/en/select.
2. Select the development board. For example, EVK-MIMXRT1064.
3. Click the **Build MCUXpresso SDK** button.
4. Select the two middleware LVGL and FreeRTOS from the **Build SDK for <target>** page.
5. Make sure to select the MCUXpresso (toolchain).
6. Click the **Download SDK** button.

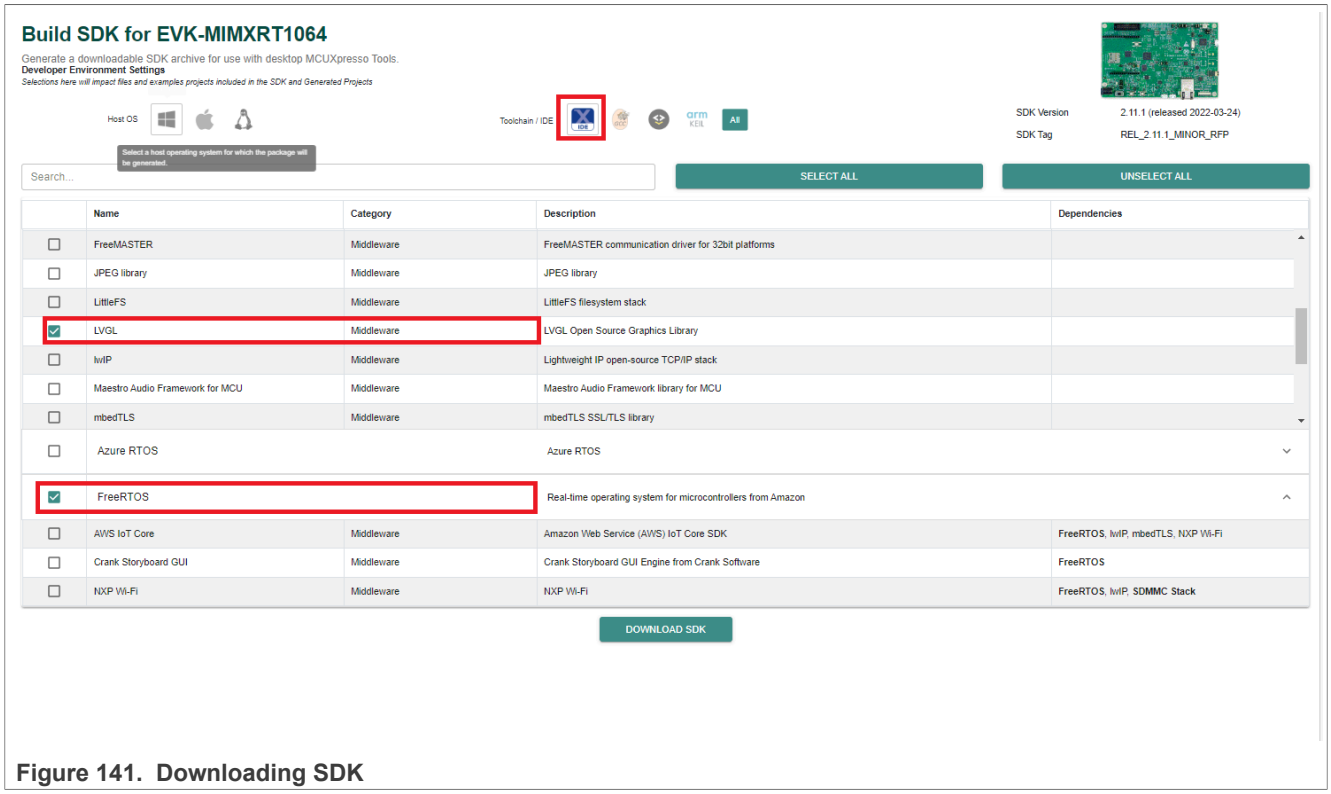


Figure 141. Downloading SDK

7. Import the downloaded SDK into the IDE.
8. Click **File** > **Import** > **General**.

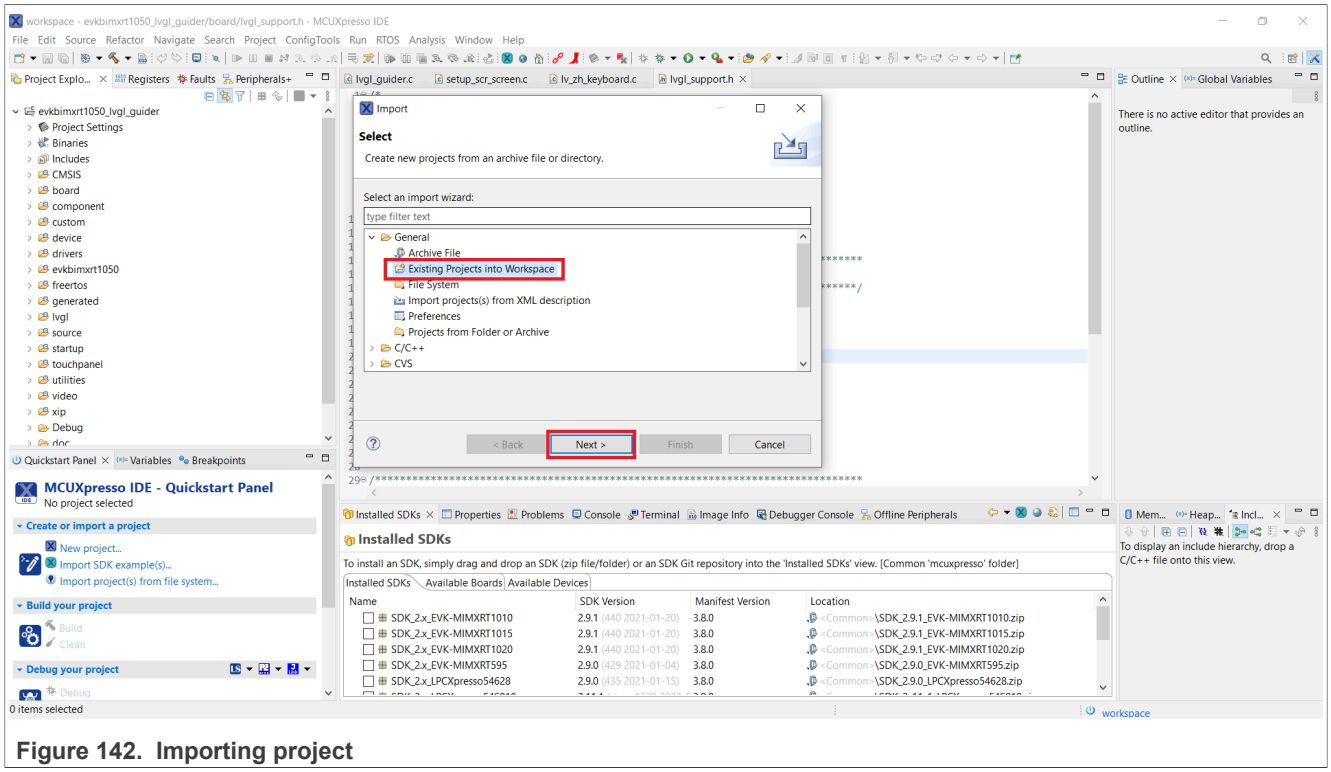


Figure 142. Importing project

9. Select the GUI Guider project MCUXpresso path.

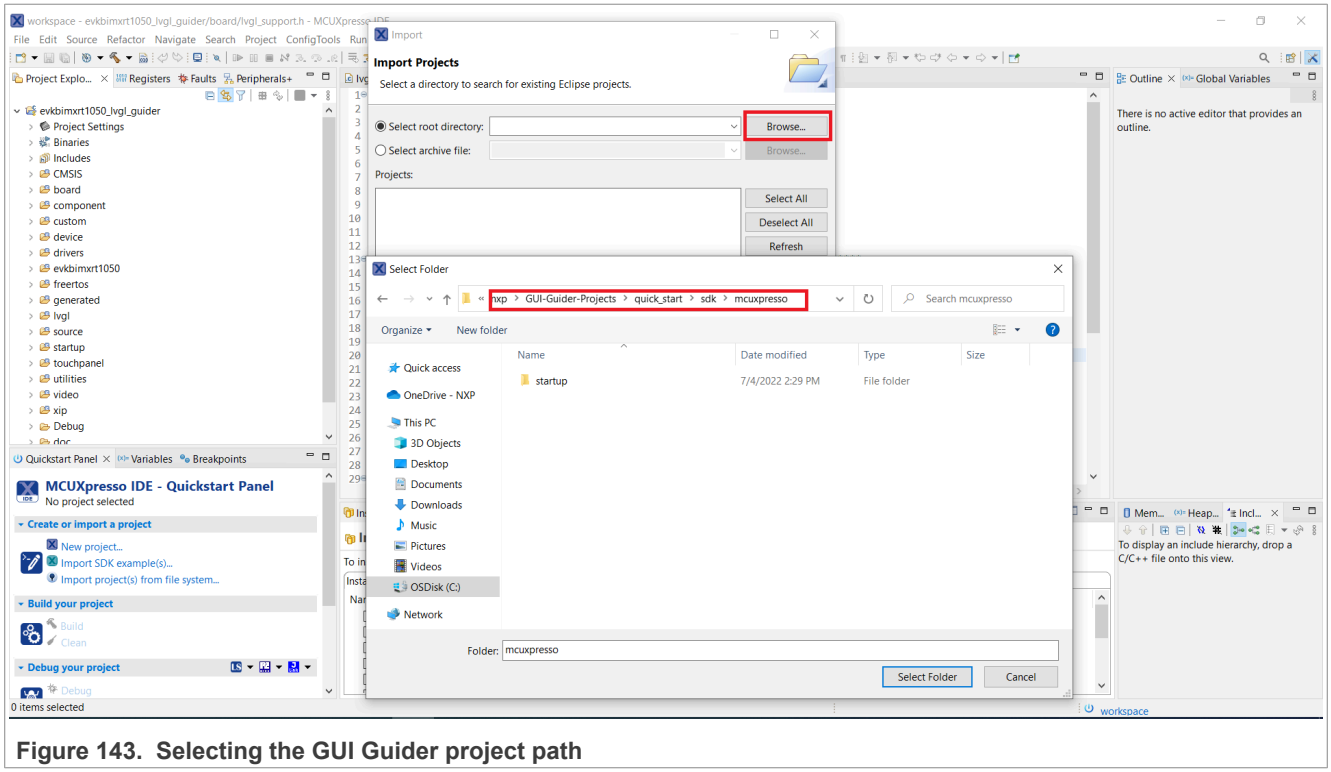


Figure 143. Selecting the GUI Guider project path

8.2 Keil MDK

Find the path named "mdk", double click `lvgl_guider.uvprojx`.

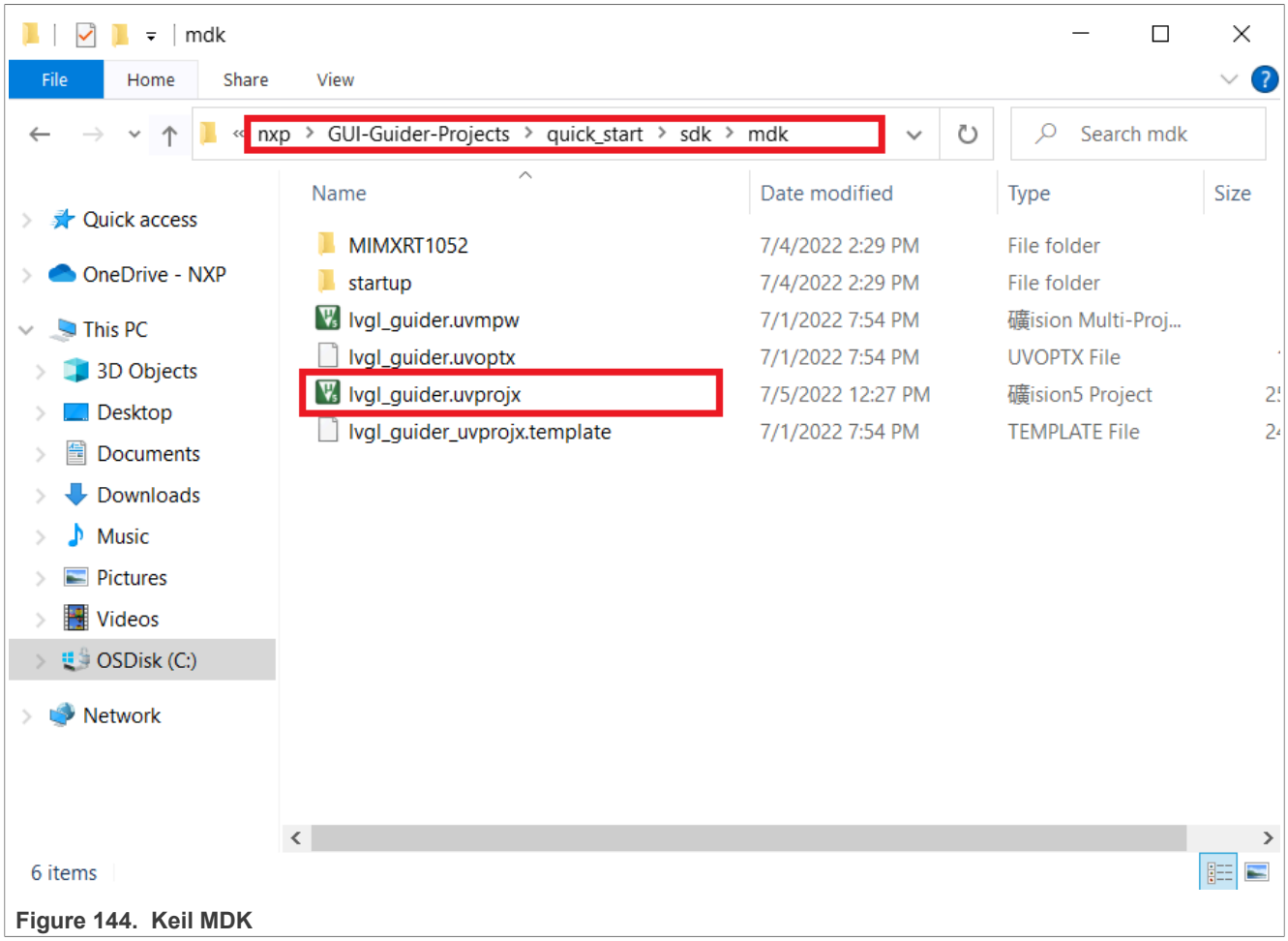


Figure 144. Keil MDK

8.3 IAR

Find the path named "iar", double click `lvgl_guider.eww`.

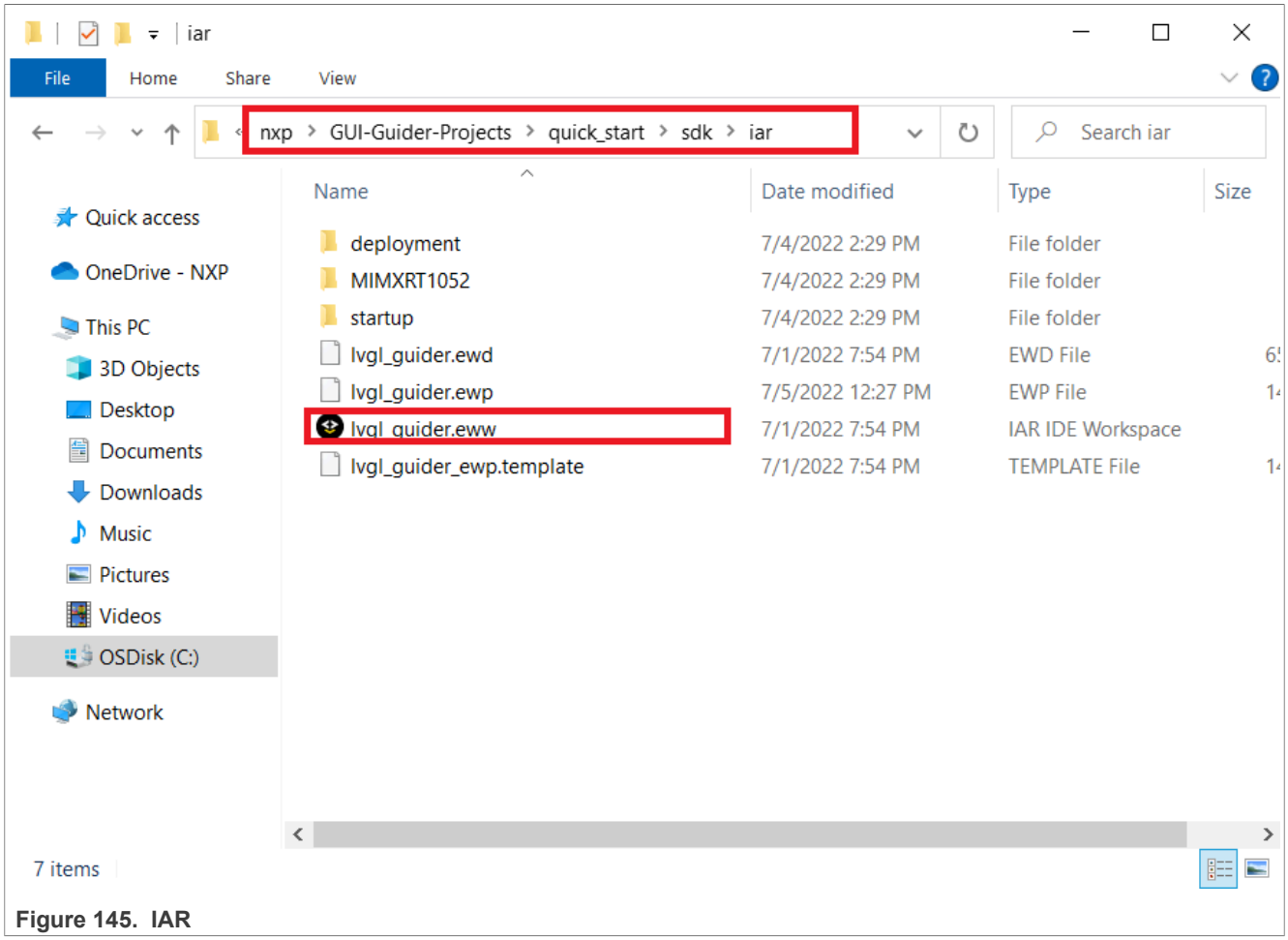


Figure 145. IAR

9 MicroPython

MicroPython is a lean and efficient implementation of the Python 3 programming language. MicroPython includes a small subset of the Python standard library and is optimized to run on microcontrollers and in constrained environments.

9.1 Using LVGL in MicroPython

By building LVGL as a MicroPython module, user can have a high-level GUI library for fast prototyping GUI, taking advantage of Python's language features. These features include *Inheritance*, *Closures*, *List Comprehension*, *Generators*, *Exception Handling*, *Arbitrary Precision Integers*, and others.

9.1.1 Advantages

- Develop GUI in Python, a very popular high-level language.
- Use paradigms such as Object-Oriented Programming.
- Usually, GUI development requires multiple iterations to get things right.
  With C, each iteration consists of **Change code** > **Build** > **Flash** > **Run**.
  In MicroPython, it is **Change code** > **Run**.

9.2 MicroPython in GUI Guider

GUI Guider ships prebuilt MicroPython binaries by default. For more information on how to build, see `lv_MicroPython` README.

9.2.1 Generate code

When the **Generate code** button on GUI Guider UI is clicked, the code for both C and MicroPython is generated under the folder *<GUI-Guider-Project-name>/generated*. The MicroPython file `gui_guider.py` is available in the UI.

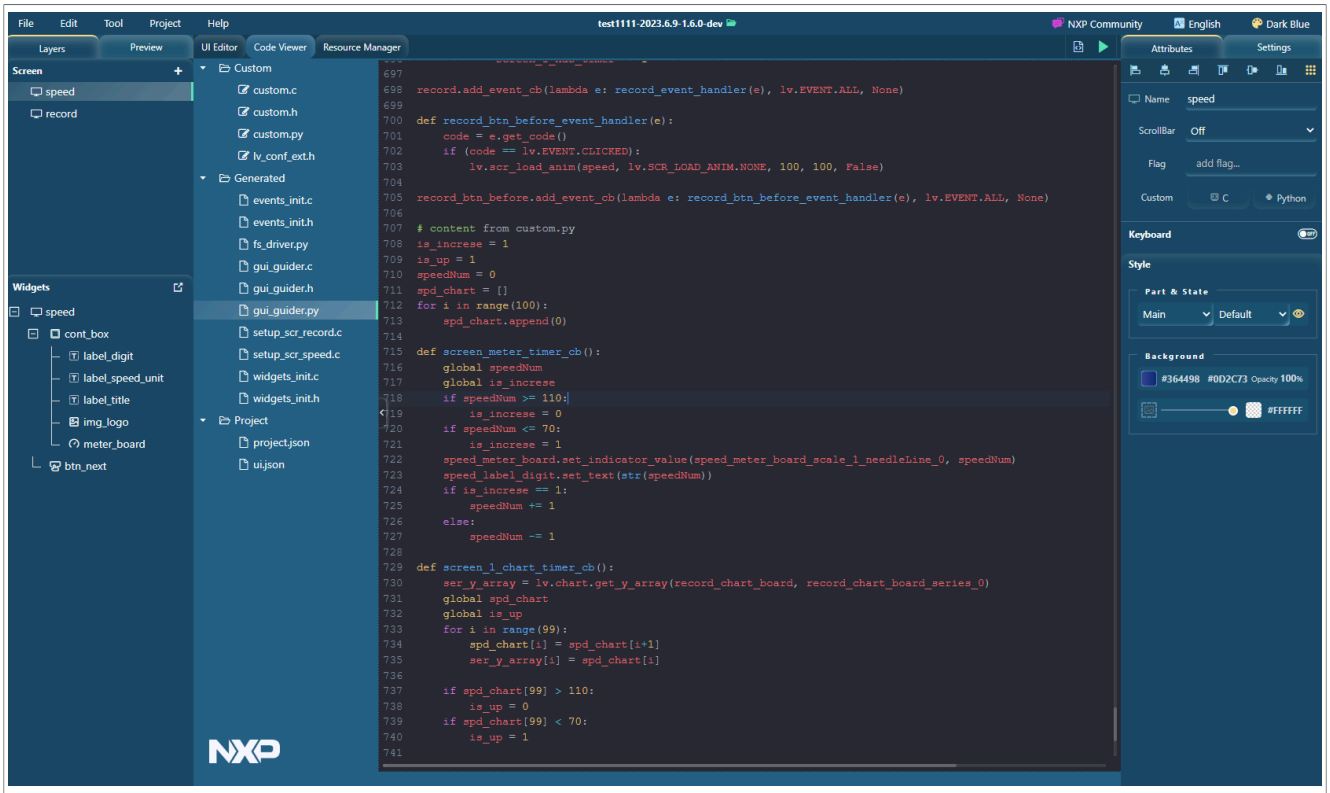


Figure 146. View MicroPython code

9.2.2 Run simulator

Click the **Run simulator** > **MicroPython** button. The GUI Guider generates code and launches the simulator in a separate window.

9.2.3 Add custom code

Like C, GUI Guider supports adding custom Python code, either as event action, or as independent `custom.py` file under the folder "custom".

Note: *Indentation is a very important concept of Python because without proper indenting the code, IndentationError appears and the code is not compiled. To avoid this, GUI Guider follows the below assumptions during the code generation:*

- *Each line of a block is indented with four spaces.*
- *Tab is replaced with four spaces automatically.*

9.2.3.1 As event action

Table 62 provides a description of the custom Python code options.

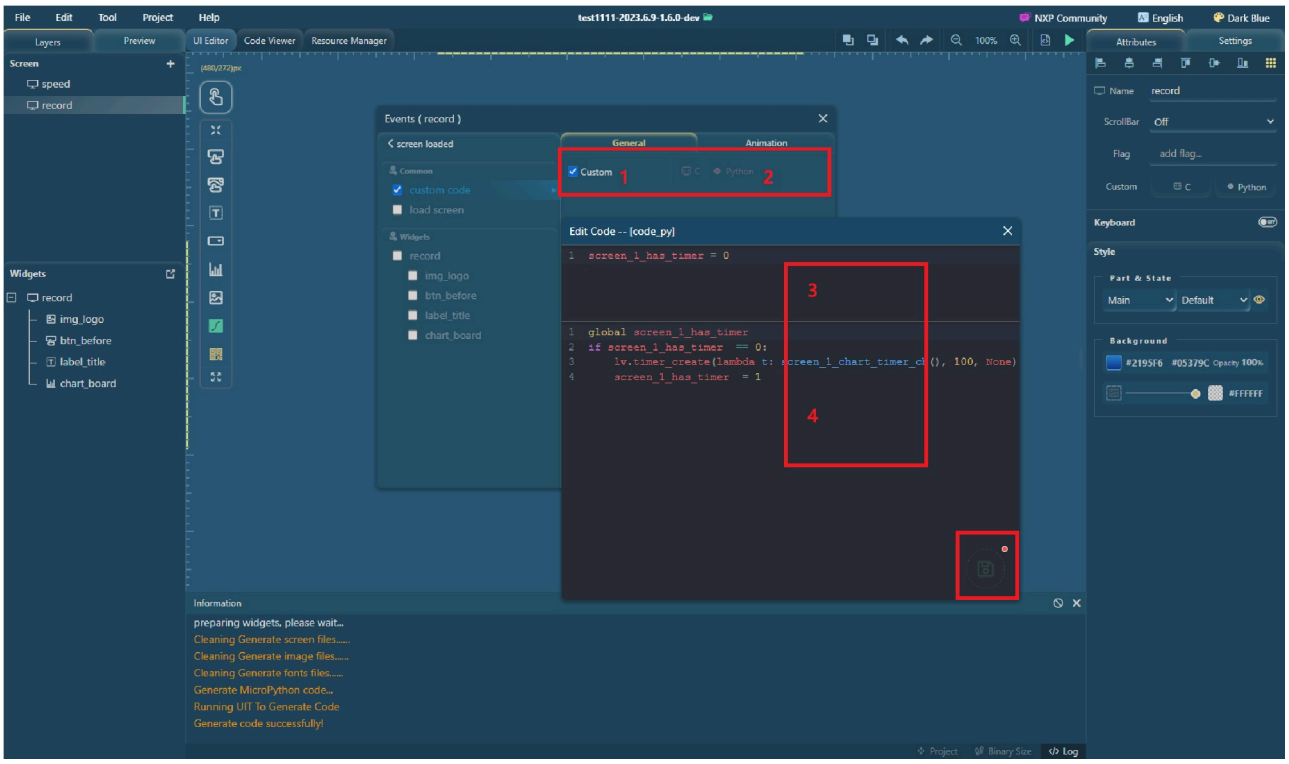


Figure 147. Python code options

Table 62. Custom Python code options

Label	Description
1	Event Type: Customer code
2	Event Code Type: Python code
3	Global variable or function
4	Codes that are wrapped in event callback

9.2.3.2 As custom.py

Put the custom.py file into the folder <*GUI-Guider-Project-name*>*/custom/*. The content appears merged into the `final gui_guilder.py` file, replacing the tab with four spaces.

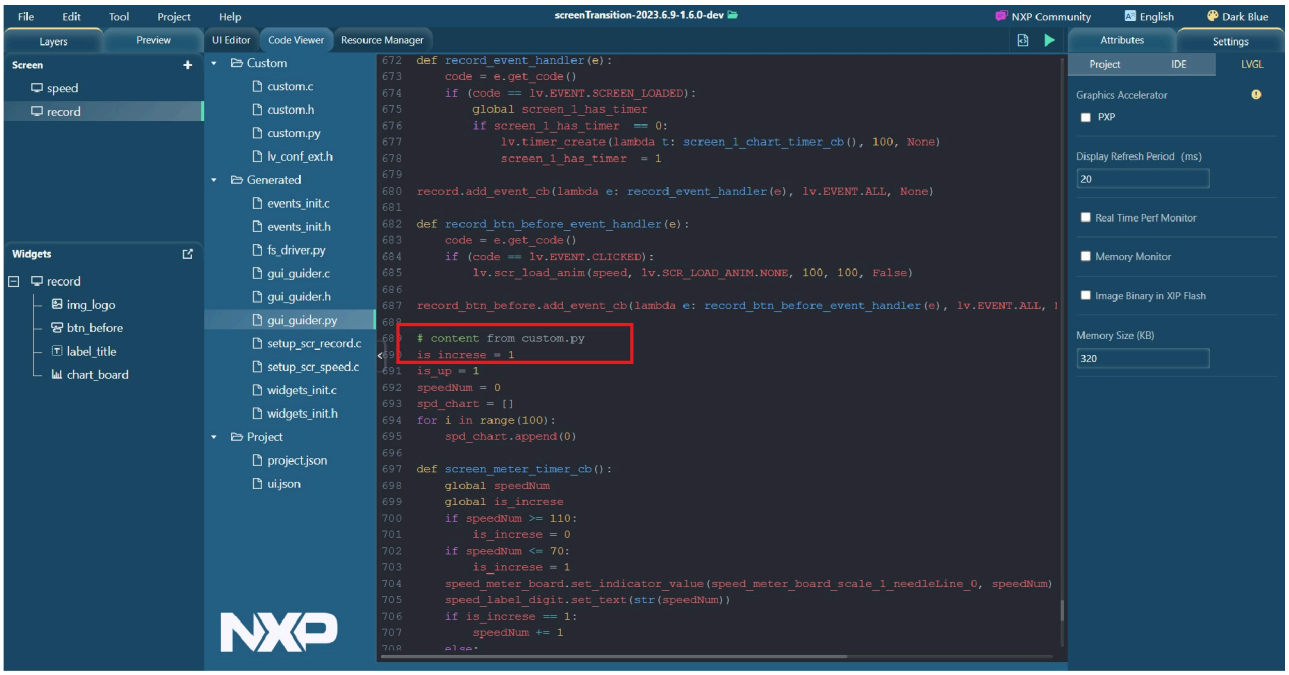


Figure 148. Content appears merged into the final gui_guilder.py file

9.2.4 Limitations

- Only LVGL v8 is supported.
- Compared to C, MicroPython runs slower. Due to this, some animations are not added in Music player demo.

10 Porting (RT)OS

This section lists the steps to port GUI APP to (RT)OS.

10.1 RT-Thread

To port the LVGL C source file generated by GUI Guider to the RT-Thread project, see the following sections.

10.1.1 Prerequisite

- Keil v5.35 or newer.
- Latest GUI Guider GA.
- Connect i.MX RT1060 to the host with a USB cable.

Note: *In the working environment, all paths are not allowed to have Chinese characters or spaces.*

10.1.2 Install Git

Git supports the software package management. Download Git from https://git-scm.com/downloads. Install and add the install path into the system environment variable PATH.

10.1.3 Configure the Env tool

To configure the Env tool, perform the following steps:

1. Download the Env tool: env-windows-v1.3.5.7z.
2. Extract the file `env-windows-v1.3.5.7z` to a local folder. For example, `D:\rt-thread\`.
3. In the env directory (`D:\rt-thread\env`), run `env.exe`. If it fails to open, you can try to use `env.bat`.
4. Register env utility in the right-click menu.

Figure 149. Click settings

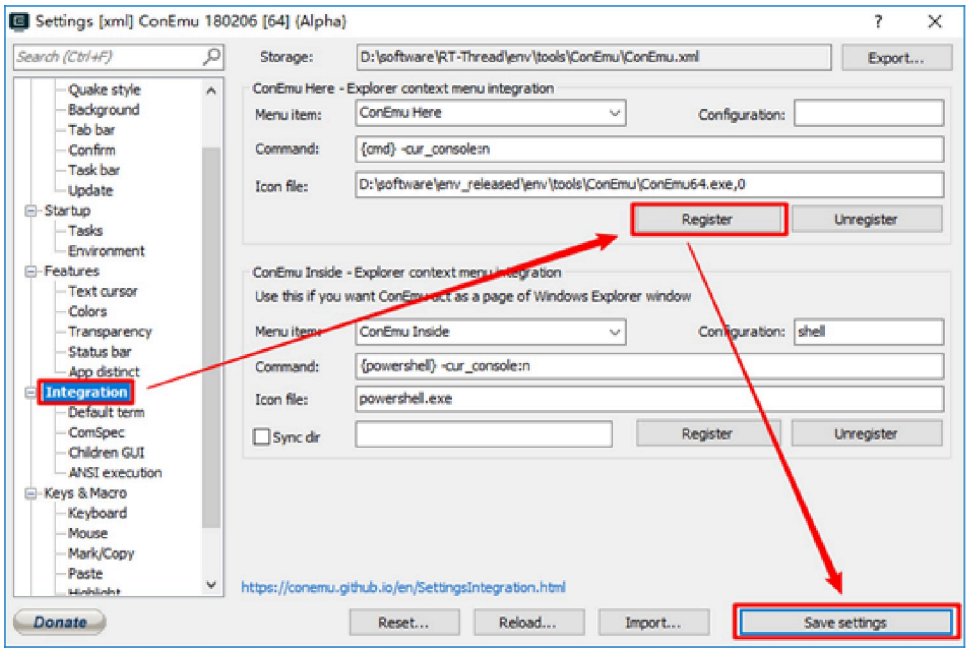


Figure 150. Save settings

10.1.4 Download RT-Thread and apply patches

To download RT-Thread, perform the following steps:

1. Go to the root folder of RT-thread. For example, `D:\rt-thread\`.
2. Run Git clone https://github.com/RT-Thread/rt-thread.git to download RT-thread source code. Use the committed ID: "aab2428d4177a02cd3b0fd020e47a88de379a6ab".
3. Go to the i.mxrt1060 bsp folder (`D:\rt-thead\rt-thread\bsp\imxrt\imxrt1060-nxp-evk`). Right-click the window and select **ConEmu Here** to open env console.

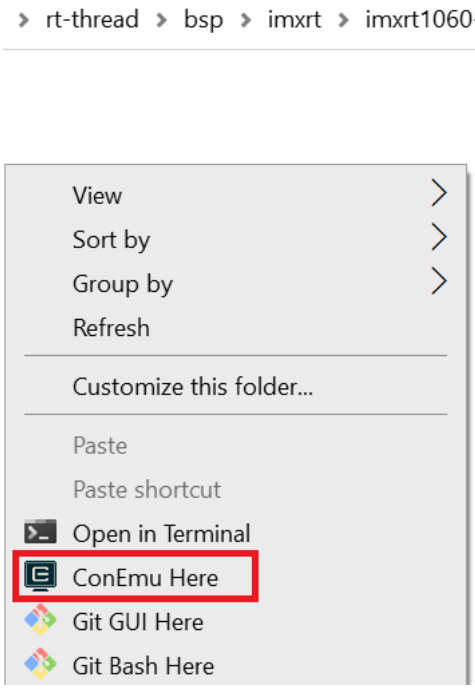


Figure 151. ConEmu Here option

10.1.5 Enable GUI demo project in RT-Thread

To enable GUI demo project, perform the following steps:

1. In env console, go to the imxrt1060 bsp folder (`D:\rt-thead\rt-thread\bsp\imxrt\imxrt1060-nxp-evk\`) and run `menuconfig` to open config UI.

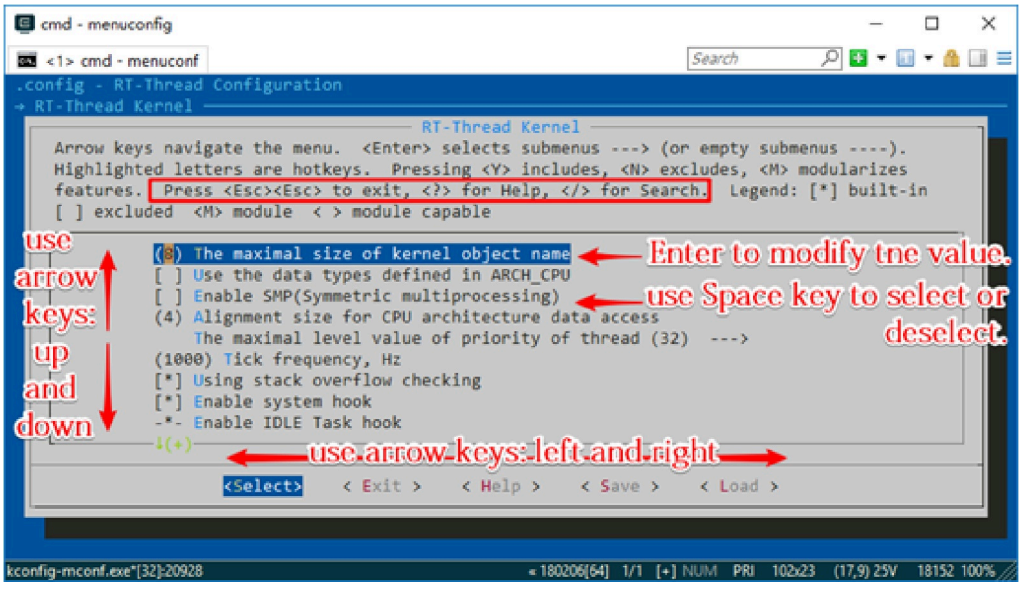


Figure 152. menuconfig

2. Enable LVGL GUI Guider support.
   Location:
   - Hardware drivers config

- Onboard peripheral drivers
- Enable LVGL for LCD
- Support NXP GUI Guider

- To download the selected packages, run `pkgs --update`.

10.1.6 Export source of GUI designed by GUI Guider

To export the source, perform the following steps:

1. Use GUI Guider to design a GUI application.
2. Click **Generate Code** in the GUI Guider IDE.

Figure 153. Generate code

3. Click **File** > **Export Code** > **RT-Thread** on menu bar to export source code of GUI designed by GUI Guider to a template project folder (`D:\rt-thread\rt-thread\bsp\imxrt\imxrt1060-nxp-evk\packages\gui_guider_demo-latest\`).

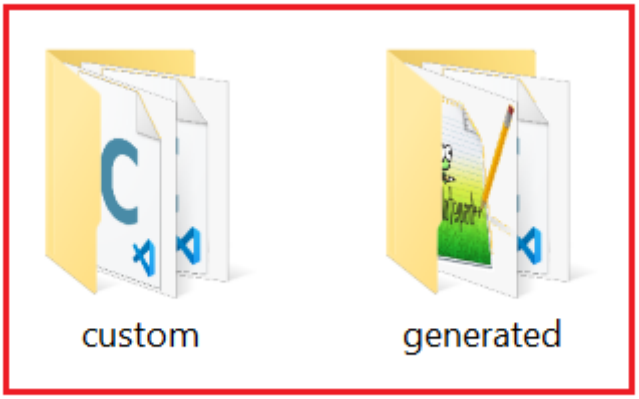


Figure 154. Template project folder

4. Run `scons --target=mdk5 -s` to generate/update Keil project file `project.uvprojx` which is at `D:\rt-thread\rt-thread\bsp\imxrt\imxrt1060-nxp-evk`.

10.1.7 Build and compile

To build and compile, perform the following steps:

1. Double-click Keil project file `project.uvprojx` in `D:\rt-thread\rt-thread\bsp\imxrt\imxrt1060-nxp-evk` and rebuild all the files.
   Note: *If the following error appears, update the corresponding source file to replace* `lvgl/lvgl.h` *with* `lvgl.h`.
   Error: src.c(10): error: 'lvgl/lvgl.h' file not found s

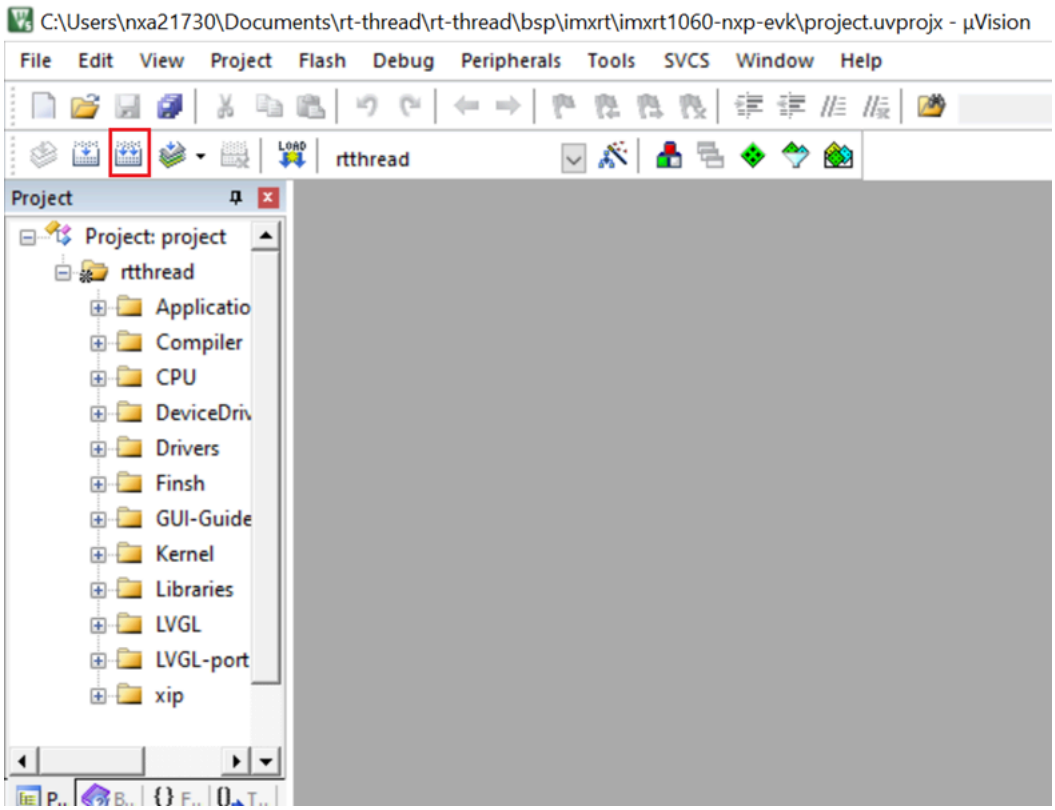


Figure 155. Rebuild Keil project files

2. Connect i.MX RT1062 to PC with a USB cable. Click "Download (F8)".

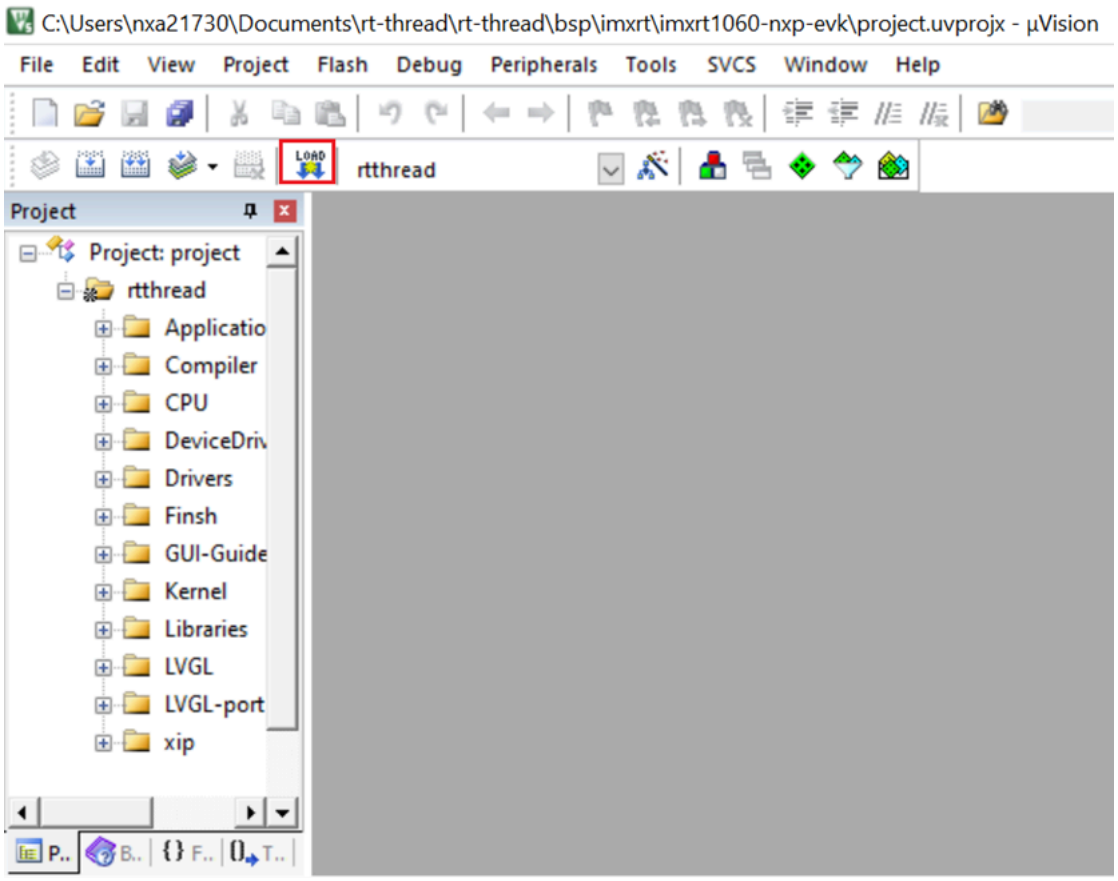


Figure 156. Click download or press F8 key

After performing the above steps, the GUI application designed by GUI Guider can be compiled in RT-Thread and run on i.MX RT1060 board.

10.1.8 Known Issues

- If option **Event** > **load screen** > **Delete current screen** is enabled, then the PC hangs when switching between different screens. The workaround is to disable the **Delete current screen** when loading a new screen.

10.2 Zephyr

This section describes how to port the LVGL C source file generated by GUI Guider for Zephyr.

10.2.1 Set up Zephyr build environment

To set up Zephyr build environment on build machine, perform the steps below. For more details, refer to Zephyr getting started guide.

1. Install chocolatey (https://chocolatey.org/install).
2. Open the `cmd.exe` window as Administrator. To do so, press the Windows key, type `cmd.exe`, right-click the result, and choose "Run as Administrator".
3. To avoid having to confirm the installation of individual programs, disable global confirmation.

```
choco feature enable -n allowGlobalConfirmation
```

4. Use choco to install the required dependencies.

```
choco install cmake --installargs 'ADD_CMAKE_TO_PATH=System' choco install
 ninja gperf python git dtc-msys2 wget unzip
```

5. Install pyocd.

```
python3 -m pip install -U pyocd
```

6. Close the window and open a new `cmd.exe` window as a regular user to continue.

10.2.2 Get Zephyr and install Python dependencies

To download Zephyr and install Python dependencies, perform the steps below:

1. Install west. Install west as Administrator.

```
pip3 install -U west
```

2. Get the Zephyr source code.

```
cd %HOMEPATH%
west init zephyrproject
cd zephyrproject
west update
```

3. Export a Zephyr CMake package. It allows CMake to load boilerplate code required for building Zephyr applications automatically.

```
west zephyr-export
```

4. Zephyr's `scripts\requirements.txt` file declares additional Python dependencies. Install them with pip3.

```
pip3 install -r %HOMEPATH%\zephyrproject\zephyr\scripts\requirements.txt
```

10.2.3 Install Zephyr SDK

To install Zephyr SDK on build machine, perform the steps below:

1. Open the `cmd.exe` window.
2. Download the latest Zephyr SDK bundle.

```
cd %HOMEPATH%
wget https://github.com/zephyrproject-rtos/sdk-ng/releases/download/v0.15.2/
zephyr-sdk-0.15.2_windows-x86_64.zip
```

3. Extract the Zephyr SDK bundle.

```
unzip zephyr-sdk-0.15.2_windows-x86_64.zip
```

Note: *Extract the Zephyr SDK bundle at one of the following locations.*

```
%HOMEPATH%
%PROGRAMFILES%
```

The Zephyr SDK bundle contains the zephyr-sdk-0.15.2 directory and, when extracted under `%HOMEPATH%`, the resulting installation path is `%HOMEPATH%\zephyr-sdk-0.15.2`.

4. Run the Zephyr SDK bundle setup script.

```
cd zephyr-sdk-0.15.2
setup.cmd
```

Note: *Run the setup script once after extracting the Zephyr SDK bundle.*
Note: *If you relocate the Zephyr SDK bundle directory after the initial setup, Rerun the setup script.*

10.2.4 Design GUI and export code by GUI Guider

To export the source code of GUI application designed by GUI Guider to Zephyr, perform the steps below:

1. Design GUI application using GUI Guider.

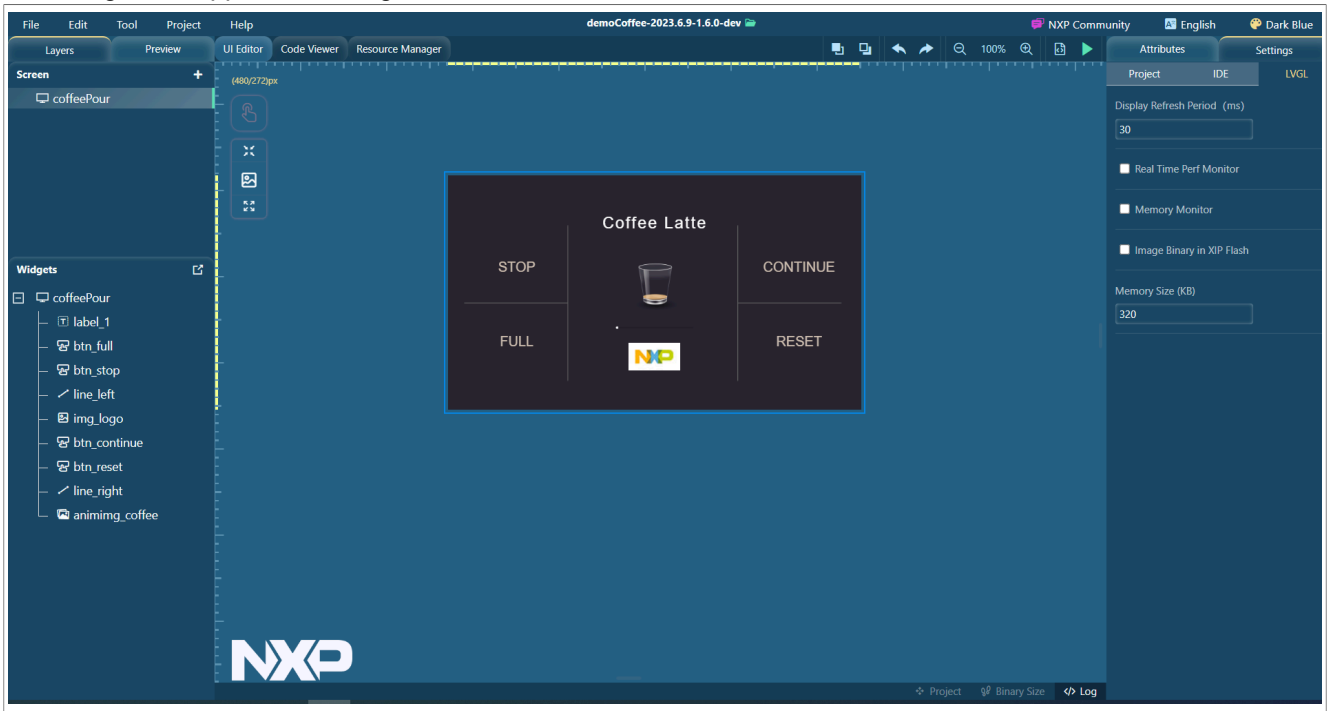


Figure 157. Design GUI application

2. To generate the GUI source code, click the "Generate Code" button.

Figure 158. Generate GUI source code

3. Export the source code of GUI application to a local folder, for example, `C:\Users\user1\zephyrproject\gui_guider_demo`.

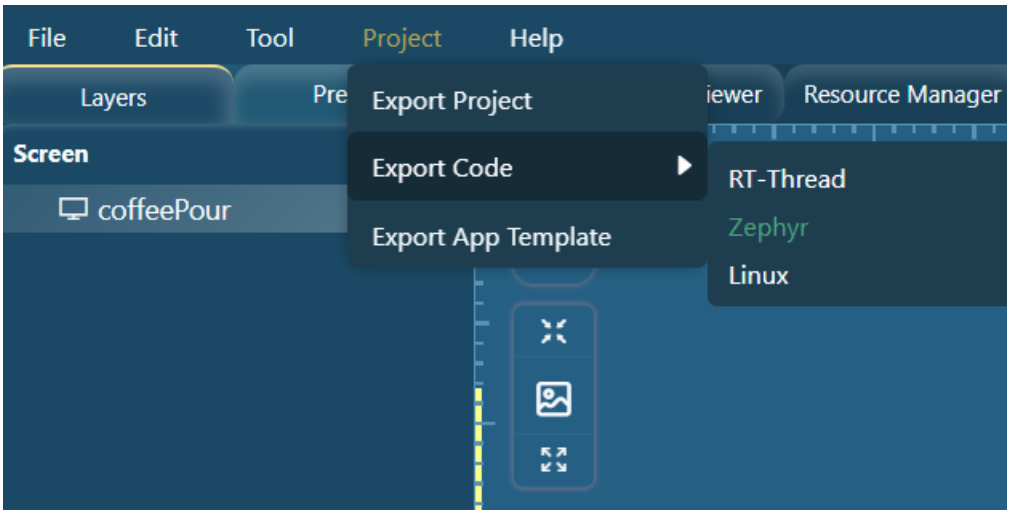


Figure 159. Export source code

10.2.5 Build and deploy Zephyr image

To build and deploy Zephyr images on target board, run the following commands.

```
> west build -c -p always -b mimxrt1050_evk C:\Users\user1\zephyrproject
\gui_guider_demo
> west flash --runner pyocd
```

10.3 Linux

The i.MX family Linux board support package (BSP) supports the Linux operating system (OS) on the i.MX application processors by using the Yocto project build environment.

The following are the boards on which GUI Guider supports generating app codes:

- MCIMX93EVK

This section lists the steps to port GUI app to Linux.

10.3.1 Prerequisite

- GUI Guider GA 1.6.0 release
- NXP Linux Factory v6.1.1_1.0.0 release

10.3.2 Create a project

To create a project, perform the following steps:

1. When GUI Guider is launched, click the **Create a new project** button from the Wizard, or select **File > New**.
2. Select LVGL v8.3.5.

Figure 160. Select LVGL v8.3.5

3. Select MCIMX93EVK board template.

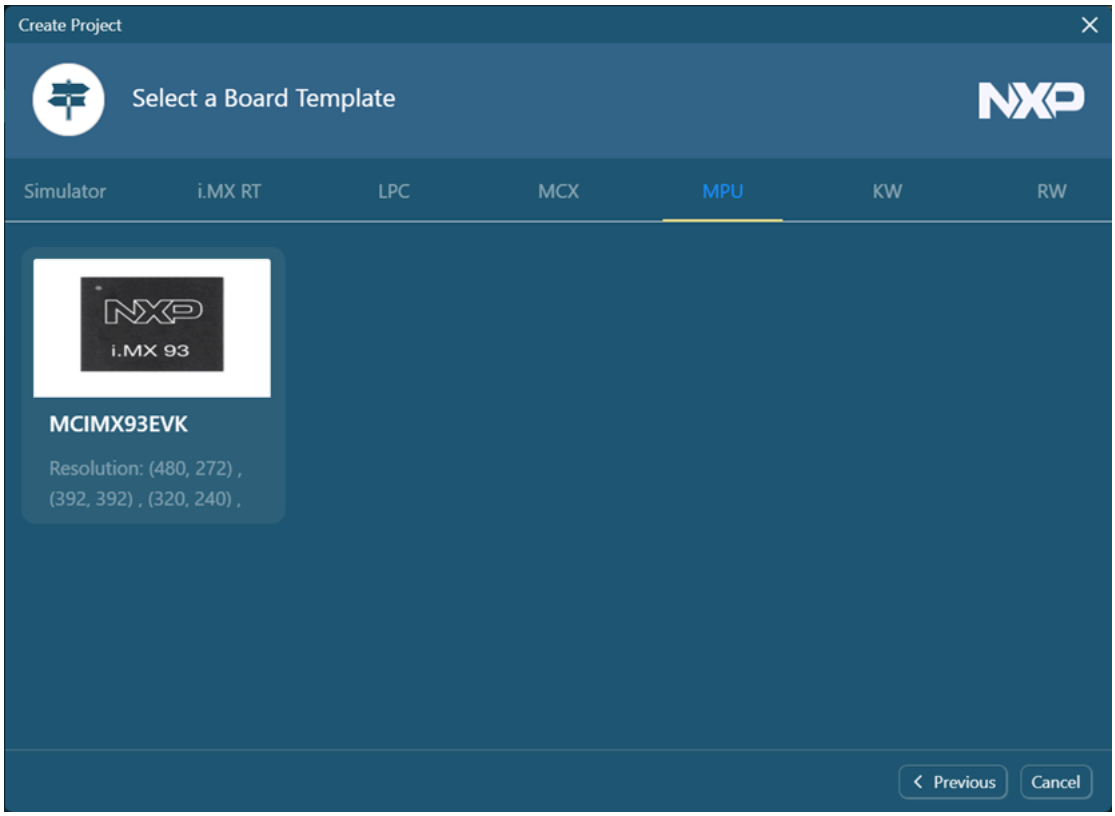


Figure 161. Select MCIMX93EVK template

4. Select an application template or Empty UI.
5. Create a project.
6. Design your GUI application, then continue.

10.3.3 Build GUI application binary

GUI Guider provides two options to build the GUI application binary (gui_guider):

- Standalone build using the GUI Guider IDE.
- Export the Yocto layer and build using Yocto build environment.

Standalone build

In this way, GUI Guider IDE launches the Yocto toolchain to cross-compile the GUI application. When the application binary is built, user must copy it to pre-installed Yocto rootfs and execute it on the board.

Note: *Only Linux host is supported.*

1. Steps to build the Yocto toolchain are:
   a. Set up the Yocto build environment.
      i. Install the 'repo' utility.

```
$ mkdir ~/bin
$ curl http://commondatastorage.googleapis.com/git-repo-downloads/repo
 > ~/bin/repo
$ chmod a+x ~/bin/repo
$: PATH=${PATH}:~/bin
```

ii. Download the Yocto Project BSP.

```
$ mkdir imx-bsp-6.1.1-1.0.0
$ cd imx-bsp-6.1.1-1.0.0$ repo init -u https://github.com/nxp-imx/imx-manifest -b imx-linux-langdale -m
imx-6.1.1-1.0.0.xml$: repo sync
```

b. Setup Yocto build project.

```
$ MACHINE=imx93evk DISTRO=fsl-imx-xwayland source ./imx-setup-release.sh -b bld-imx93evk
```

c. Build the Yocto toolchain.

```
$ bitbake -c populate_sdk imx-image-multimedia
```

d. Install the Yocto toolchain.

```
$ sudo sh ./fsl-imx-xwayland-glibc-x86_64-imx-image-multimedia-armv8a-imx93evk-toolchain-6.1-langdale.sh -y
```

2. Install ninja utility on the build host.

```
$ sudo apt install ninja-build
```

3. Click menu **Project** > **Build** to start standalone build.

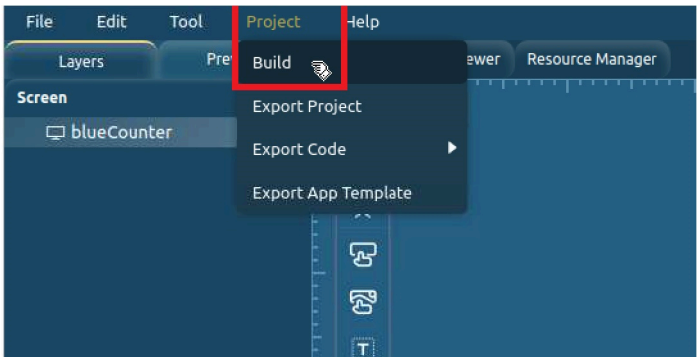


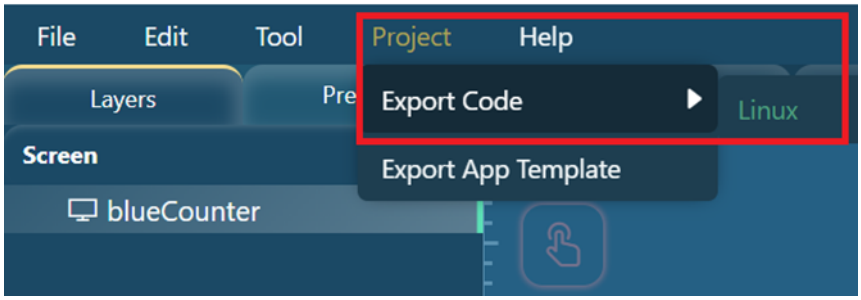
Figure 162. Click Build

4. Check build logs in log window, the gui_guider binary gets generated under *<project path>/build/*.

Export Yocto layer and build GUI application by Yocto

In this way, GUI Guider IDE exports a Yocto layer which includes GUI application codes and related Yocto recipes. User must plug in the exported Yocto layer into an existing Yocto build environment, and use bitbake to build the gui_guider binary.

1. Export Yocto Layer
   a. Click **Generate Code** to generate code.
   b. Click menu **Project** > **Export Code** > **Linux** to export Yocto layer.



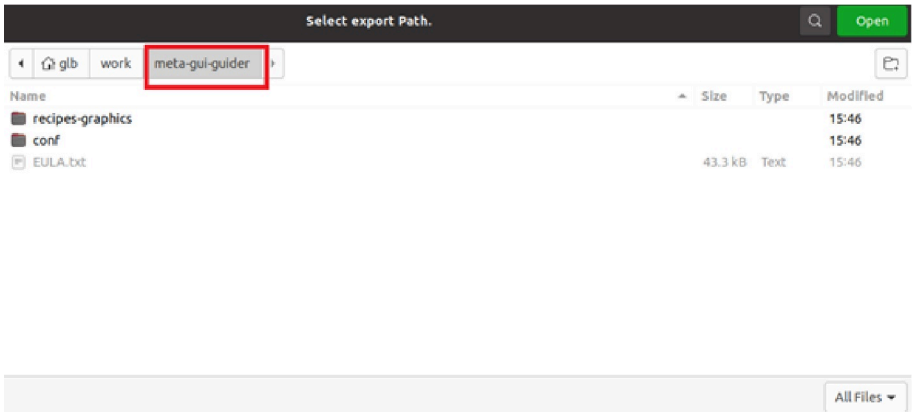


Figure 163. Export Yocto layer

Note: *"meta-gui-guider" folder is the Yocto layer which can be used as a plugin of Yocto SDK. Refer to the following section on how to build by Yocto.*

2. Build GUI application in yocto.
   a. Copy the exported "meta-gui-guider" folder to the `<path>/imx-bsp-6.1.1-1.0.0/sources/` folder.
   b. Build by Yocto.
      i. If this is the first time to run the yocto build, use the following steps:

```
$ MACHINE=imx93evk DISTRO=fsl-imx-xwayland source ./imx-setup-
release.sh -b bld-imx93evk
$ bitbake-layers add-layer ../sources/meta-gui-guider
$ echo "INHERIT += \"rm_work\"" >> conf/local.conf
$ echo "RM_WORK_EXCLUDE += \"gui-guider\"" >> conf/local.conf
$ bitbake gui-guider
```

      ii. If this is the subsequent build, use the following steps:

```
$ source sources/poky/oe-init-build-env bld-imx93evk/
$ bitbake gui-guider
```

Note: *The gui_guider binary gets generated in `<path>/imx-bsp-6.1.1-1.0.0/bld-imx93evk/tmp/work/armv8a-poky-linux/gui-guider/8.3.2-r0/images/` folder.*

10.3.4 Run GUI application on i.MX93

The LVDS panel (**Part number: EV121WXM-N12-3GP0**) is used. You can select other supported panel to try the generated GUI application.

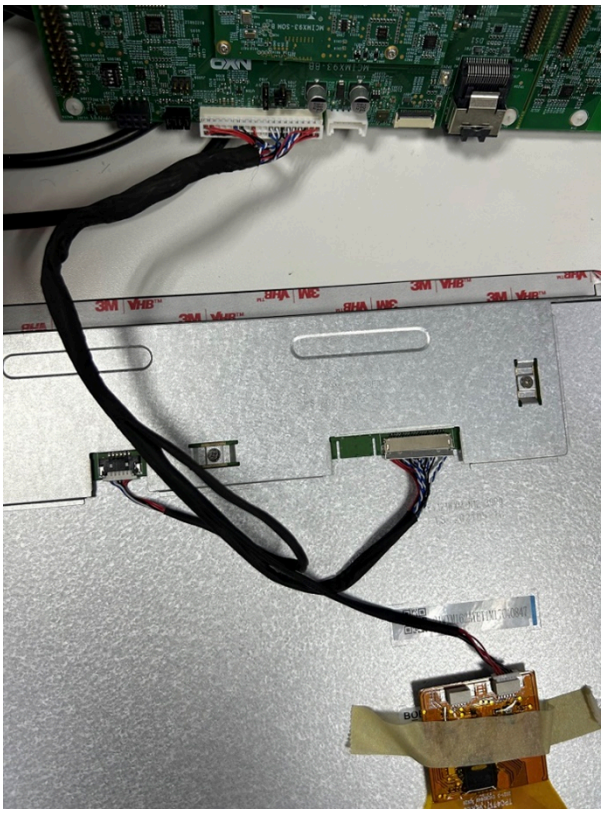


Figure 164. Run GUI application on i.MX93

1. Deploy the image on SD card.

```
$ zstd -d imx-image-multimedia-imx93evk.rootfs.wic.zst
```

Note: *If there is no* `zstd` *command, install using:* `sudo apt-get install zstd`.

```
$ sudo dd if=imx-image-multimedia-imx93evk.rootfs.wic of=/dev/sdx bs=4M &&
 sync
```

2. Insert SD on i.MX93 and bootup board.
3. Replace default `dtb` with `lvds-panel dtb`.

```
$ cd /run/media/boot-mmcblk1p1
$ cp imx93-11x11-evk-boe-wxga-lvds-panel.dtb imx93-11x11-evk.dtb
```

4. Reboot the board and transfer gui_guider binary onto the board.
5. Run the GUI application.

```
$ ./gui_guider&
```

11 External storage

This section describes how to use external storage (SD card) in the GUI Guider project.

11.1 Supported devices

External storage is supported on selected devices currently.

- Video file (H264)
  - NXP i.MX RT1050
- Image file (BIN, BMP, JPG, PNG)
  - NXP i.MX RT1064, LPC54S018J4M

11.2 Video

The format of the input video should be *.h264. The demo application implements video play on NXP MCU by using the LVGL library.

11.2.1 Prerequisites

- MCUXpresso 11.8.0/IAR 9.40.1/Keil MDK 5.38
- GUI Guider v1.6.0 GA.
- Connect the supported device to the host by a USB cable.

11.2.2 Prepare h264 file

To prepare an h264 video file, perform the following steps:

1. Install FFmpeg on your host.
2. Use the following command to convert the *.mp4 video file to an *.h264 video file.

```
$ ffmpeg -i input.mp4 -vf scale=480:272 -c h264 output.h264
```

3. To get the best play effect, make the *scale* identical to the expected size in the GUI application.
4. Load the *.h264 video on the SD card of the MCU device.

11.2.3 Create project

To create a project, perform the following steps:

1. Open GUI Guider IDE and create a project by selecting the device template of supported boards.

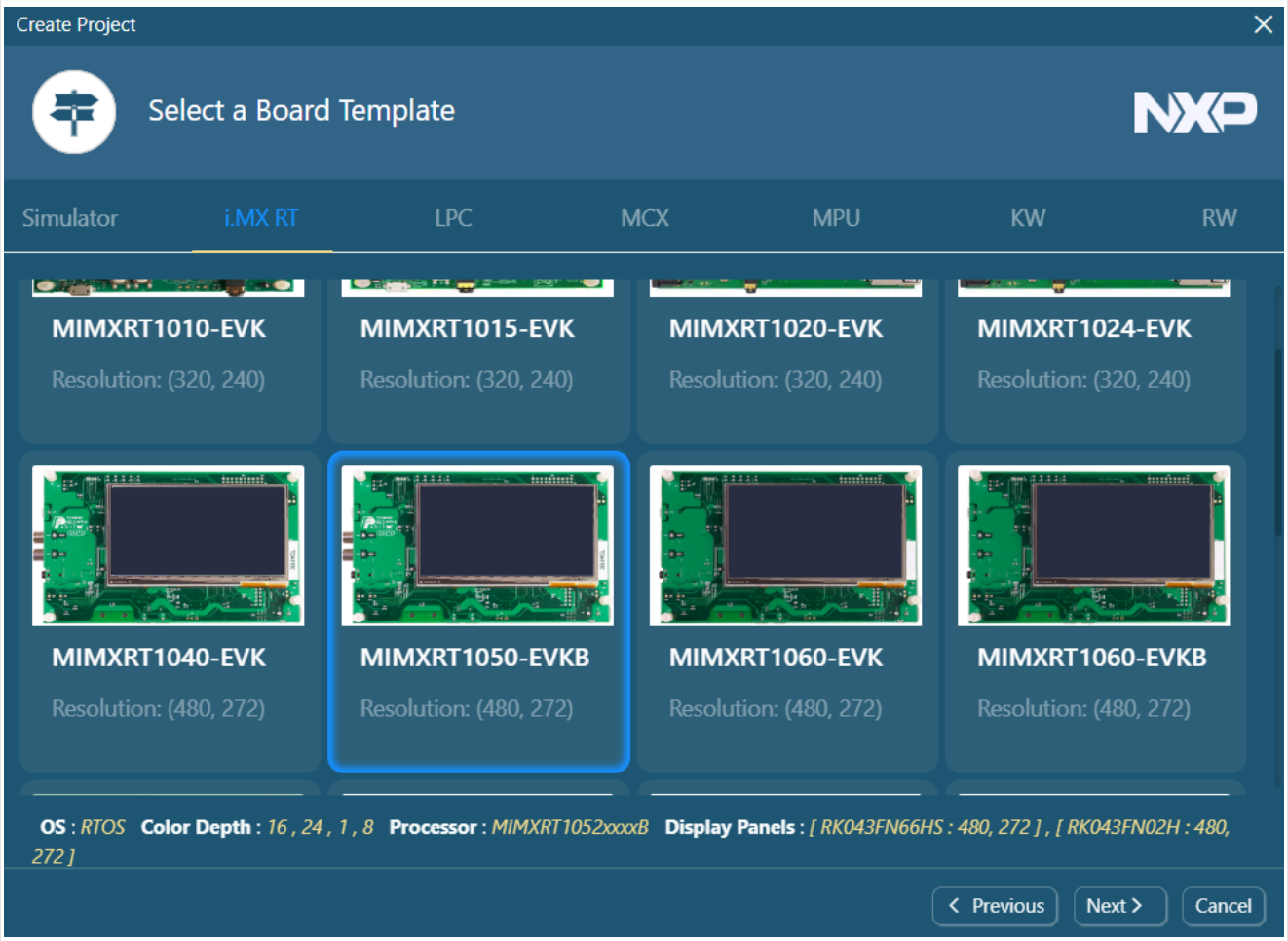


Figure 165. Select a board template

2. Select VideoPlayer application template.

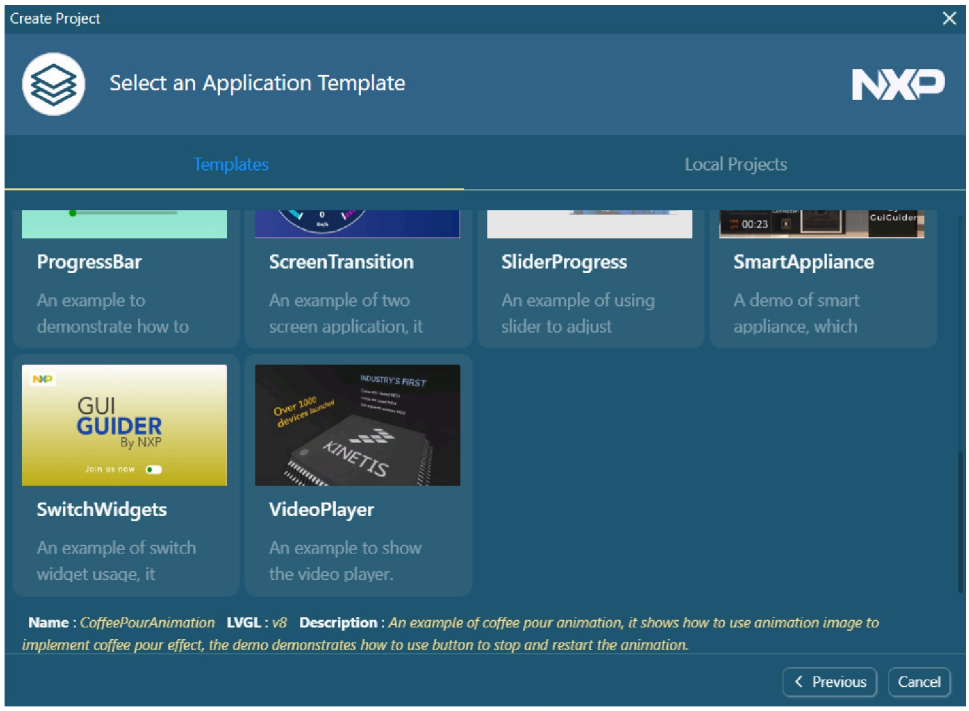


Figure 166. Select an application template

3. Open the project folder by clicking the "Open project directory" icon, which is in the right-upper corner of the preview window.

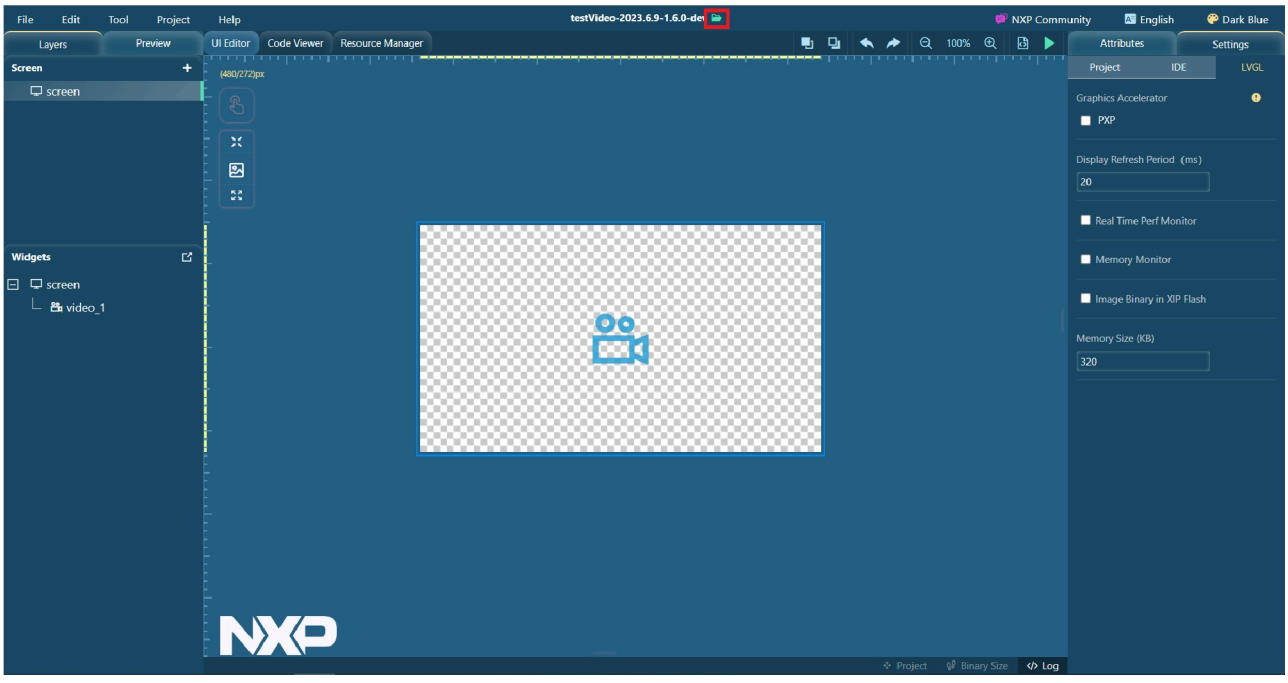


Figure 167. Open the project folder

4. Go into the import folder and locate the `demo.h264` file.

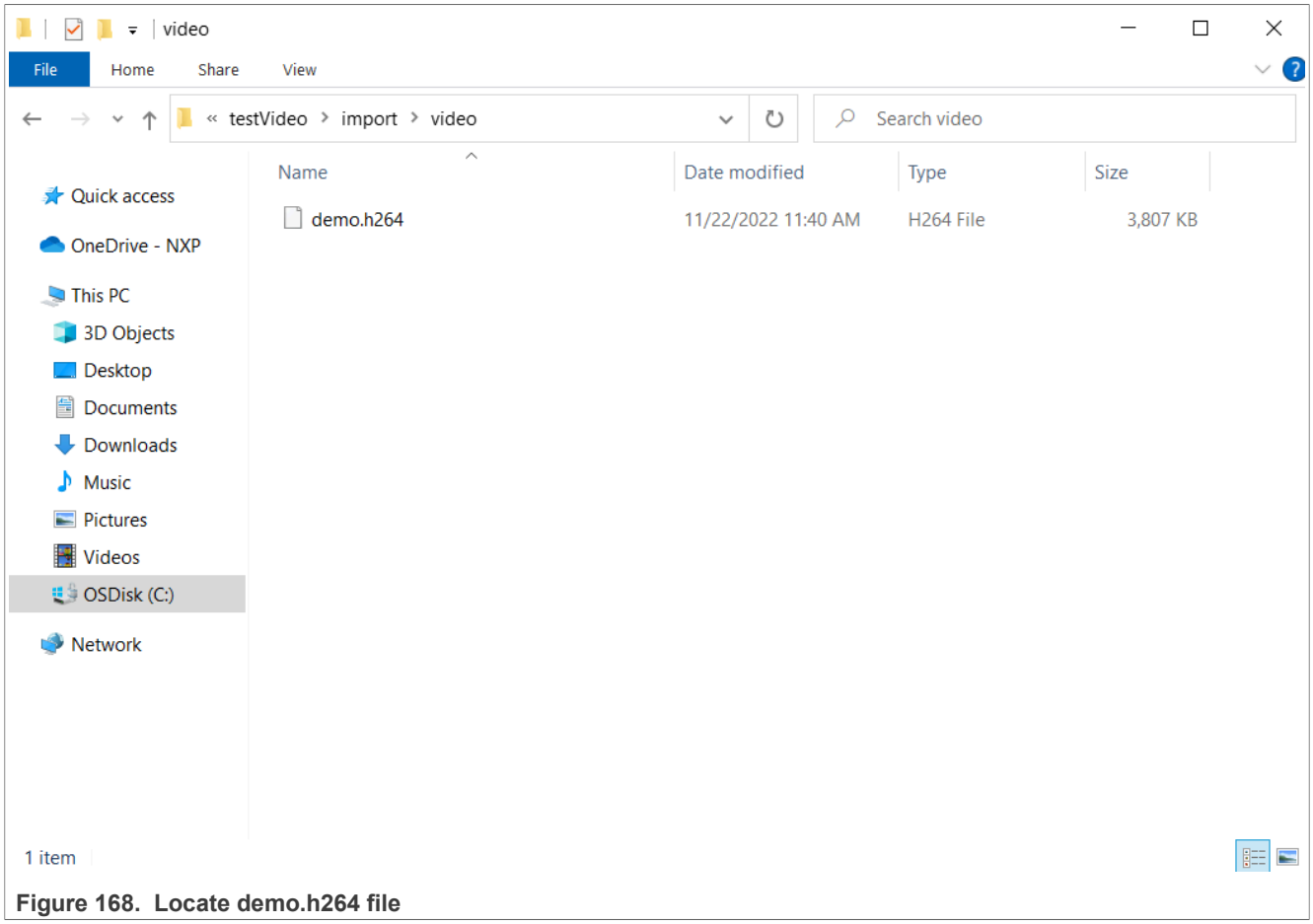


Figure 168. Locate demo.h264 file

5. Copy the `demo.h264` file into SD card of the MCU device.
6. To load the code into your device, click **Run** > **Target** > **MCUXpresso**. After finishing, you can play this demo video on display.

Note: *Because the conversion of YUV420 to rgb565 at the board end is through PXP, PXP line selection cannot be enabled in the video demo in the GUI Guider.*

11.2.4 Customize project

The name and path of the *.h264 video file can be changed in `custom.c`. Different variables are used to set the simulator and target.

11.3 Image

The images (BIN, BMP, JPG, PNG) can be stored on an SD card and used by image-related widgets (imgbtn, image, Aimg, 3Dimg). The images are decoded in runtime.

11.3.1 Prerequisites

- GUI Guider 1.6.0 GA.
- Connect the supported device to the host by a USB cable.

11.3.2 Project template

There is an application template for supported boards. The usage tips are displayed on the screen.

1. Create a project by selecting one supported board and the "SDcardStorage" application template.

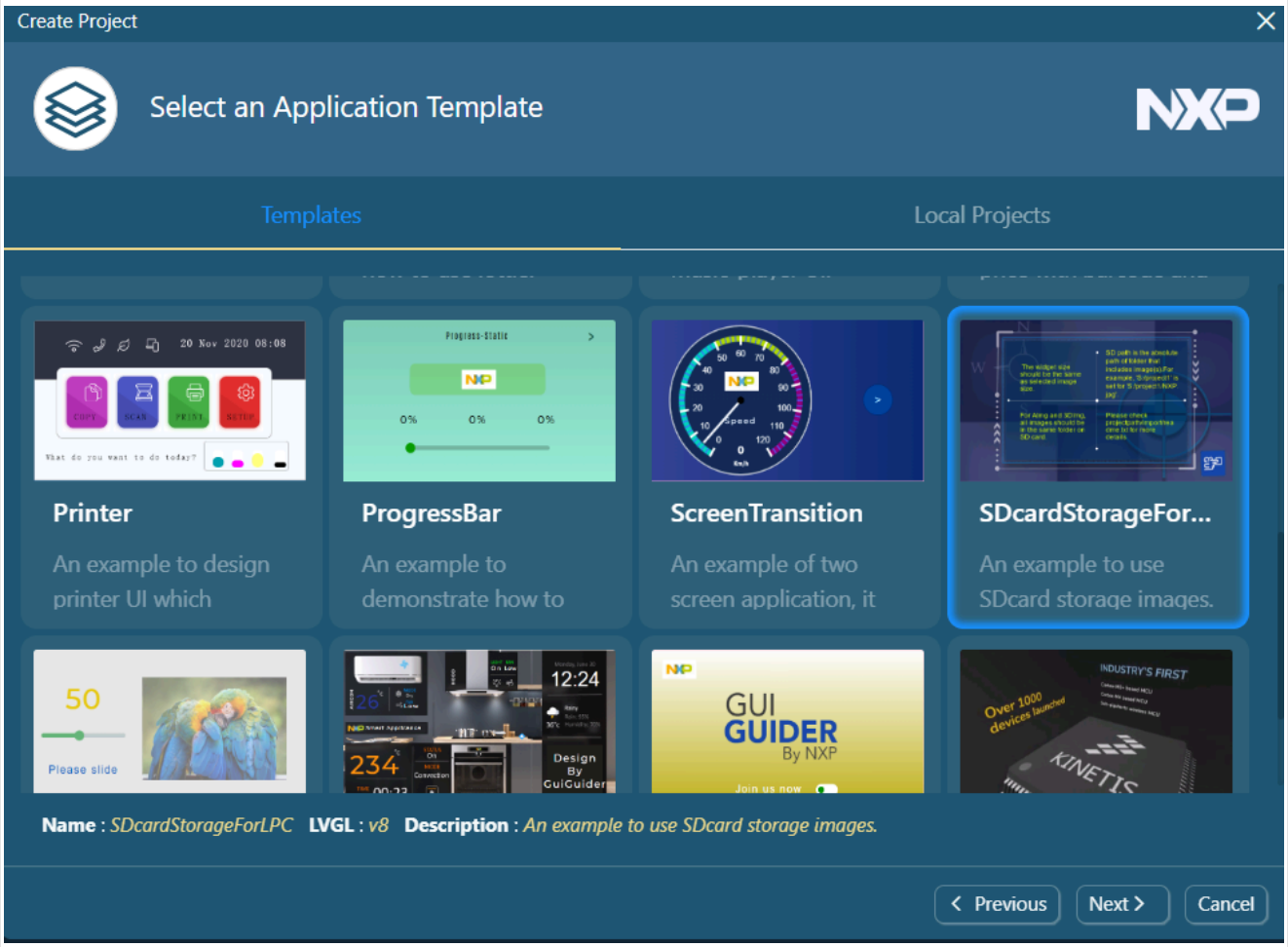


Figure 169. Create a project

2. Open the project folder by clicking the "Open project directory" icon, which is in the right-upper corner of the preview window.
3. The image files are located in the import folder.

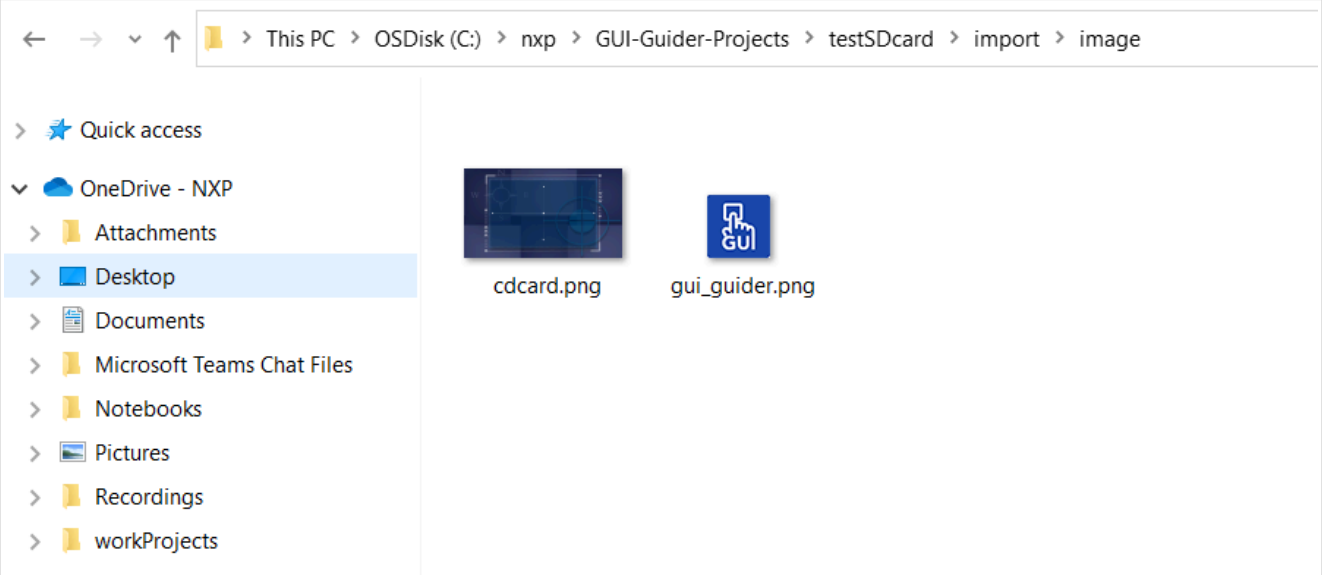


Figure 170. Import folder

4. The SD card storage can be enabled in the attribute setting window of image-related widgets.

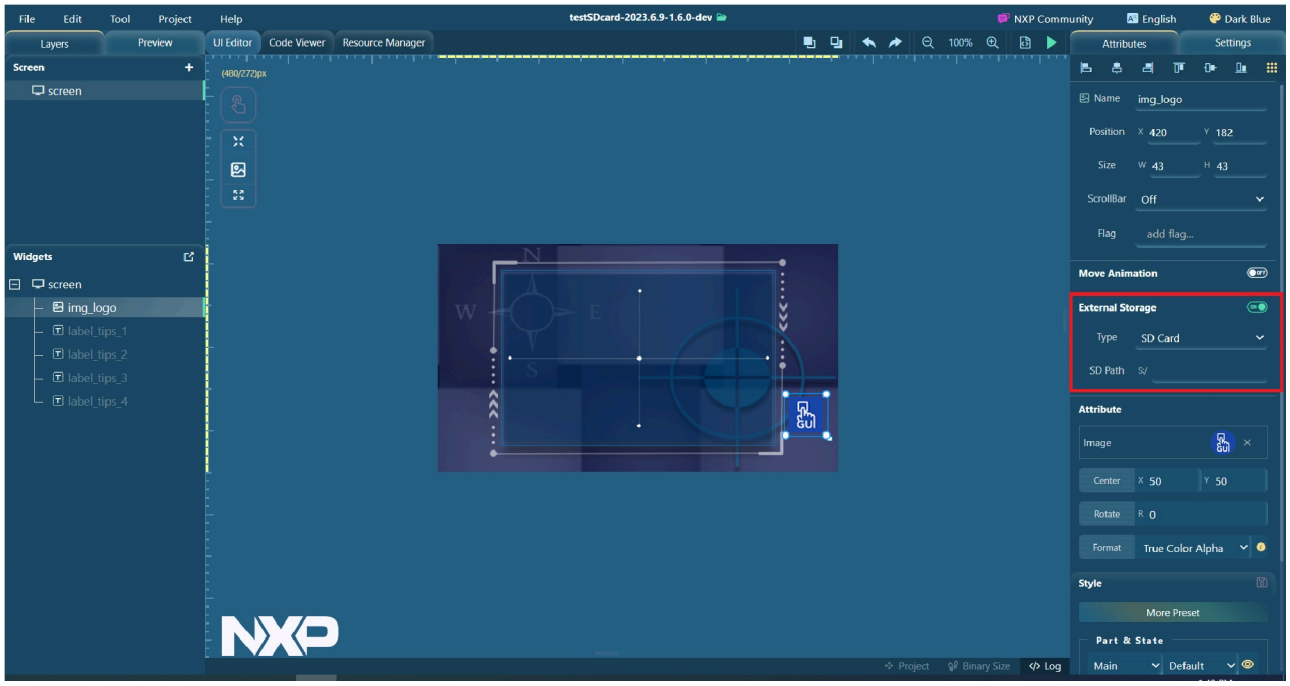


Figure 171. Attribute setting window

Copy the images into the SD card of the MCU device. If SD card storage is enabled, keep the SD path the same as the actual file folder on SD.

Note: *For the LVGL file system, use single/as a path separator.*

11.3.3 Customized project

When using image-related widgets, follow the steps to store images on the SD card.

1. Drag and drop the widget into the editor and set the attributes.

2. Open project folder > import. Confirm one or more image files that you want to save in SD, and copy those images to the SD card of the MCU device.
   Note: *All image files of Aimg and 3Dimg should be in the same folder on the SD card.*
3. Enable "External Storage" in the attributes setting window, and input the absolute path of the folder that includes one or more images.
4. Insert SD card to MCU device. To deploy the application on the board, click **Run** > **Target**.

12 External image in QSPI Flash

To provide maximum flexibility, LVGL supports following image sources:

- A variable in code (a C array with the pixels).
- A file stored externally (for example, on an SD card or QSPI flash).
- A text with symbols.

An attractive GUI is reliant upon well-designed images. The more complex the GUI is, the more these assets are required. Building the images into firmware is impossible if the selected MCU does not have adequate flash storage. Therefore, storing the images externally is a way to fit this case with reduced firmware size.

To use an external image, you must use LVGL's file system module and register a driver with some functions for the basic file operation. Go to the File system to learn more. Currently, GUI Guider supports:

- Images with PNG/JPG/BMP/binary format on an SD card with FatFs file system
- Images with binary format on QSPI flash with rawfs file system

As a demo, this document mainly focuses on putting images on imxrt1060evk QSPI flash.

12.1 Prerequisites

- GUI Guider 1.6.0
- MCUXpressoIDE or Keil or IAR

12.2 Create a project

To create a GUI Guider project, follow the steps below:

1. select the **Create a new project** button.

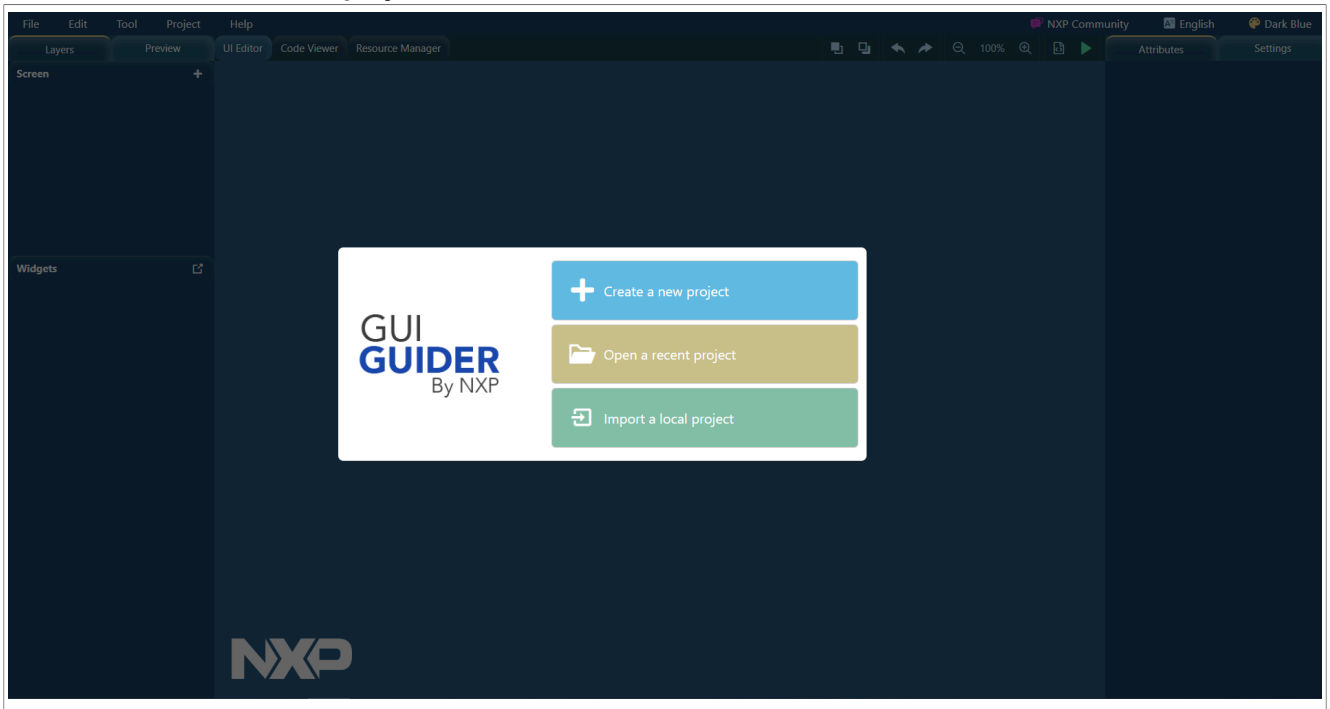


Figure 172. Select "Create a new project"

2. Select LVGL version as **v8.3.5** and click the **Next** button.

Figure 173. Select LVGL version

3. Select **MIMXRT1060-EVK** as target board template and then click the **Next** button.

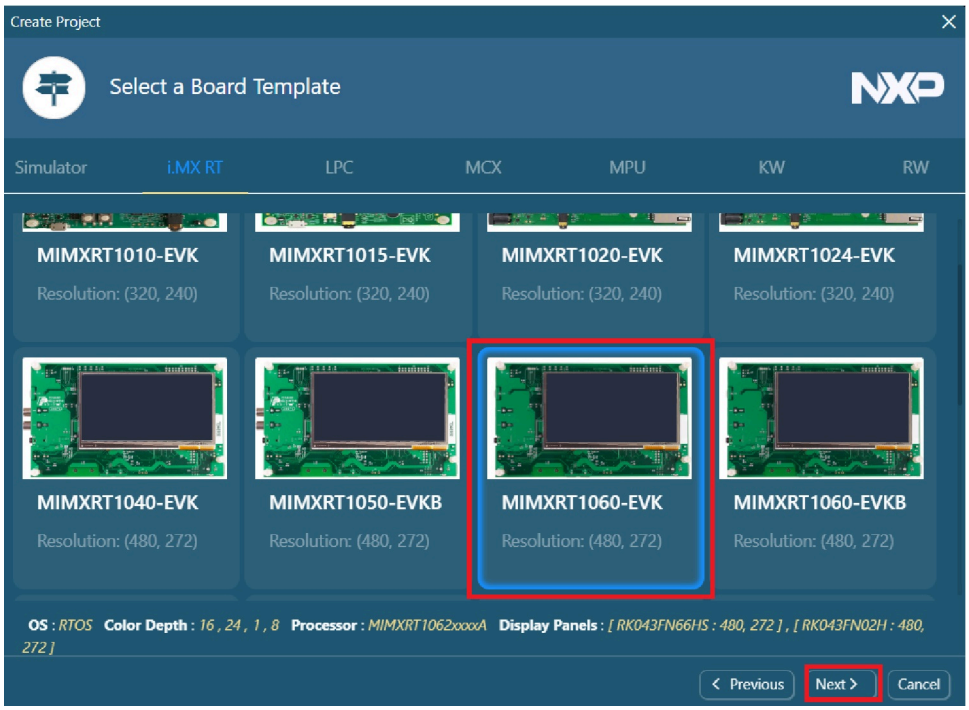


Figure 174. Select target board

4. Select an empty application template, **EmptyUI**.

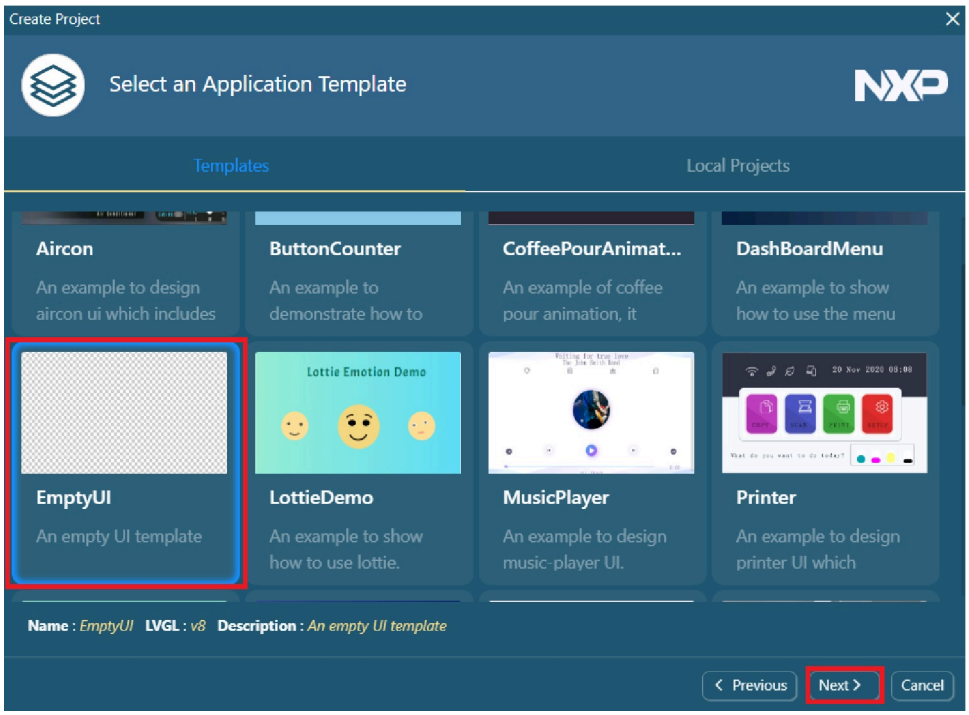


Figure 175. Select an empty application

5. Perform project settings, such as project name, project location, panel type, and color depth. Click **Create**.

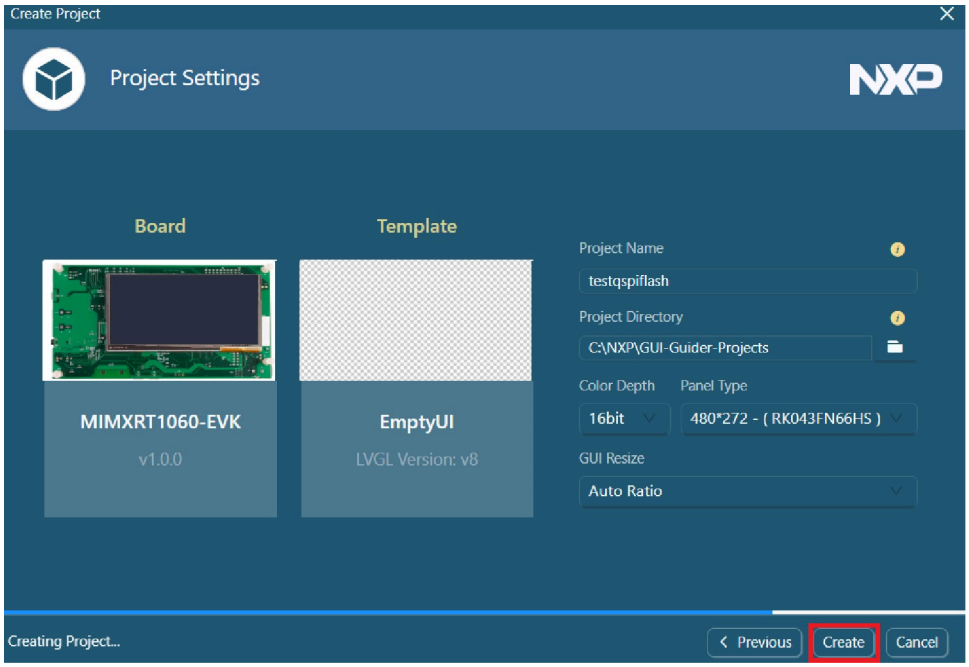


Figure 176. Project settings

6. The created project is shown.

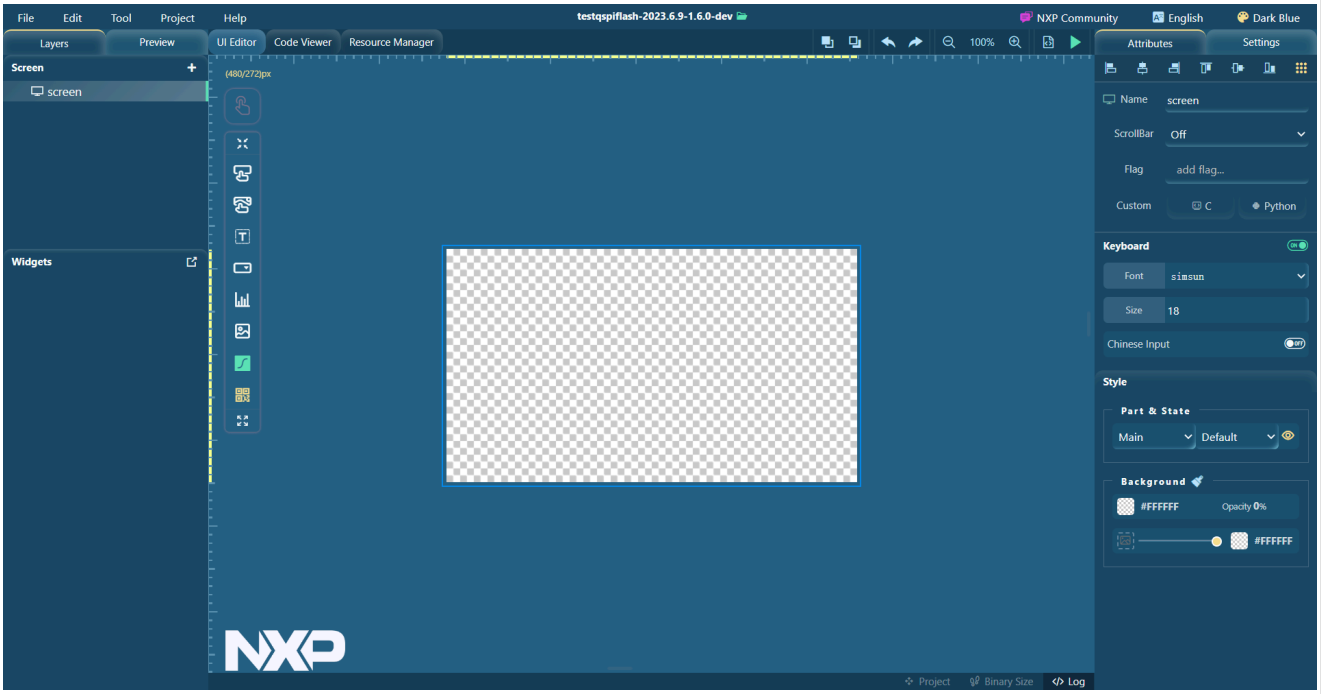


Figure 177. Project is created

12.3 Add image widget and set property

To add an image widget and set its properties, follow the steps below:

1. Click **img** in the **Widgets** tab and a new image widget is added into the workspace. Set "External Storage" as "on" and make sure "flash" type is selected.

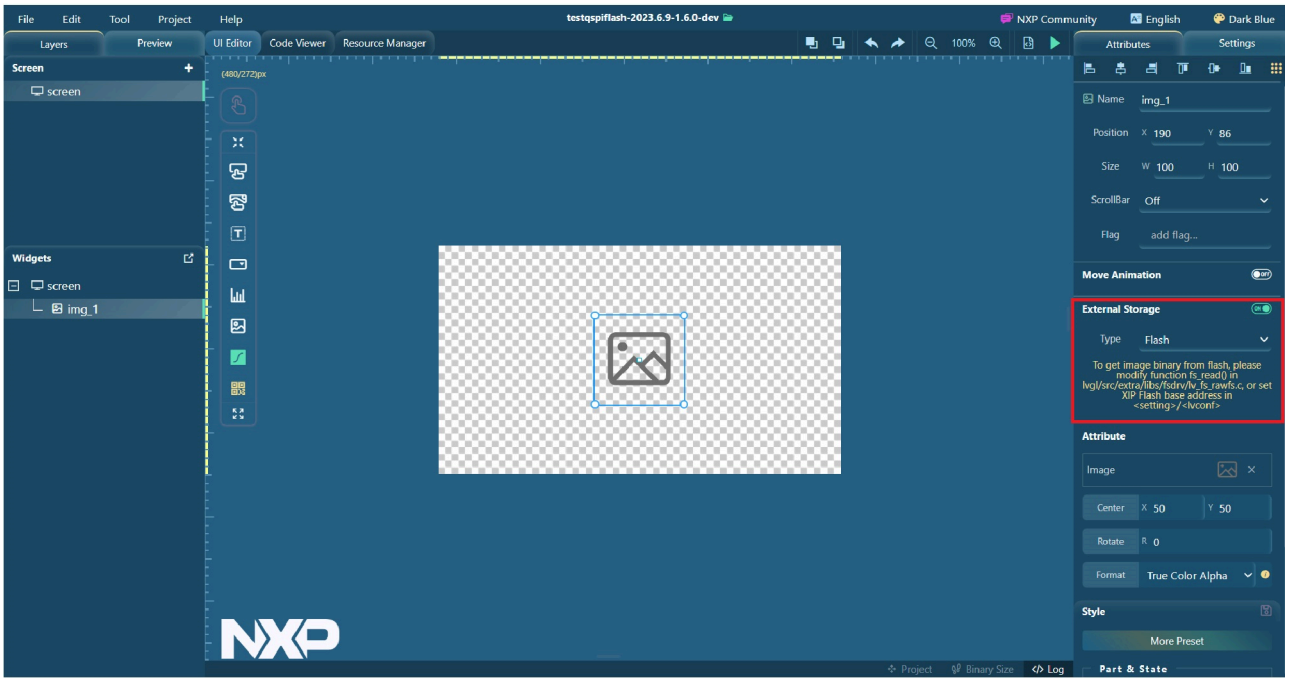


Figure 178. Set External Storage

2. Import the local image file and set it in the image widget attribute.

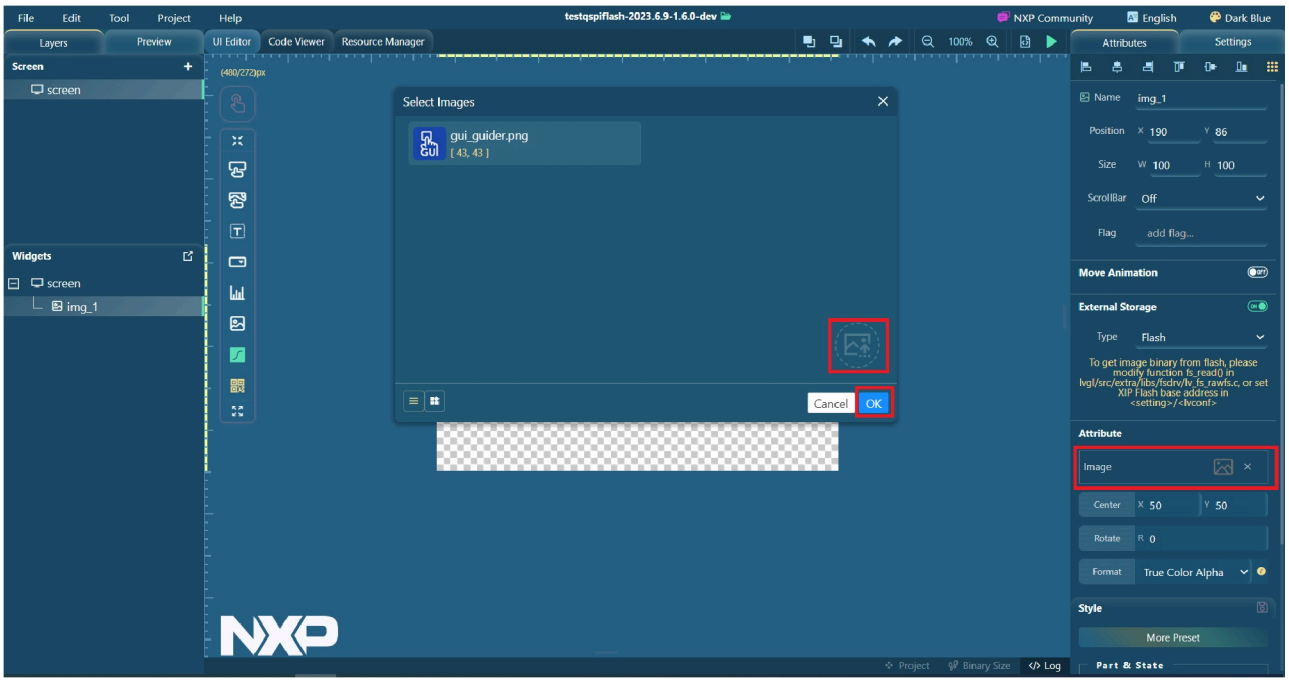


Figure 179. Import local image file

12.4 Build and deploy

Connect the supported device to the host by a USB cable. Follow the steps below:

1. Select **Image Binary in XIP flash** in **Setting** > **lvConf**, and set "Base Address" as **0x60600000**.

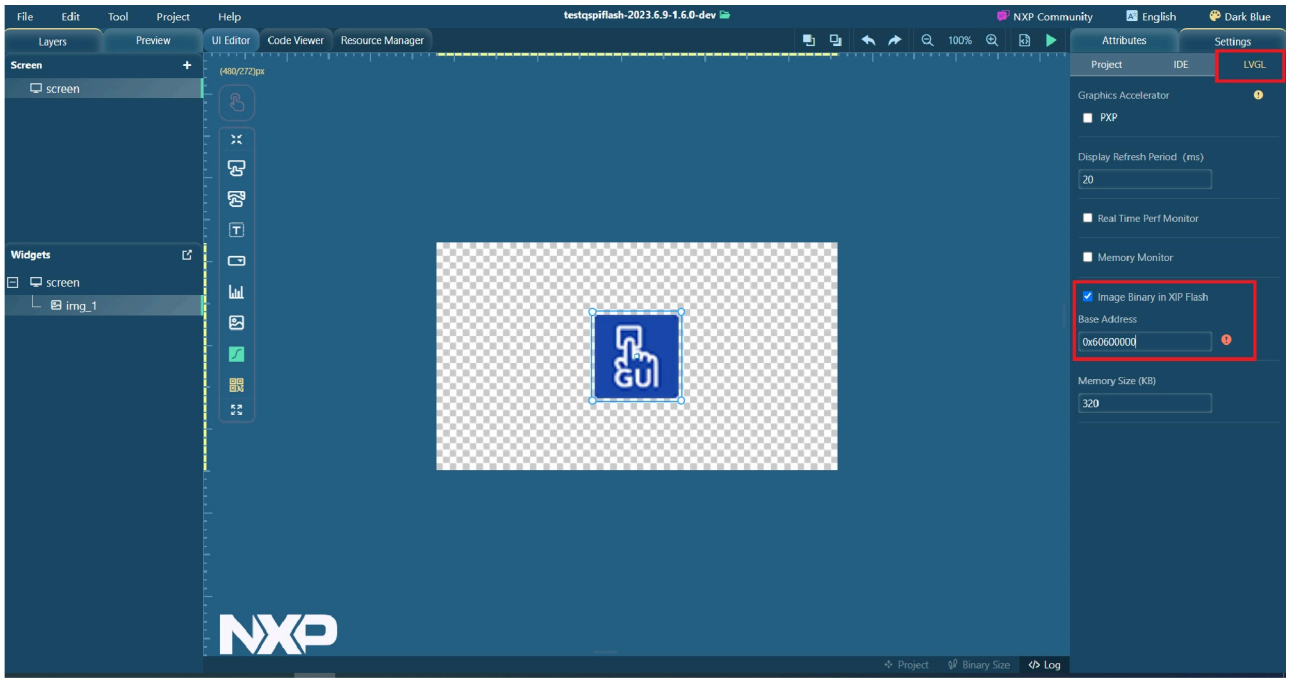


Figure 180. Set Base Address

Note: *In computer science,* ***execute in place (XIP)*** *is a method of executing programs directly from long-term storage. For this to work, one requirement is that the storage must provide a similar interface to the CPU as regular memory. In this demo, we put the image binary on XIP flash, which can be accessed directly via a base address. This is just for the demonstration of how external images are supported. It is more efficient and simple to link the image as a C array with the pixels in the firmware.*

Note: *Another real case in which the flash storage cannot be accessed directly via a base address is covered in the subsection below.*

Note: *imxrt1060evk ships an 8 MB Quad SPI flash, with the address from 0x60000000 to 0x607FFFFF. In this demo, we put the image binary to flash starting at address* ***0x60600000****, leaving 2 MB space for the image binary and 6 MB space for the firmware. You can adjust it based on the size of the image binary and firmware.*

2. Generate source code, build, and deploy. We choose "Keil" as an example here.

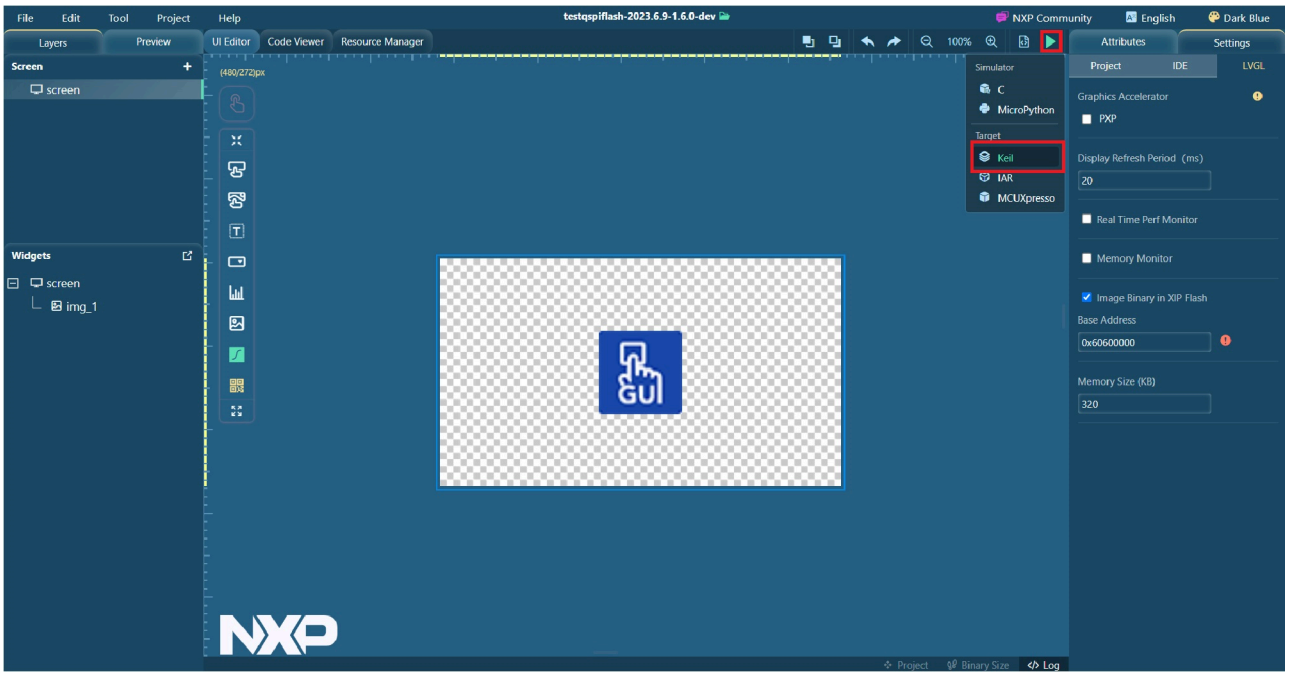


Figure 181. Choose Keil

Note: *There is no output as the image binary is not programmed to the flash until now.*

3. Program the merged image binary to flash at address **0x60600000**. The image binary can be found at `<project path>/generated/images/mergeBinFile.bin`.

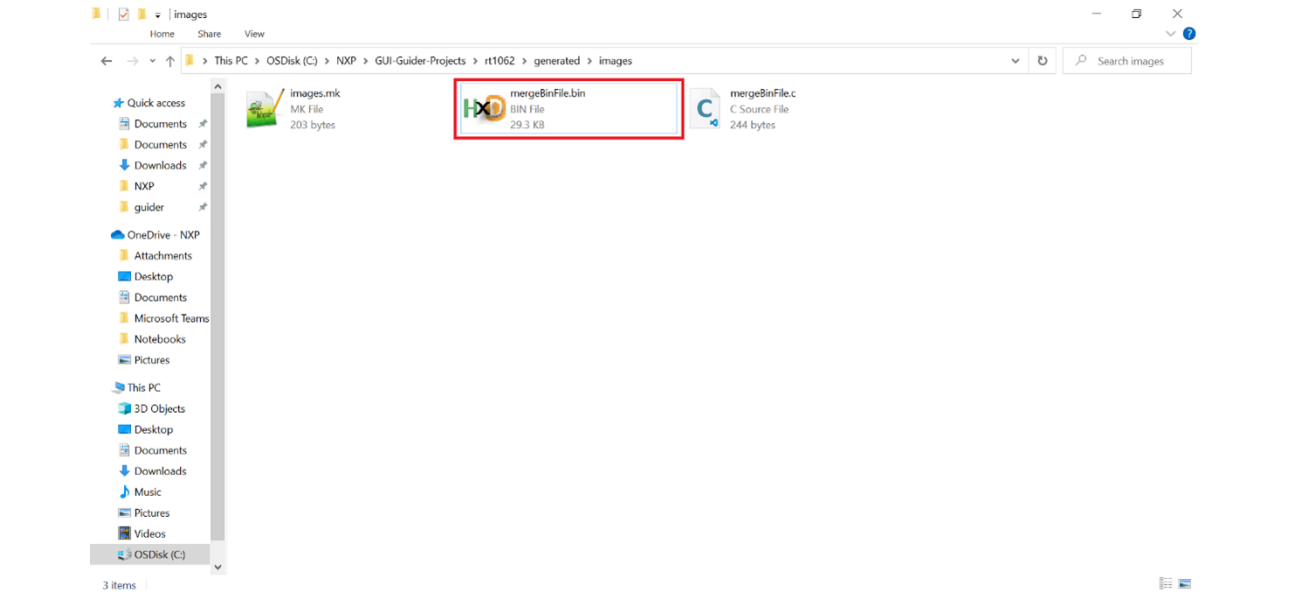


Figure 182. Program the merged image binary

4. Reset the board. The image widget should be shown normally.

12.5 Image Binary in non-XIP flash

One real case is that the flash cannot be accessed directly via a base address. In this case, you must import the corresponding flash driver and implement the read logic in function `fs_read()` of `file lvgl/src/extra/libs/fsdrv/lv_fs_rawfs.c`. Follow the steps below:

1. Deselect the **Image Binary in XIP Flash** checkbox.

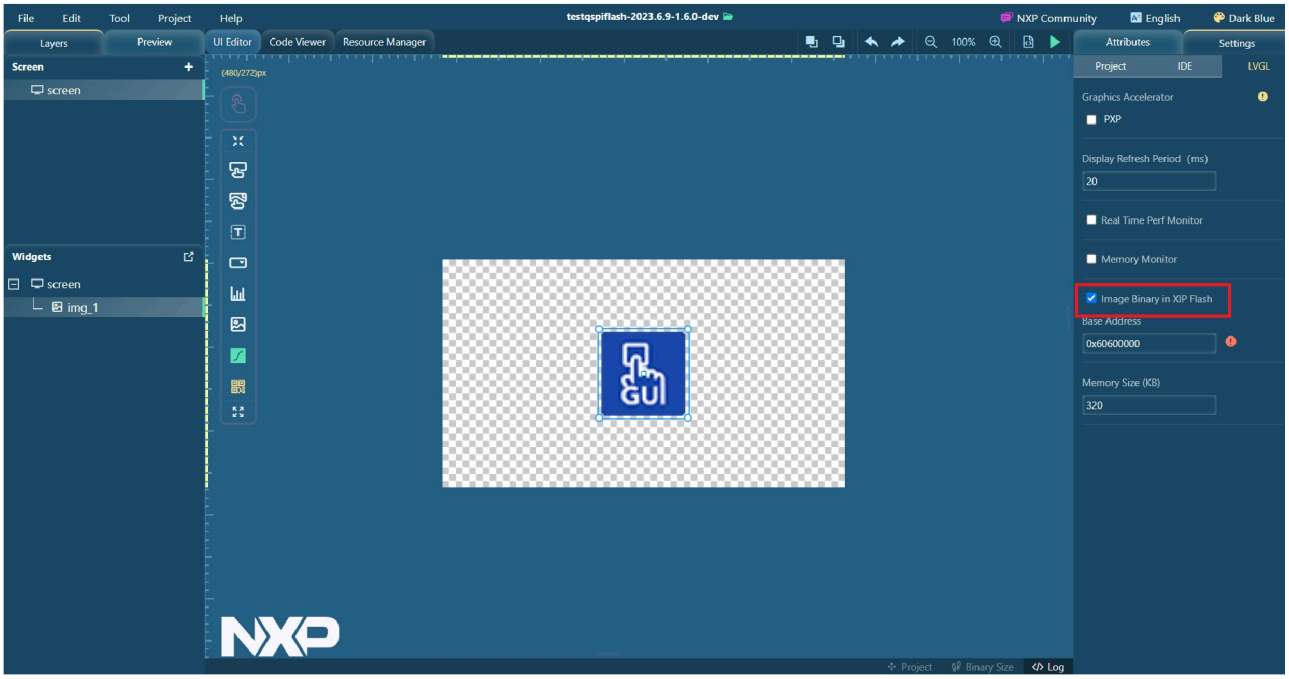


Figure 183. Deselect Image Binary in XIP Flash

2. Modify the file `lvgl/src/extra/libs/fsdrc/lv_fs_rawfs.c`. Add code to implement the logic to read from flash in function `fs_read()`.

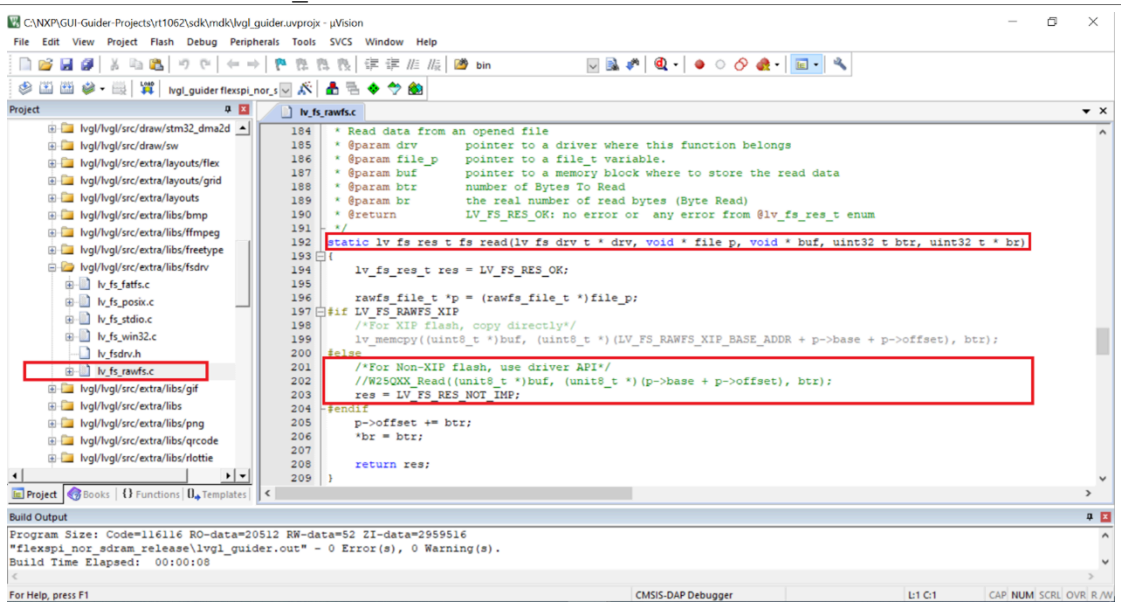


Figure 184. Add code

3. Rebuild the firmware and deploy it to the flash.
4. Program the merged image binary to flash. The image binary can be found at `<project path>/generated/images/mergeBinFile.bin`.
5. Reset the board.

13 Frequently Asked Questions (FAQs)

This chapter lists the Frequently Asked Questions (FAQs) about GUI Guider.

Question: How to avoid simulator running the MCU-specific code?

Answer: GUI Guider provides a predefined macro `LV_USE_GUIDER_SIMULATOR` in `lv_conf.h`. Do the following changes in your source files:

```
#if !LV_USE_GUIDER_SIMULATOR // or LV_USE_GUIDER_SIMULATOR == 0
...(MCU specific Code)
#endif
```

Question: What should I do if the project upgrade fails?

Answer: The backup project can be found in the workspace folder if you enable the backup function during upgrade. Use previous version for development and report the issue in https://community.nxp.com/t5/GUI-Guider/bd-p/GUI-Guider.

Question: What to do if the effect is inconsistent after upgrading the project?

Answer: It is necessary to manually adjust the style to compare with the old project, for example, font size, font position.

Question: How to reuse applications on other boards?

Answer: When creating a project, select an existing project as a template, according to the auto-size function configuration board display.

Question: How to do the Meter control realize the rounded rectangle needle?

Answer: Use the image needle.

Question: How to resolve the issue if touch or display does not work?

Answer: The issue is possibly caused if an incorrect panel type is selected. Check the panel type of your project.

Question: When lottie widget is used in the project, some black lines flicker at the bottom of the screen. What should I do to fix this issue?

Answer: Import the project using the MCUXpresso IDE. See Section 8.1, then build and deploy the image using the MCUXpresso IDE.

Question: How to customize and modify `lv_conf` macro without being automatically overwritten by GG?

Answer: Customize `lv_conf.h` options using `lv_conf_ext.h` in custom folder.

Question: How to add custom code for different widgets in event setting window?

Answer: When the custom code is updated for a widget, close the custom code editor and click another widget. Then, open the custom code editor in event setting window and input the custom code for selected widget.

Question: When running the lvgl v7 project with "Run > MCUXpresso" build failed.

Answer: Check the MCUXpresso IDE version. Make sure that the version is lower than 11.8.0.

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15 Revision history

Table 63 summarizes the revisions to this document.

Table 63. Revision history

Revision number	Date	Substantive changes
0	29 October 2020	Initial release
1	17 November 2020	Updated Work with MCUXpresso IDE
2	11 January 2021	Added and updated multiple sections
3	10 May 2021	Added and updated multiple sections for v1.1
4	30 July 2021	Added and updated multiple sections for v1.2
5	29 September 2021	Updated multiple sections for v1.2.1
6	07 January 2022	Updated multiple sections for v1.3.0
7	31 March 2022	Updated multiple sections for v1.3.1
8	25 July 2022	Updated multiple sections for v1.4.0
9	23 September 2022	Updated multiple sections for v1.4.1
10	10 January 2023	Added and updated multiple sections for v1.5.0
11	31 March 2023	Updated multiple sections for v1.5.1
12	31 July 2023	Updated multiple sections for v1.6.0

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