

megawin

MG32CoGen v2.0

User Manual

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1. Introduction

The “MG32CoGen v2.0” is a software designed for megawin’s M0 series. It is a graphical tool, in addition to the GPIO and CSC in the first version, it also adds many peripherals for user. Users can easily configure the initial settings of these peripherals and produce the sample project used in Keil-MDK.

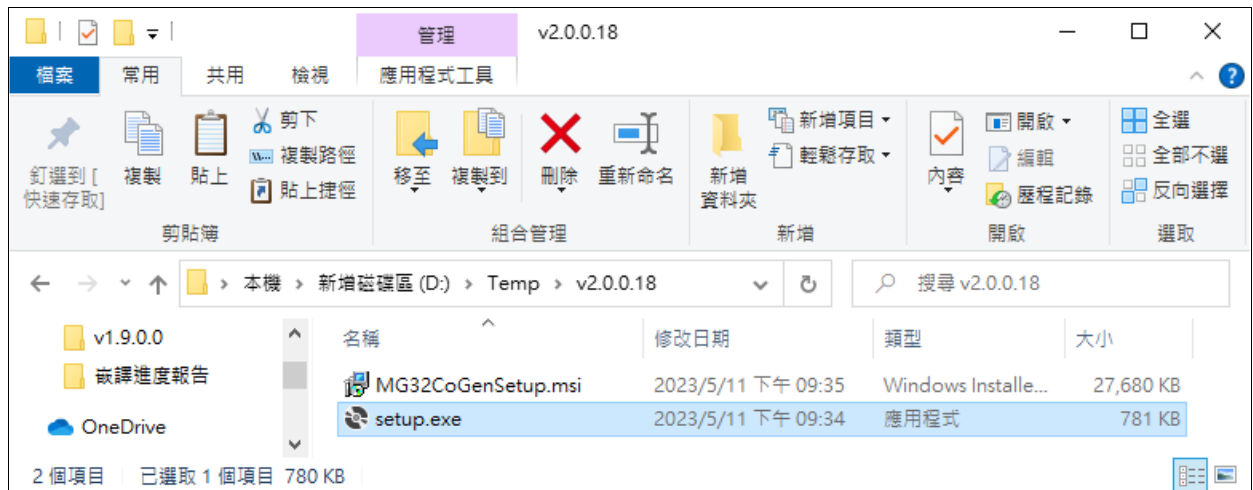
The newly added features are listed below:

- 1.1. Supports both Simplified Chinese and English user interface.
- 1.2. Add NVIC 、ADC 、CMP 、DAC 、Timers 、I2C 、SPI and UART.
- 1.3. Added independent program “Pack Manage” to manage the installation and removal of each Packs.
- 1.4. Added support for MG32F02V032.

2. Install software

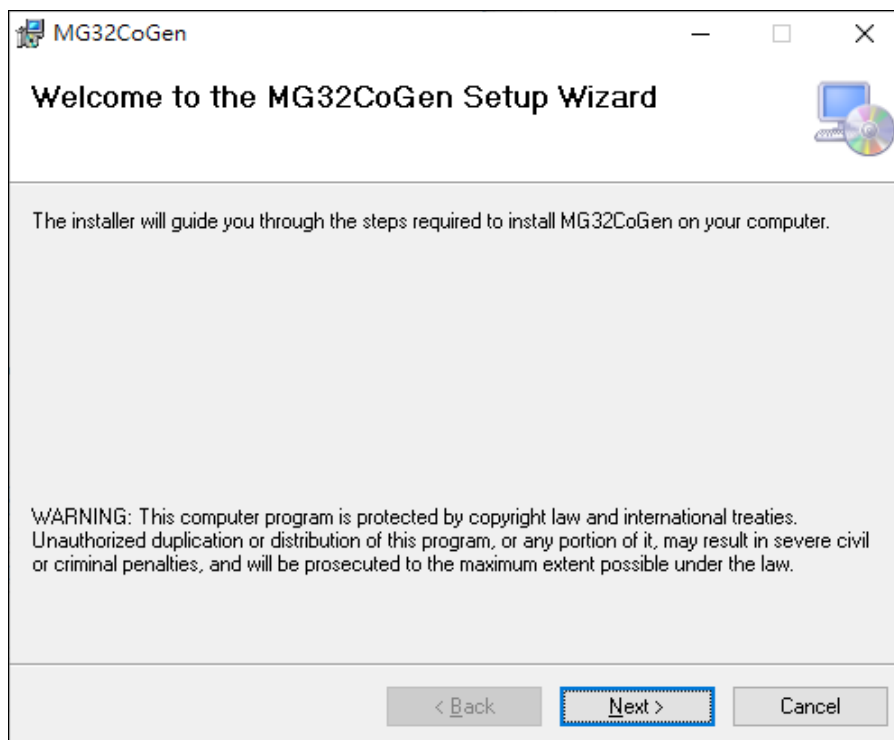
The following sections will demonstrate how this tool can be installed very easily. The following figure shows the files of the software pack.

2.1. Double click the file “setup.exe”.



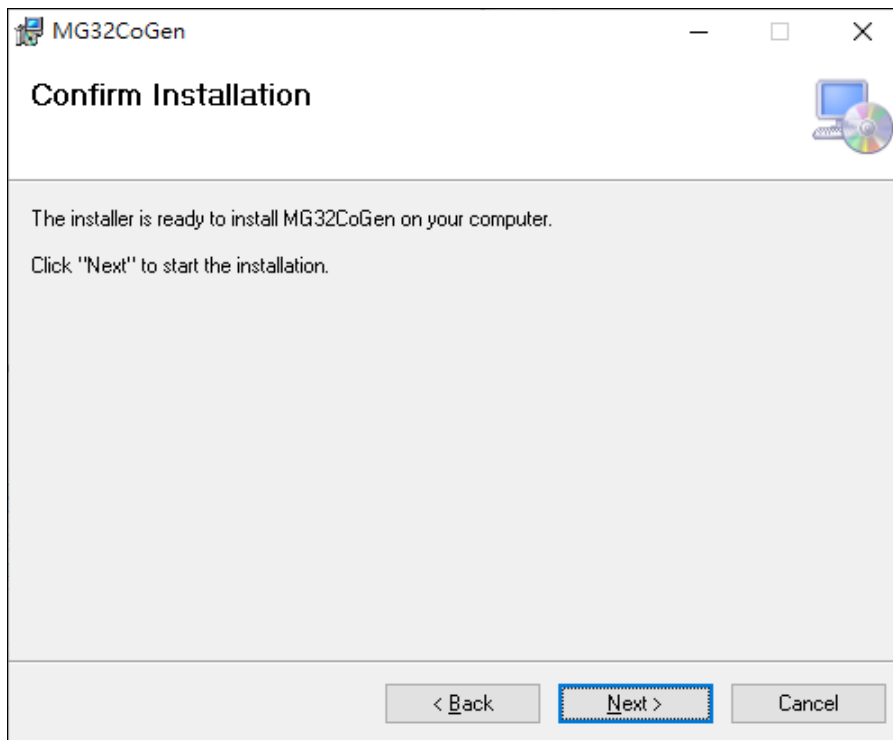
(Figure 1)

2.2. Click the “Next >” button.



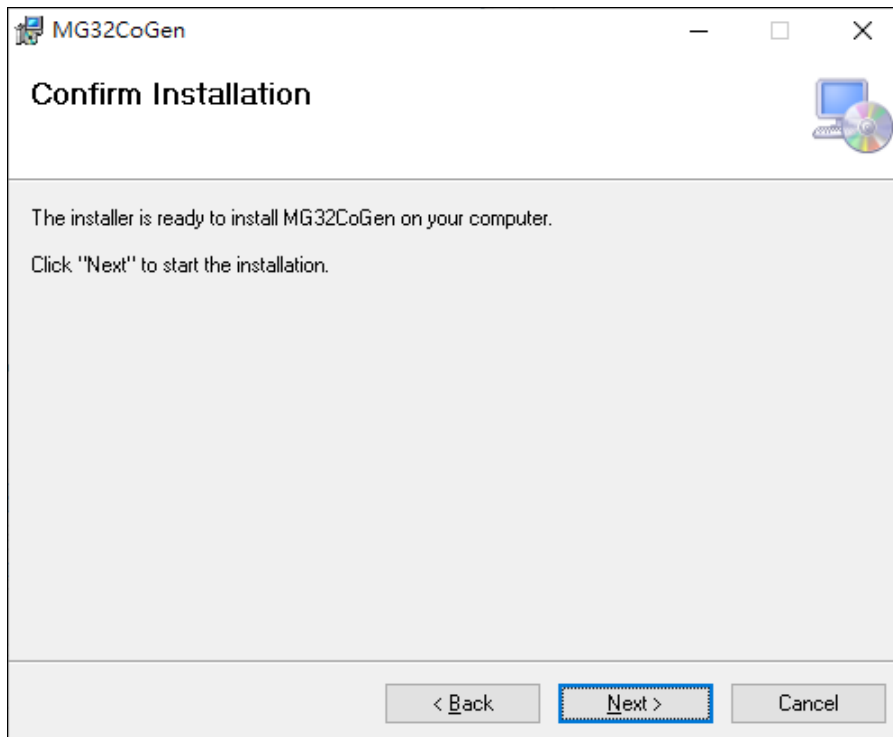
(Figure 2)

2.3. Use the default setting, click the “Next >” button.



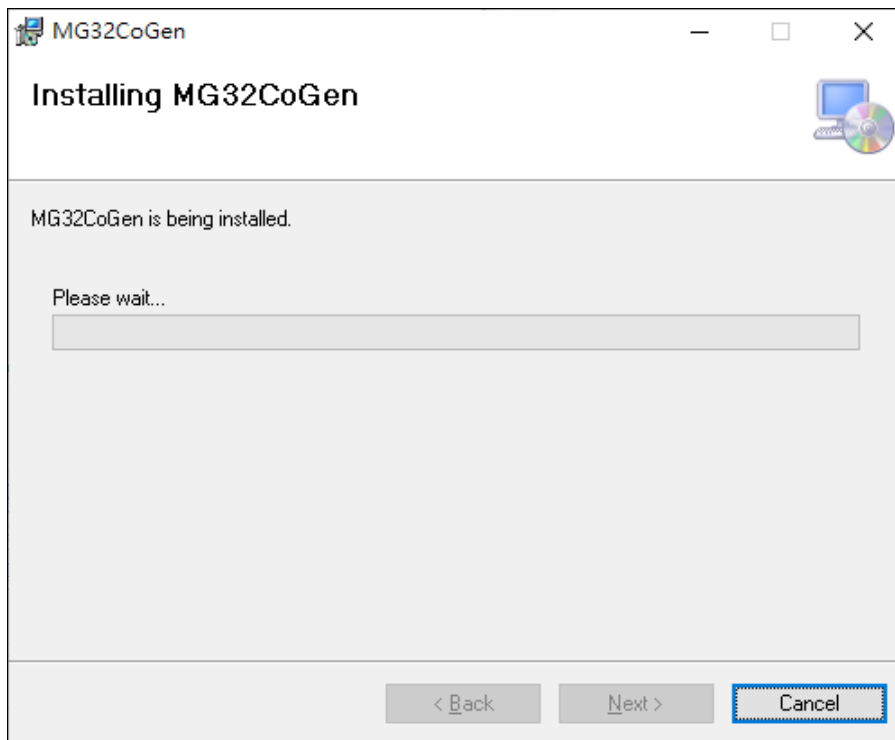
(Figure 3)

2.4. Click the “Next >” button



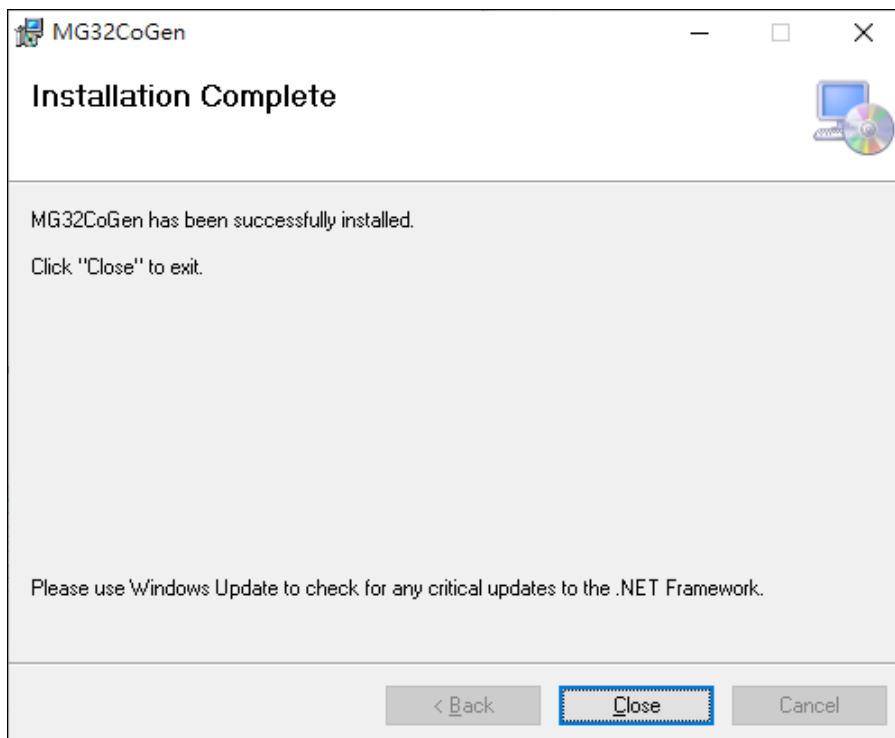
(Figure 4)

2.5. If an UAC dialog is displayed, just click “Yes” to go to next step.



(Figure 5)

2.6. Just click “Close” button to finish the installation.

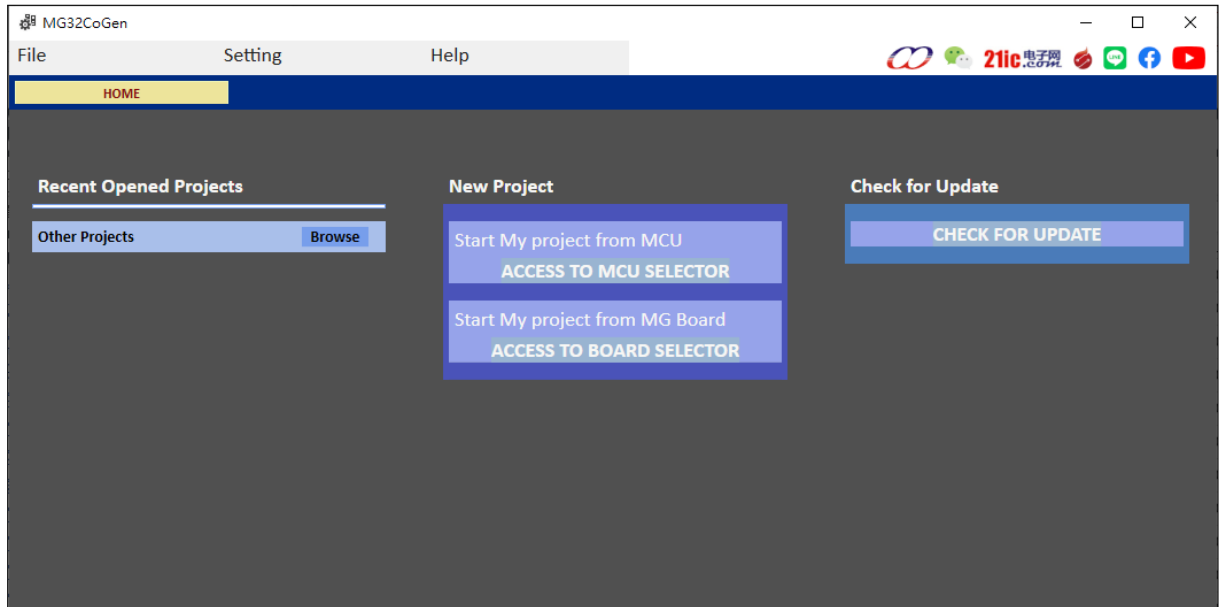


(Figure 6)

3. User Interface

3.1. HOME interface

The HOME interface shows as Figure 7, it is divided into three blocks.



(Figure 7)

3.1.1. Recent Opened Projects:

The application keeps up to five recently used projects. User can click one item in the list to open the project directly or click “Browse” to select the specific project.

3.1.2. New Project:

User can create a new project by selecting MCU or MG Board. The difference between MCU and MG Board is the project created by selecting the MG Board will has a setting that has been configured.

3.1.3. Check for Update:

The application will check if there is a new version of application on the web site.

3.2. File Menu

- 3.2.1. New Project: Creates a project from MCU Selector or Board Selector.
- 3.2.2. Load Project: Opens an existing project.
- 3.2.3. Save Project: Saves the current project.
- 3.2.4. Save Project As: Saves and renames the current project.
- 3.2.5. Close Project: Close the current project.
- 3.2.6. Recent Project: Lists the most recently used projects.
- 3.2.7. Exit: Quit MG32CoGen and prompts for saving project.

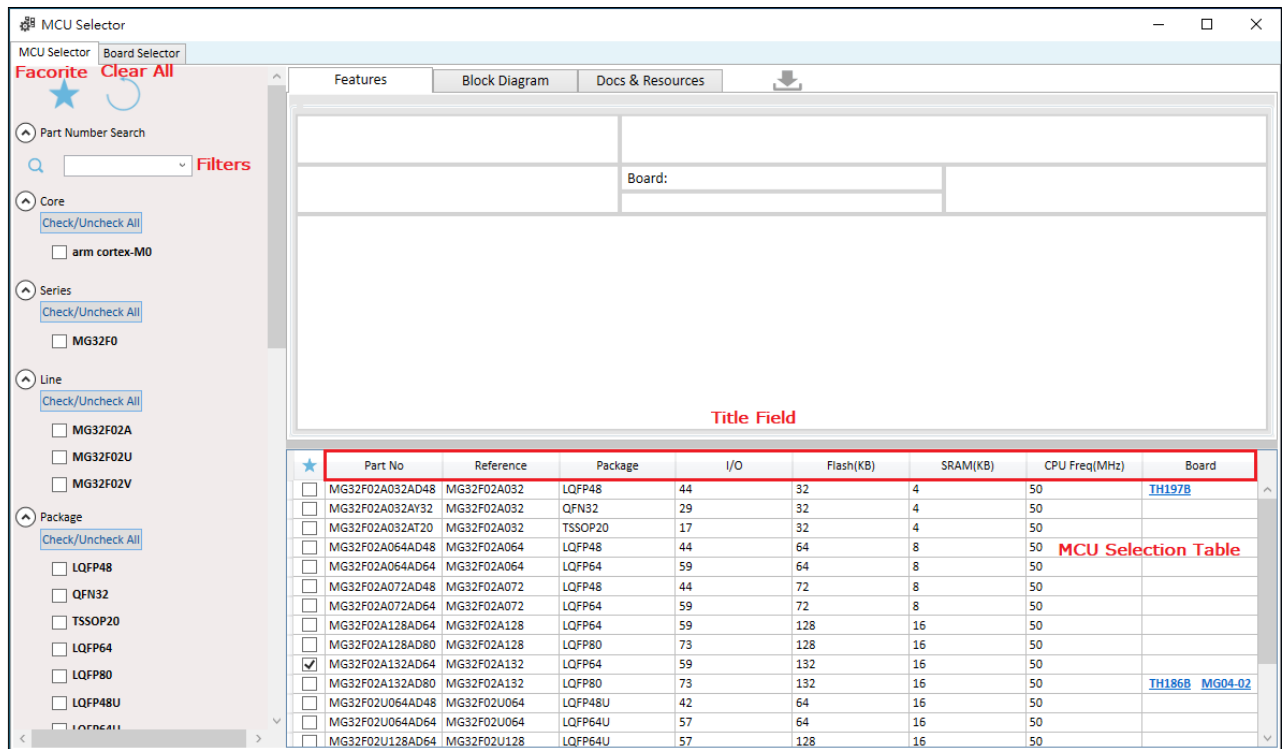
3.3. Setting Menu

- 3.3.1. Language: Choose a language from the submenu to switch the user interface. The application supports “English” and “简体中文”
- 3.3.2. Firmware Development Package Default: Choose a version of Firmware Development Package as default setting.
- 3.3.3. Package Direction: Choose the first pin’s position of a chip relative to logo.
Left bottom: Please refer to figure 33.
Left top: Please refer to figure 15.

3.4. Help Menu

- 3.4.1. About: Displays version numbers, hyper link and license information.
- 3.4.2. Check for Update: Check out www.megawin.com.tw for new available updates.
- 3.4.3. Pack Manage: Execute a standalone program “Pack Manage”.

4. Create a new project from MCU



(Figure 8)

4.1. Filters: The left side panel of the user interface has many filter options the user can select. All the filter conditions are connected by the logical AND then the filter result will be shown in “MCU Selection Table”.

4.1.1. Clear all: Clear all the filter condition.

4.1.2. Favorite: User can select the favorite item in MCU Selection Table and use the button to hide all the other items. The favorite items will be displayed when the application run again at the next time.

4.1.3. Part Number Search: User can type substring in the text box to search for the specified Part No.

4.2. MCU Selection Table:

4.2.1. When user use the left button of the mouse to click any row of the table. The information about the MCU will be displayed on the upper part.

4.2.2. When user use the left button of the mouse to double click in one row, a new MCU project will be created.

4.2.3. Click the cell in “Board” column in MCU Selection Table, it will be navigate to Board Select Tab.

4.2.4. Click the title field (refer to Figure 8) in MCU Selection Table, the content will be sorted according the title field.

4.2.5. Click the title row with the right mouse button, a context menu will display for user to click on the filed name to be displayed.

★	Part No	Reference	Package	I/O	SRAM(KB)	CPU Freq(MHz)	Board
<input type="checkbox"/>	MG32F02A032AD48	MG32F02A032	LQFP48	44	4		
<input type="checkbox"/>	MG32F02A032AY32	MG32F02A032	QFN32	29	4		
<input type="checkbox"/>	MG32F02A032AT20	MG32F02A032	TSSOP20	17	4		
<input type="checkbox"/>	MG32F02A064AD48	MG32F02A064	LQFP48	44	8		
<input type="checkbox"/>	MG32F02A064AD64	MG32F02A064	LQFP64	59	8		
<input type="checkbox"/>	MG32F02A072AD48	MG32F02A072	LQFP48	44	8		
<input type="checkbox"/>	MG32F02A072AD64	MG32F02A072	LQFP64	59	8		
<input type="checkbox"/>	MG32F02A128AD64	MG32F02A128	LQFP64	59	16		
<input type="checkbox"/>	MG32F02A128AD80	MG32F02A128	LQFP80	73	16		
<input checked="" type="checkbox"/>	MG32F02A132AD64	MG32F02A132	LQFP64	59	16		
<input type="checkbox"/>	MG32F02A132AD80	MG32F02A132	LQFP80	73	16		
<input type="checkbox"/>	MG32F02U064AD48	MG32F02U064	LQFP48U	42	16		
<input type="checkbox"/>	MG32F02U064AD64	MG32F02U064	LQFP64U	57	16		
<input type="checkbox"/>	MG32F02U128AD64	MG32F02U128	LQFP64U	57	16		
<input type="checkbox"/>	MG32F02U128AD80	MG32F02U128	LQFP80U	71	16		

Remove Current Column
☒ Part No
☐ Brief description
☒ Reference
☐ Core
☐ Series
☐ Line
☒ Package
☐ I/O
☐ Flash(KB)
☒ SRAM(KB)
☒ CPU Freq(MHz)
☐ ADC 12-Bits
☐ CCL
☐ COMP
☐ CRC
☐ DAC
☐ DMA

(Figure 9)

4.3. Features Tab: Display the features about the MCU.

Features
Block Diagram
Docs & Resources

MG32F02A072

MG32F02A072AD48
arm cortex-M0 MCU with 48MHz CPU, 72KBytes Flash, 8KBytes RAM, EMB and GPL functions

Board:
LQFP48

CPU Core

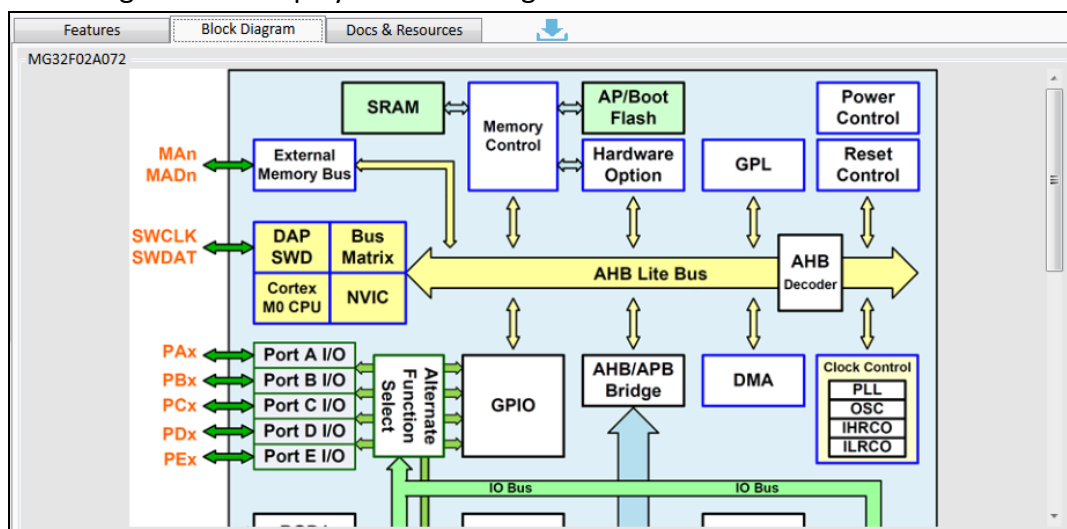
- ARM 32-bit Cortex-M0 CPU
- Operation frequency up to 48MHz
- Built-in one NVIC for 32 external interrupt inputs with 4-level priority
- Built-in one 24-bit system tick timer
- Built-in one single-cycle 32-bit multiplier
- Built-in one SWD serial wire debugger with 2 watch points and 4 breakpoints

Flash Memory

- Built-in embedded 72K bytes flash memory for application code
- Support ICP (In-circuit program) for ISP boot code update through SWD interface
- Support ISP (In-system program) for application code update

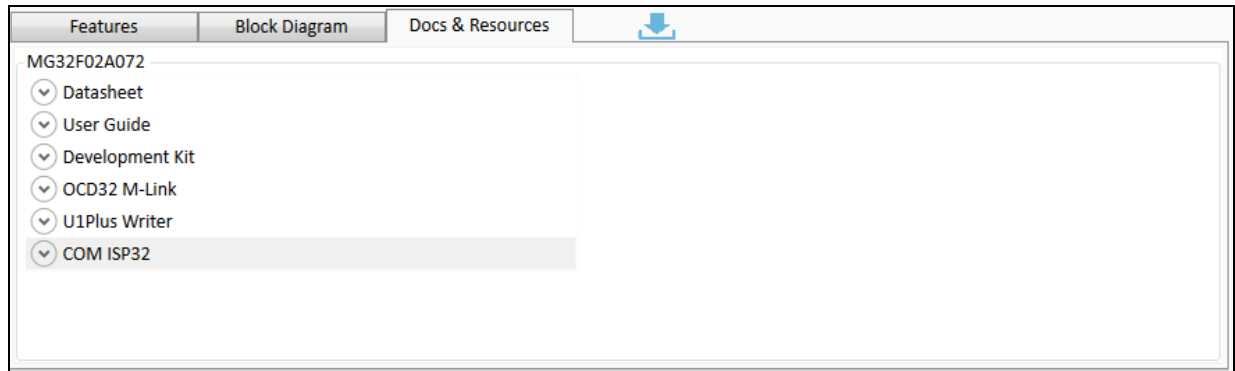
(Figure 10)

4.4. Block Diagram Tab: Display the block diagram about the MCU.



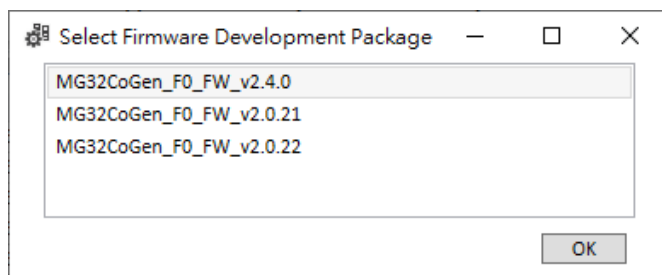
(Figure 11)

4.5. Docs & Resources Tab: List the resources available for download from the web site.



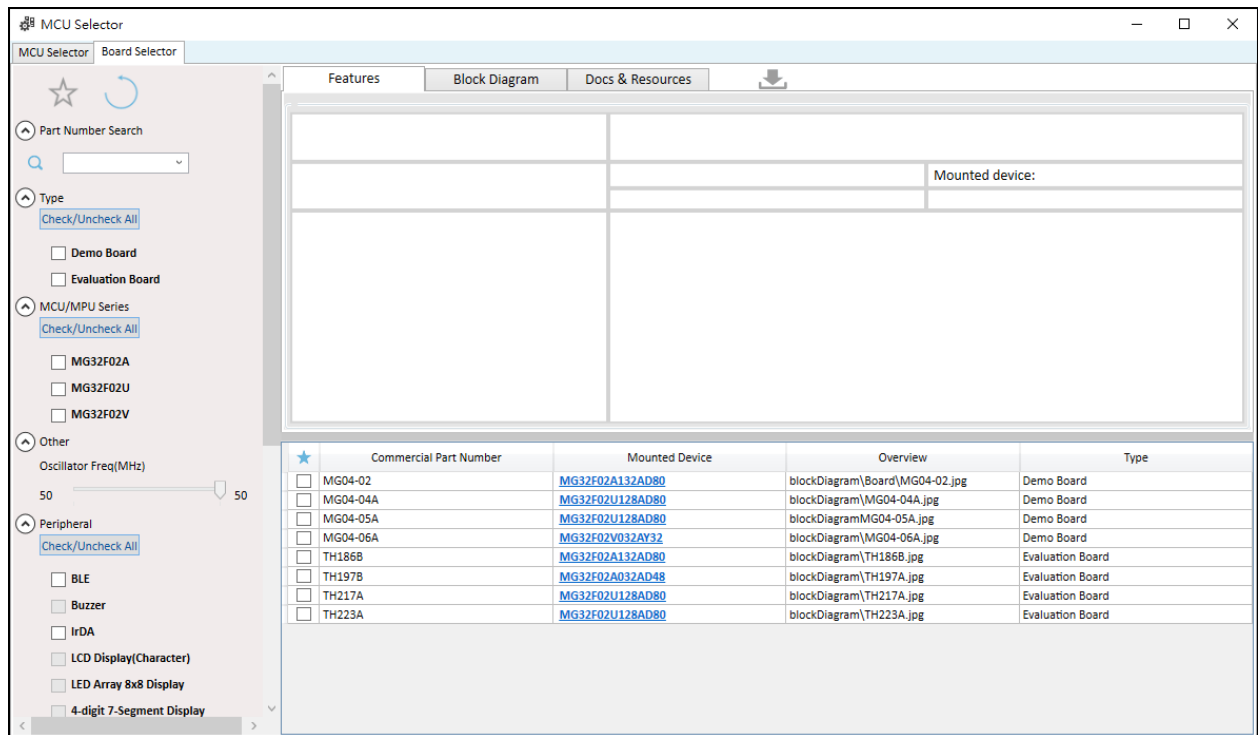
(Figure 12)

4.6. When users select a MCU from the MCU select table to start a project, the application will display a list of currently installed development package. Users must decide which version of development package to use.



(Figure 13)

5. Create a new project from MG Board

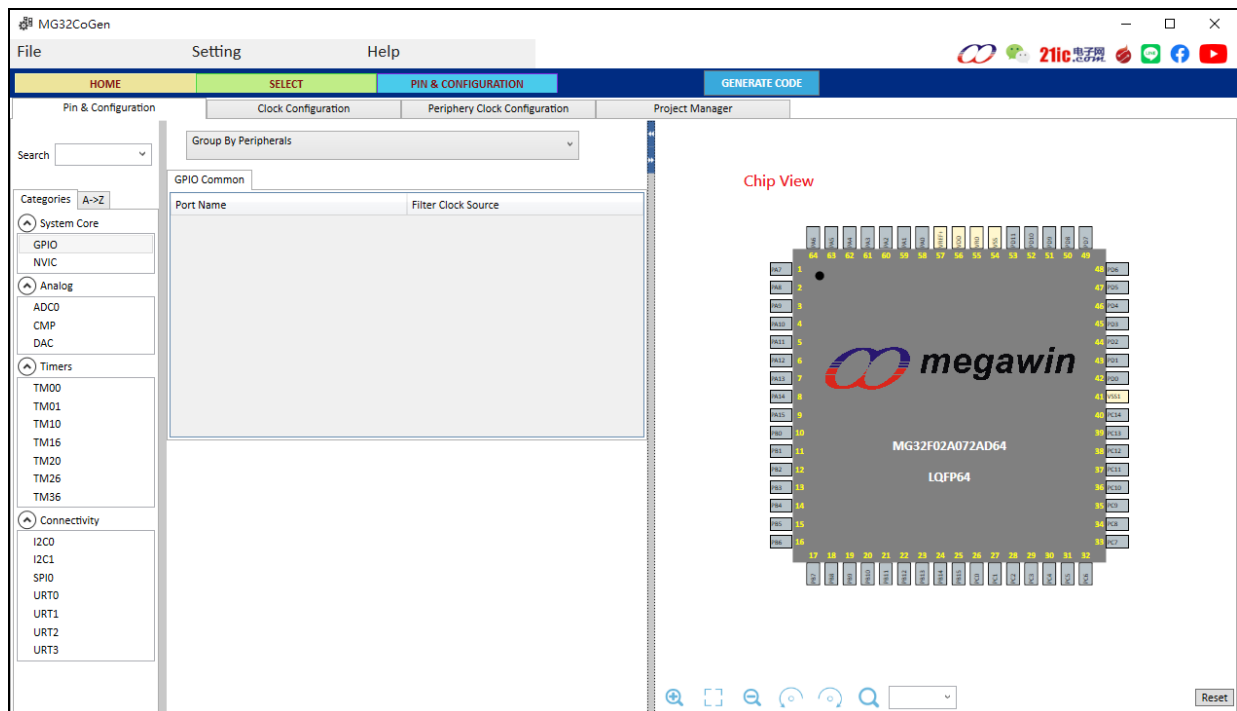


(Figure 14)

- 5.1. Filters: Please refer to the previous description.
- 5.2. Board Selection Table: Please refer to the previous description.
- 5.3. Features Tab: Please refer to the previous description.
- 5.4. Block Diagram Tab: Please refer to the previous description.
- 5.5. Docs & Resources: Please refer to the previous description.

6. Configure GPIO

The interface is on the PIN & CONFIGURATION → Pin & Configuration tab. It is shown as follows.



(Figure 15)

6.1. Categories:

6.1.1. Search: User can type text in the Combo-Box to search in the categories.

6.1.2. Click the “GPIO” item under System Core,

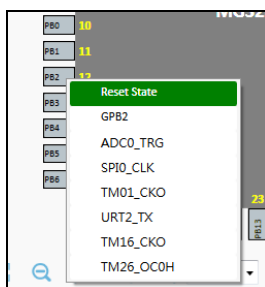
6.2. Chip View: On the right is a graphic showing the chip pins.

6.2.1. Adjusting the view: The view can be zoomed in and out with the mouse wheel. The position of the chip can be changed by dragging with the mouse. It can also be adjusted through the buttons as below, includes clockwise and counterclockwise rotation.



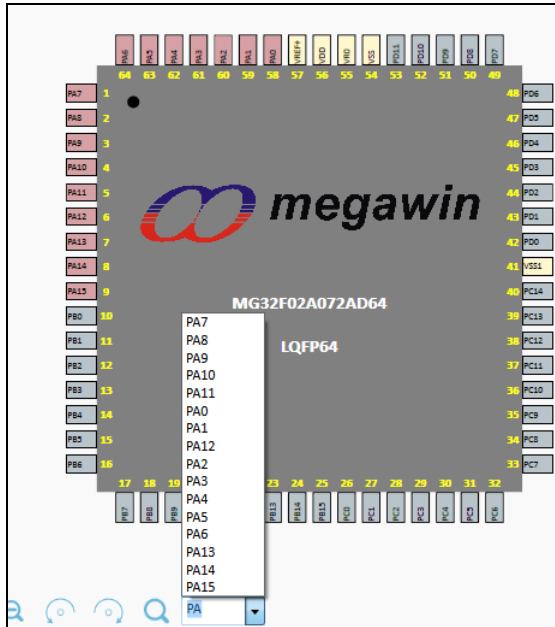
(Figure 16)

6.2.2. Select the function of the pin: To select the function of the pin, just click the left button of the mouse on the pin.



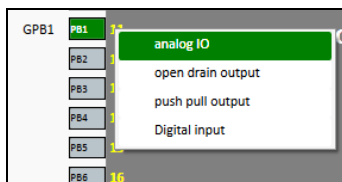
(Figure 17)

6.2.3. Find pins: Enter the pin name in the text box of Search combo-box, and the pins will be list in the list of Search combo-box and flash in the chip view.



(Figure 18)

6.2.4. Configure the pin mode: Click the left button of the mouse on the pin number with yellow color to select the IO mode of the pin.



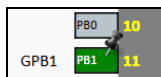
(Figure 19)

Note: The function of the pin must has be selected to configure the pin mode.

6.2.5. Pinning and User Label: Click the right button of the mouse on the pin name, the context menu will show up for user to configure.

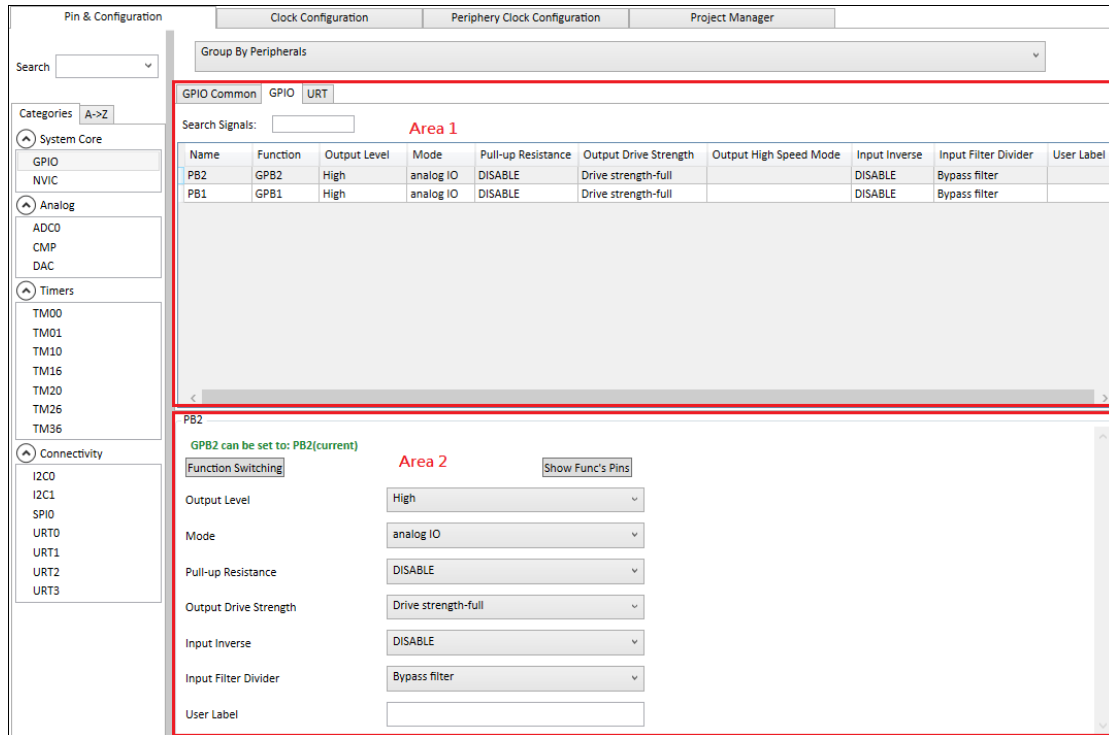
6.2.5.1. Enter User Label: To enter the name user defined to replace the original name.

6.2.5.2. Signal Pinning: Disable the selection of the function and IO mode of the pin, then user can only change the user label. A pin icon will appear on the pin name as below.



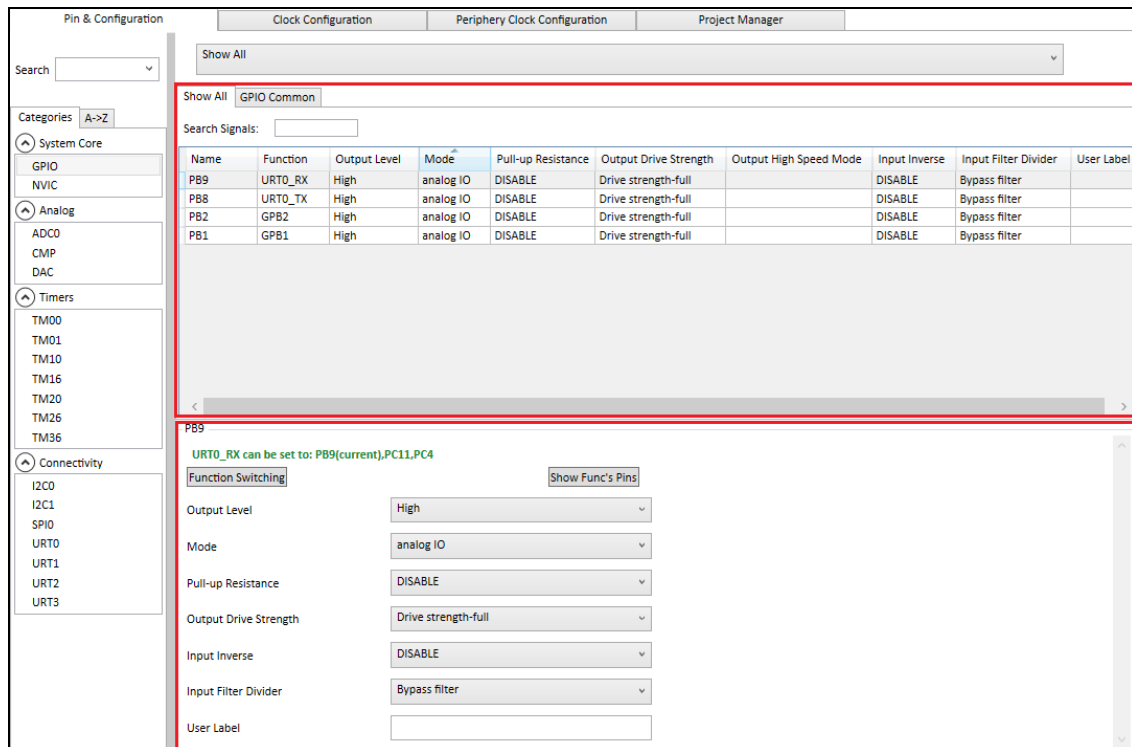
(Figure 20)

6.3. Configuration: The middle of the dialog will list all the names of pins that are group by peripheral as “Area 1” by default. User can click one item in area 1 and change the setting in area 1 by changing the settings in area 2.



(Figure 21)

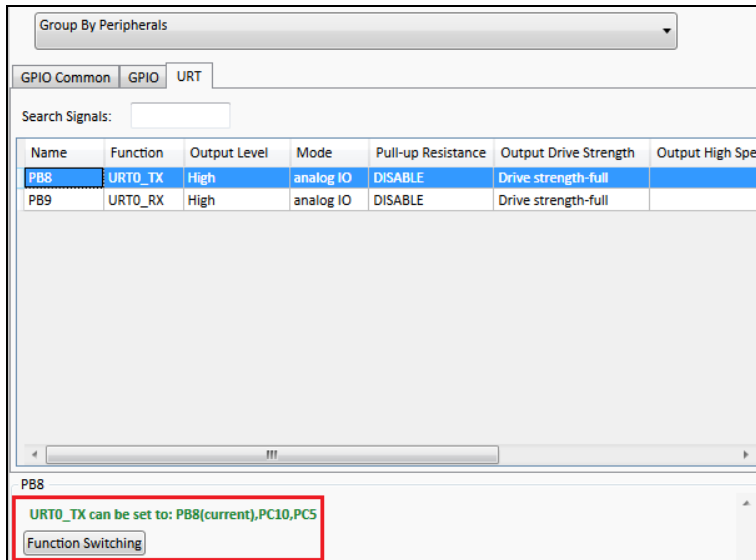
6.3.1. “Group By Peripherals” and “Show All”: The way “Group by Peripherals” shows as Figure 21. User can choose another ungroup way to view the settings of all the pins show as below.



(Figure 22)

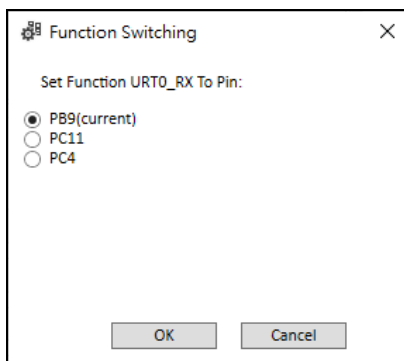
6.3.2. Search Signals : User can type string in text box on the right side of “Search Signals” to find out the pins that the partial strings of “Name” or “Function” is the same.

6.3.3. After one pin is selected, the words in green color show as blow show which pin is current selected and the other pins is user can switch to.



(Figure 23)

To click the button “Function Switching”, a dialog will be displayed for user to select to replace the current pin.



(Figure 24)

6.3.4. Show Func’s Pins: If users want to check where the pin is selected, they can click the button called “Show Func’s Pins”. The pin will flash in Chip View

Pin & Configuration | Clock Configuration | Periphery Clock Configuration | Project Manager

Search

Show All

Show All

Search Signals:

Name	Function	Output Level	Mode	Pull-up Resistance	Output Drive Strength	Output High
PB9	URT0_RX	High	analog IO	DISABLE	Drive strength-full	
PB8	URT0_TX	High	analog IO	DISABLE	Drive strength-full	
PB2	GPB2	High	analog IO	DISABLE	Drive strength-full	
PB1	GPB1	High	analog IO	DISABLE	Drive strength-full	

PB2

GPB2 can be set to: PB2(current)

Function Switching

Output Level: High

Mode: analog IO

Pull-up Resistance: DISABLE

Output Drive Strength: Drive strength-full

Input Inverse: DISABLE

Input Filter Divider: Bypass filter

User Label:

GPB1

GPB2

PA7 1

PA8 2

PA9 3

PA10 4

PA11 5

PA12 6

PA13 7

PA14 8

PA15 9

PA16 10

PA17 11

PA18 12

PA19 13

PA20 14

PA21 15

PA22 16

PA23 17

PA24 18

PA25 19

PA26 20

PA27 21

PA28 22

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PA844 838

PA845 839

PA846 840

PA847 841

PA848 842

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PA850 844

PA851 845

PA852 846

PA853 847

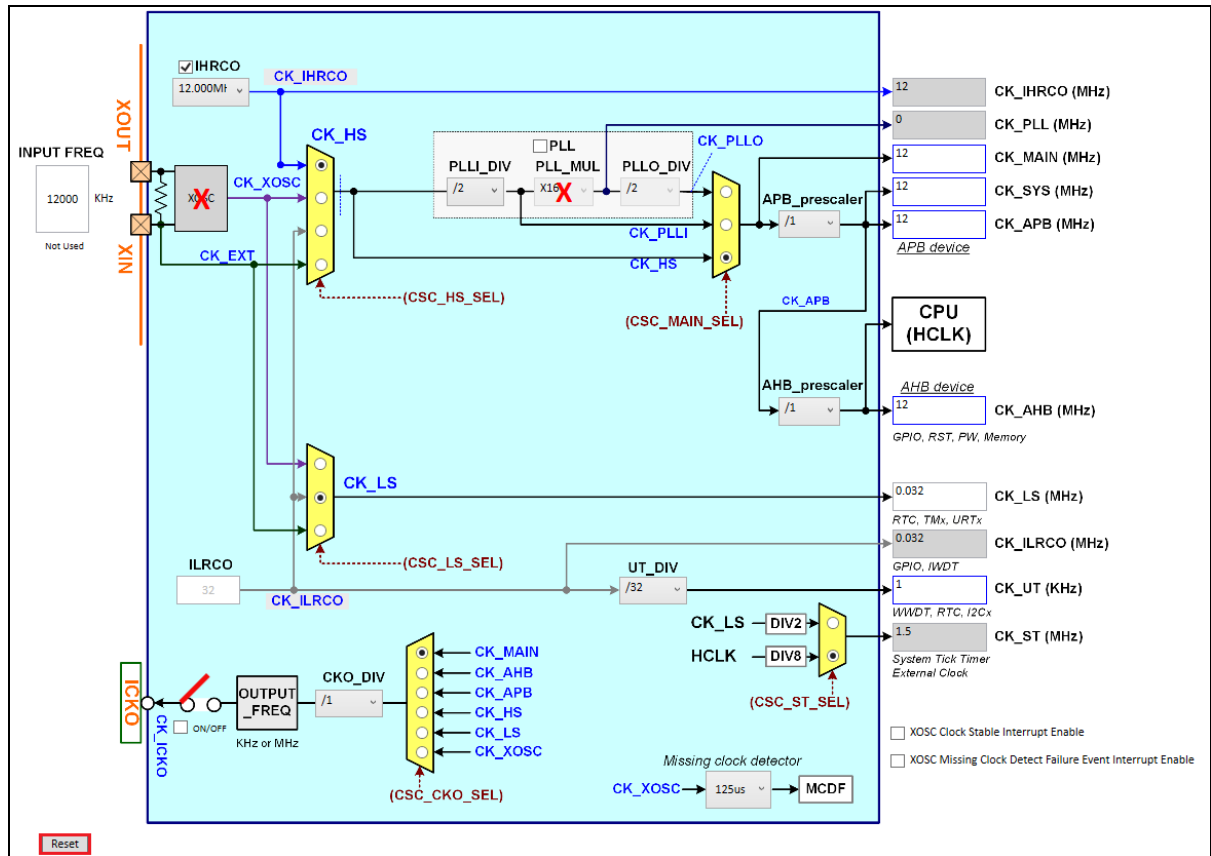
PA854 848

7. Clock Configuration

7.1. User can use mouse wheel to zoom in and out and use mouse to drag the UI.

7.2. User can operate in combo-boxes, text-boxes and option-buttons.

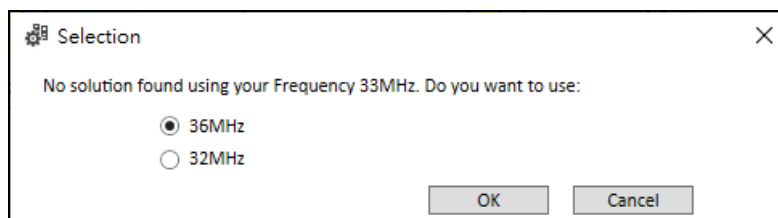
7.3. The right side shows the currently calculated frequency.



(Figure 26)

7.4. Inverse calculation:

There are four items of frequency that user can input will trigger the inverse calculation which are CK_MAIN, CK_APB, CK_AHB and CK_UT. Inverse calculation will adjust the settings automatically according to the input frequency. When there is no satisfied frequency, the following dialog box will appear for the user to select the closest frequency.



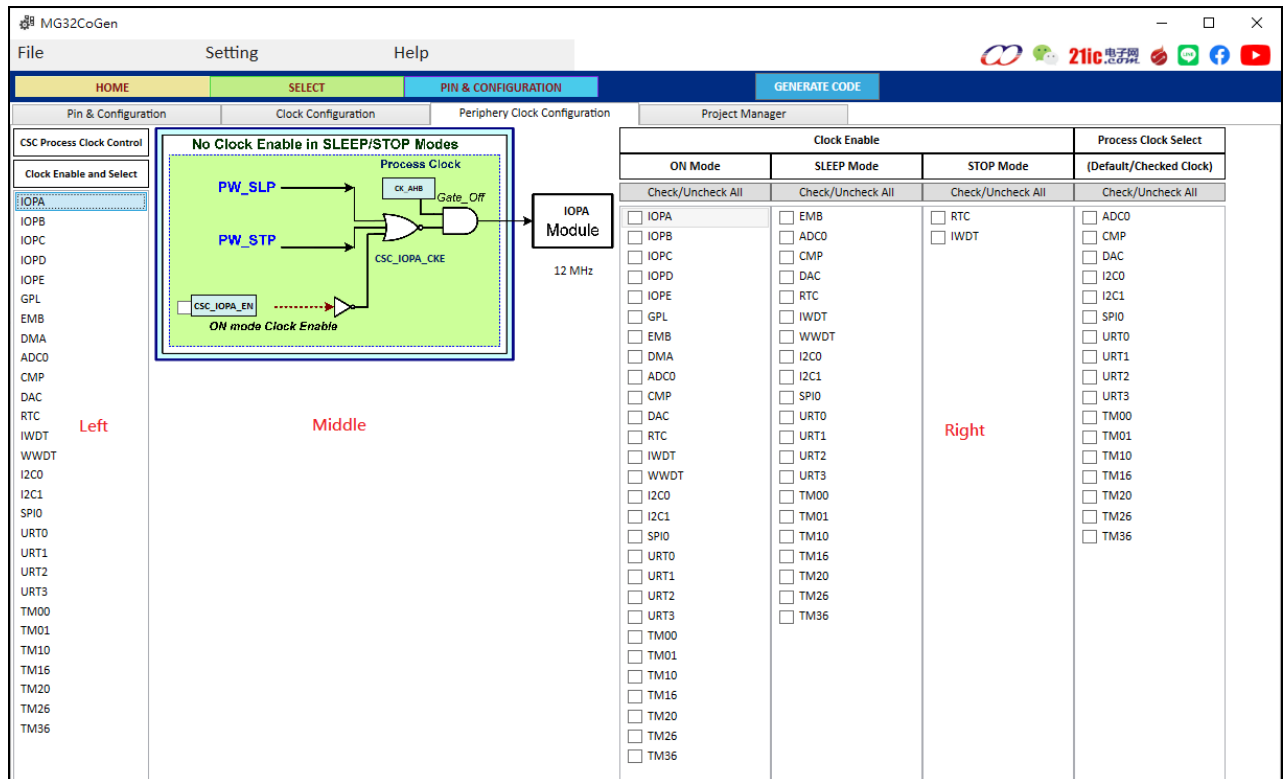
(Figure 27)

7.5. Reset:

The user can click the “Reset” button on the left bottom corner to recover the default setting.

8. Peripheral Clock Configuration

Select “Peripheral Clock Configuration” in “PIN & CONFIGURATION” tab. The clock of each module is set here. The user interface is divided into three parts. The left side lists all the modules to be configured. The middle part is the graphic interface of setting of clock module. The right part lists all the settings of all modules that user can clearly know which modules have been set. User can also configure peripheral clock in the right part directly.



(Figure 28)

9. NVIC Configuration

The users can configure which interrupt to be enable or disable and its priority.

9.1. Search: The search condition is not case-sensitive. After type in text box, click the “>” or “<” to find next or previous item which is matched.

9.2. Sort: Click the Title Bar Item “NVIC Interrupt Table” to sort the items in the grid.

9.3. Default Sequence: Reset the sort in the grid to default order.

9.4. Reset: Reset all of interrupts to default setting.

NVIC

Search

< >

Default Sequence

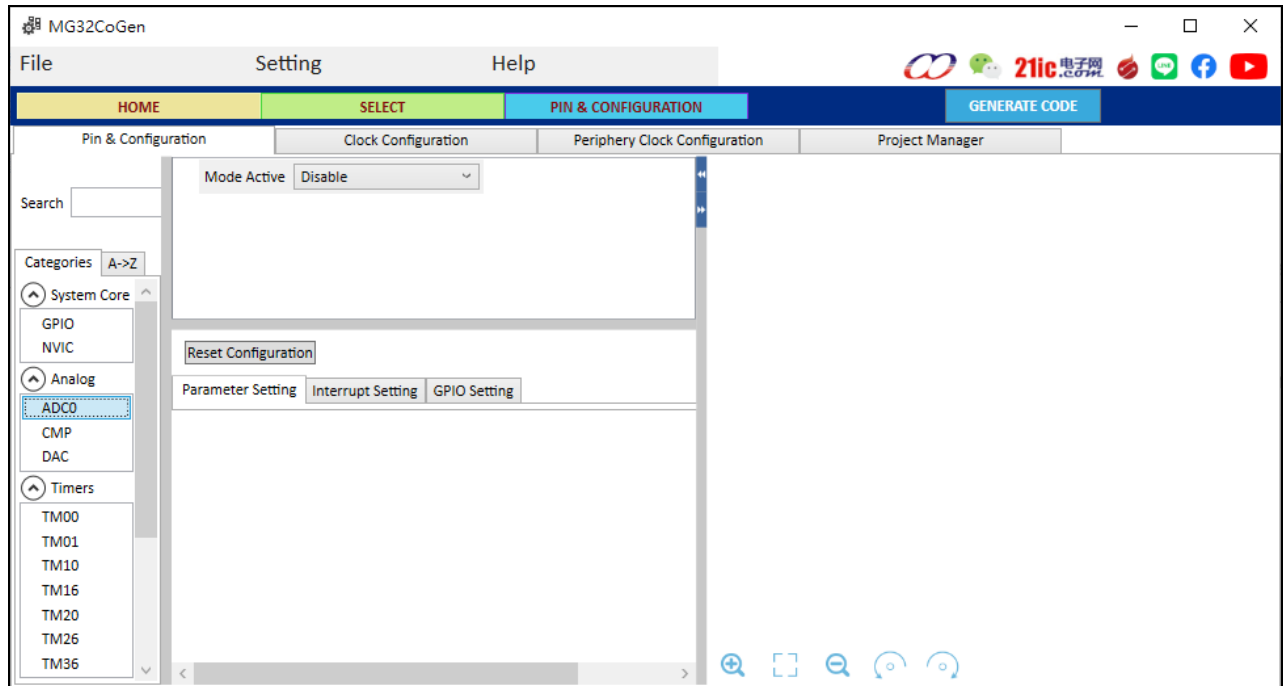
Reset

NVIC Interrupt Table	Sort	Enable	Preemption Priority
ADC interrupt		<input type="checkbox"/>	0
Analog Comparators global interrupt		<input type="checkbox"/>	0
Cortex-M0 Hard Fault Interrupt		<input checked="" type="checkbox"/>	-1
Cortex-M0 Pend SV Interrupt		<input type="checkbox"/>	0
Cortex-M0 SV Call Interrupt		<input type="checkbox"/>	0
Cortex-M0 System Tick Interrupt		<input type="checkbox"/>	0
DAC interrupt		<input type="checkbox"/>	0
DMA all channel global interrupt		<input type="checkbox"/>	0
EXIC EXINT0 (PA) interrupt		<input type="checkbox"/>	0
EXIC EXINT1 (PB) interrupt		<input type="checkbox"/>	0
EXIC EXINT2 (PC) interrupt		<input type="checkbox"/>	0
EXIC EXINT3/4 (PD/PE) interrupt		<input type="checkbox"/>	0
I2C0 interrupt		<input type="checkbox"/>	0
I2Cx global interrupt		<input type="checkbox"/>	0
Non Maskable Interrupt		<input checked="" type="checkbox"/>	-2
SPI0 interrupt		<input type="checkbox"/>	0
System global interrupt		<input type="checkbox"/>	0
Timer TM0x global interrupt		<input type="checkbox"/>	0
Timer TM10 interrupt		<input type="checkbox"/>	0
Timer TM16 TM1x global interrupt		<input type="checkbox"/>	0
Timer TM20 interrupt		<input type="checkbox"/>	0
Timer TM2x global interrupt		<input type="checkbox"/>	0
Timer TM3x global interrupt		<input type="checkbox"/>	0
UART URT0 interrupt		<input type="checkbox"/>	0
UART URT1/2/3 global interrupt		<input type="checkbox"/>	0
Window Watchdog interrupt		<input type="checkbox"/>	0

(Figure 29)

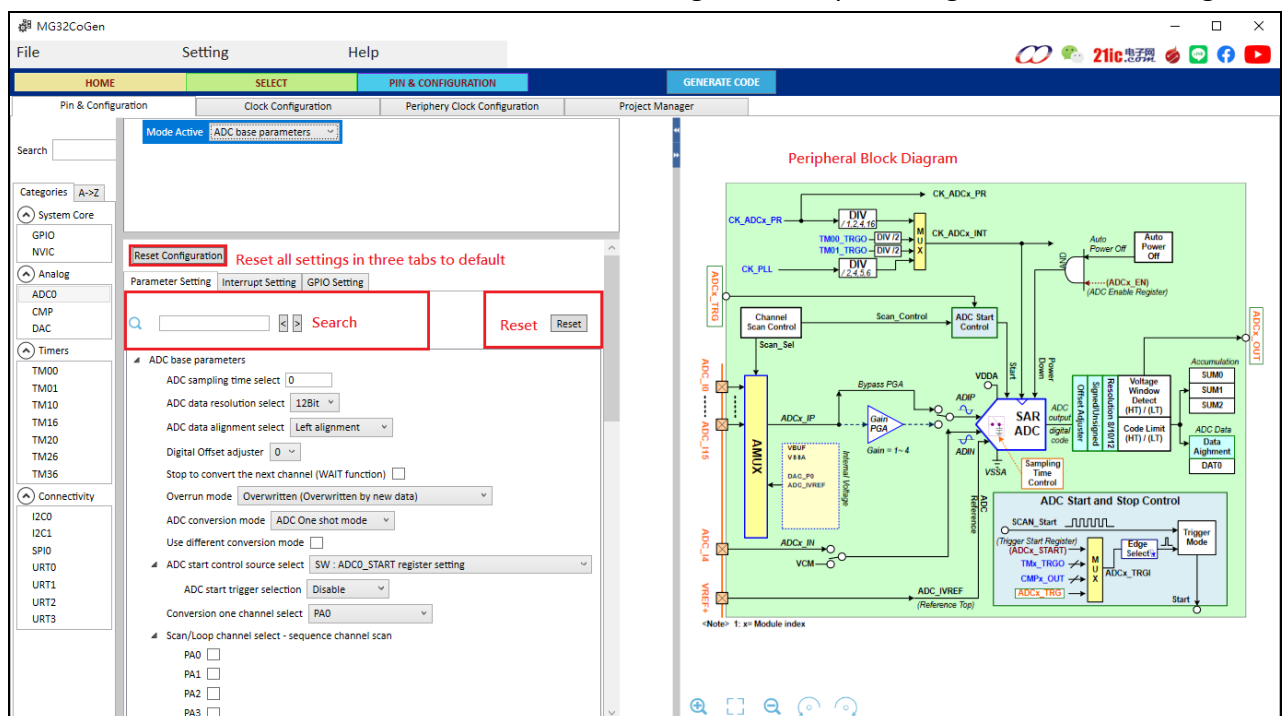
10. Other Peripheral Interfaces

The other peripheral interfaces are set in the same way. Users can select one peripheral interface from three categories in the left panel in “Pin & Configuration” tab to set. The following content take “ADC” as an example to introduce.



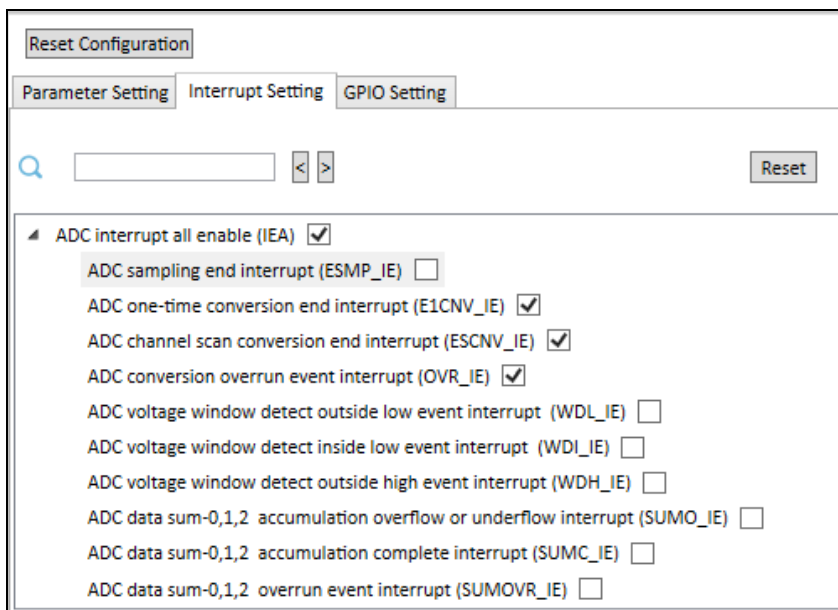
(Figure 30)

10.1. Change the mode of “ADC” to “ADC base parameters”. It will shows as figure 31. One interface has three sub tabs as “Parameter Setting”, “Interrupt Setting” and “GPIO Setting”.



(Figure 31)

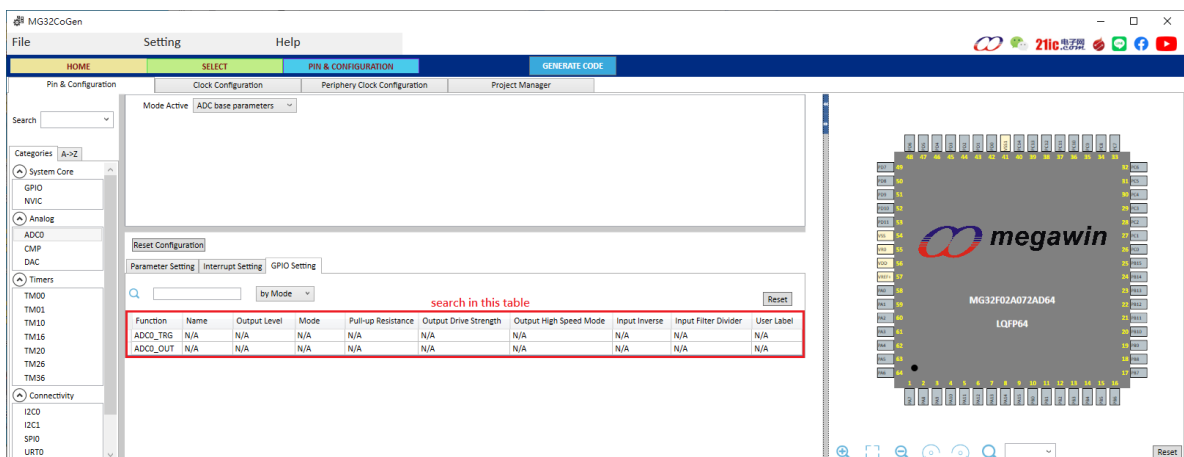
- 10.2. “Reset Configuration”, the button will reset all settings in three sub tabs to default.
- 10.3. The “Parameter Setting” will show the settings which are available. “Parameter Setting” is similar to “Configure Wizard” in Keil MDK IDE. It has an input box to support search and a “Reset” button to reset its setting;
- 10.4. The “Interrupt Setting” lists all the interrupt flags to be configured. The tab also support search and reset functions.



(Figure 32)

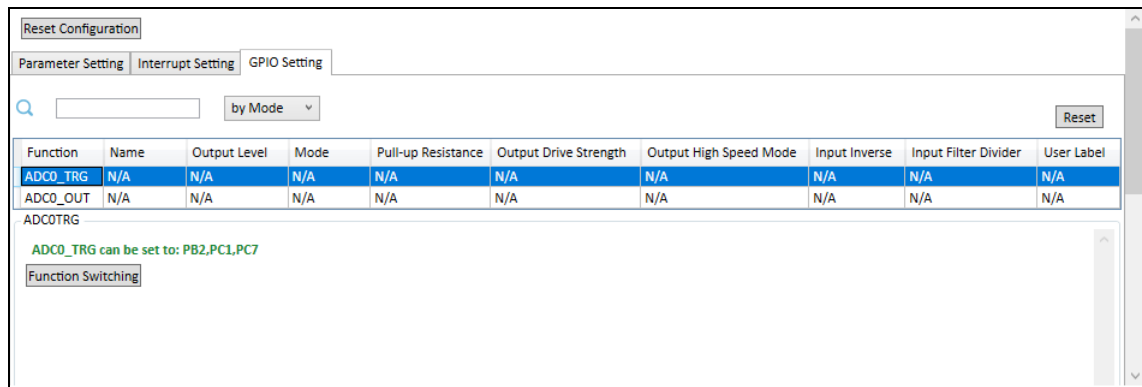
10.5. The “GPIO Setting”

When users select the “GPIO Setting” tab, the application will display as follow. The search function in this tab is to search only in the table not like the other tabs.



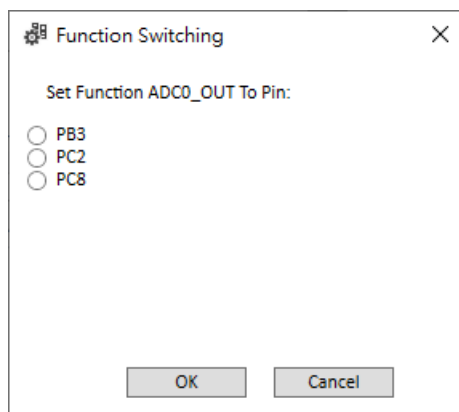
(Figure 33)

Users can move mouse to select one function in the table. The application will show a description in green words about all the pins can be selected.



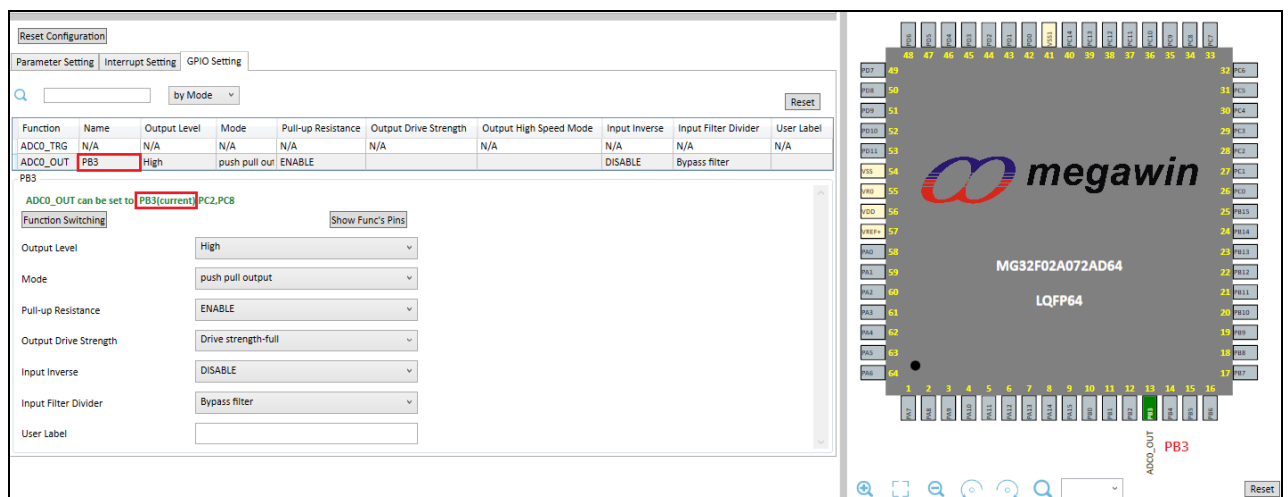
(Figure 34)

Click the button “Function Switching” and application will display a dialog for user to select the pin to be configure. For example, please select PB2 and click “OK”.



(Figure 35)

The application will display the settings available for PB3, shows as figure 36.



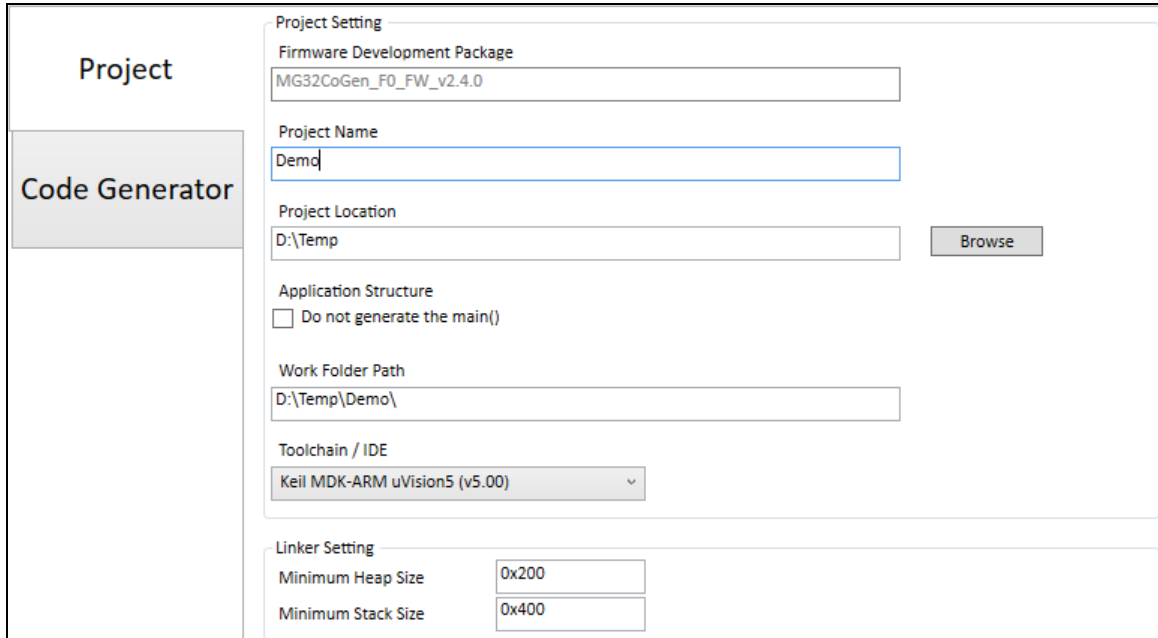
(Figure 36)

Click the button “Show Func’s Pin”, the three pins in Chip View in the right panel will keep flashing.

11. Generate Code

The tab is used to configure the project setting and generate the code according the setting. It includes two subtabs, Project and Code Generator.

11.1. Project:



(Figure 37)

11.1.1. Firmware Development Package: Shows the version of “Firmware Development Package”.

11.1.2. Project Name: This name of the project specifies the folder name and project name that users want to created.

11.1.3. Project Location: The path of the project that users want to created and saved.

11.1.4. Do not generate the main(): The main function will be marked in project generated later.

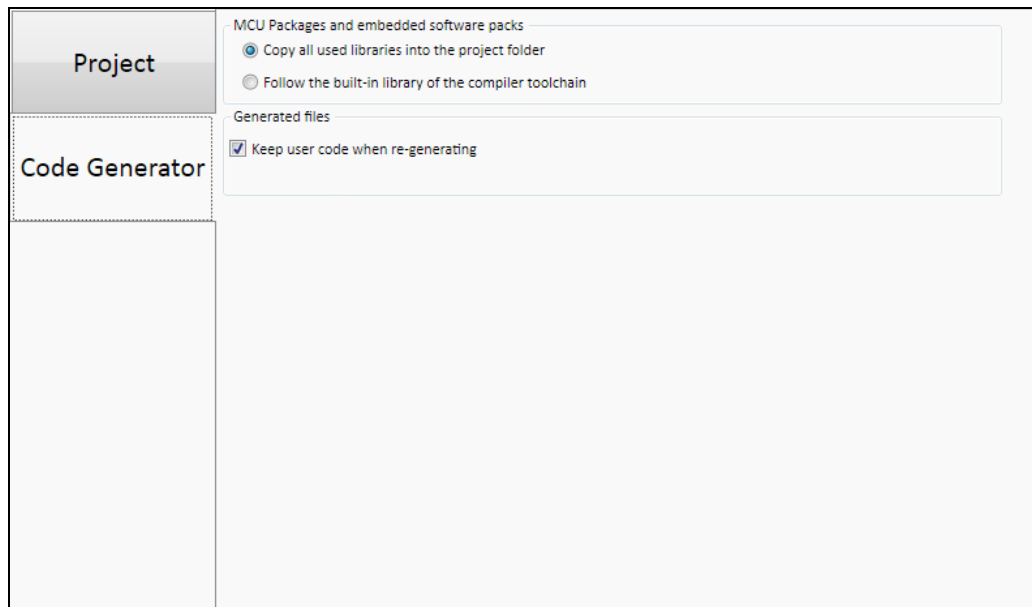
11.1.5. Work Folder Path: It is generated according to project name and folder and is read only.

11.1.6. Toolchain /IDE: The tool currently supports Keil MDK-ARM only.

11.1.7. Minimum Heap Size: Amount of memory (in bytes) allocated for heap in the project startup file (startup_MG32x02z.s)

11.1.8. Minimum Stack Size: Amount of memory (in bytes) allocated for stack in the project startup file (startup_MG32x02z.s). Tailor the needs of your application.

11.2. Code Generator:



(Figure 38)

11.2.1. Copy all used libraries into the project folder: When generate project, copy the files that the project depends on from the folder where MG32CoGen is installed.

11.2.2. Follow the built-in library of the compiler toolchain: The files of middleware and drivers in the project will refer to the DFP which is installed in Keil-MDK.

11.2.3. Keep user code when re-generating: When users have modified the code and press “Generate Code” again, some codes block in project will be reserved.

```

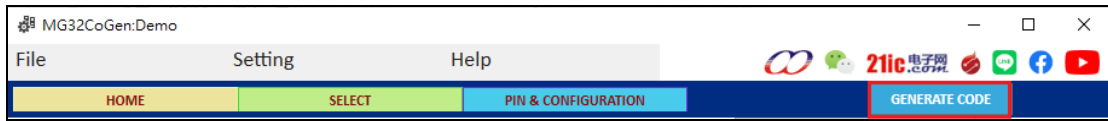
185
186 int main(void)
187 {
188     /* USER CODE BEGIN 1 */
189
190     /* USER CODE END 1 */
191
192     /* MCU Configuration-----
193
194     /* Reset of all peripherals */
195     /* Chip configure with use Wizard */
196     ChipInit();
197
198     /* USER CODE BEGIN Init */
199
200     /* USER CODE END Init */
201
202     /* Initializes the SysTick. */
203     MID_Init();
204
205     /* USER CODE BEGIN SysInit */
206
207     /* USER CODE END SysInit */
208
209     /* Initialize all configured peripherals */
210     MCG_DMA_Init();
211     MCG_GPIO_Init();
212     MCG_I2CO_Init();
  
```

(Figure 39)

The codes between `/* USER CODE BEGIN XXX */` and `/* USER CODE END XXX */` will be reserved where XXX must be unique. Please refer to figure 38.

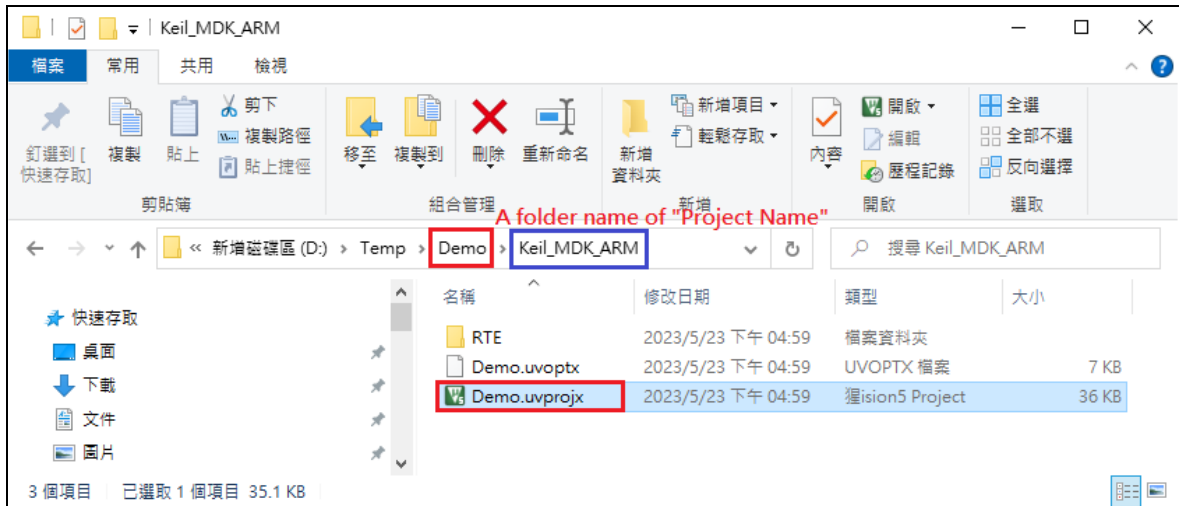
11.3. Generate Code:

When users press “GENERATE CODE” button as figure 39, the sample project will be created in a folder name of “Project Name” in “Project Location”.



(Figure 40)

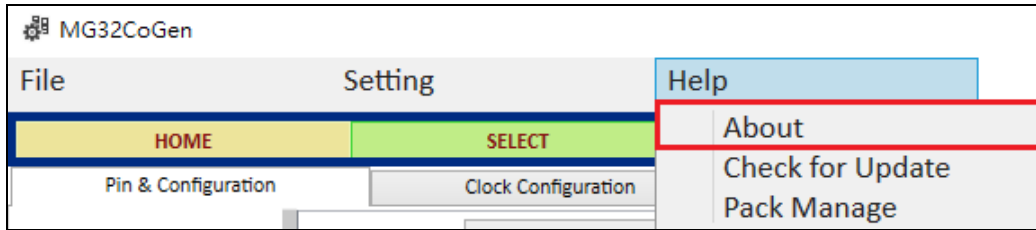
User can double click the project file (*.uvprojx) in the folder which name is “Keil_MDK_ARM” to open the project in Keil-MDK IDE. Please refer to Figure 41.



(Figure 41)

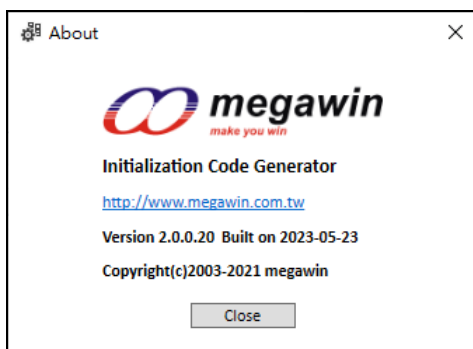
12. Version and update

12.1. Get current version: Click the “About” item in Help menu in main window as figure 42.



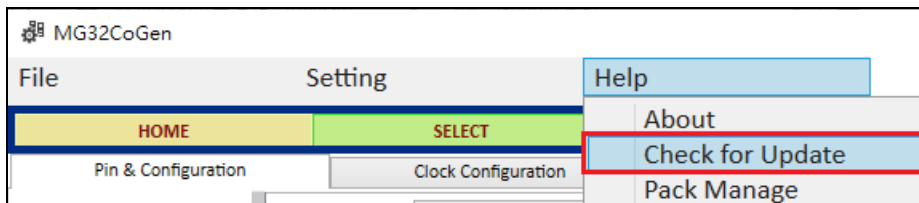
(Figure 42)

A Dialog will display the information about version.



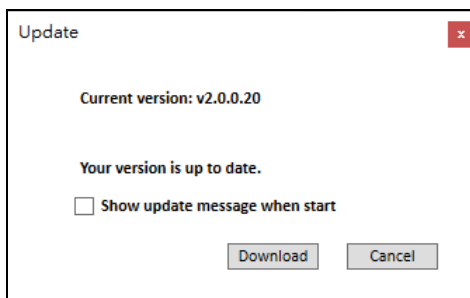
(Figure 43)

12.2. Check new version: Click the “Check for Update” item in Help menu in main window as Figure 44.



(Figure 44)

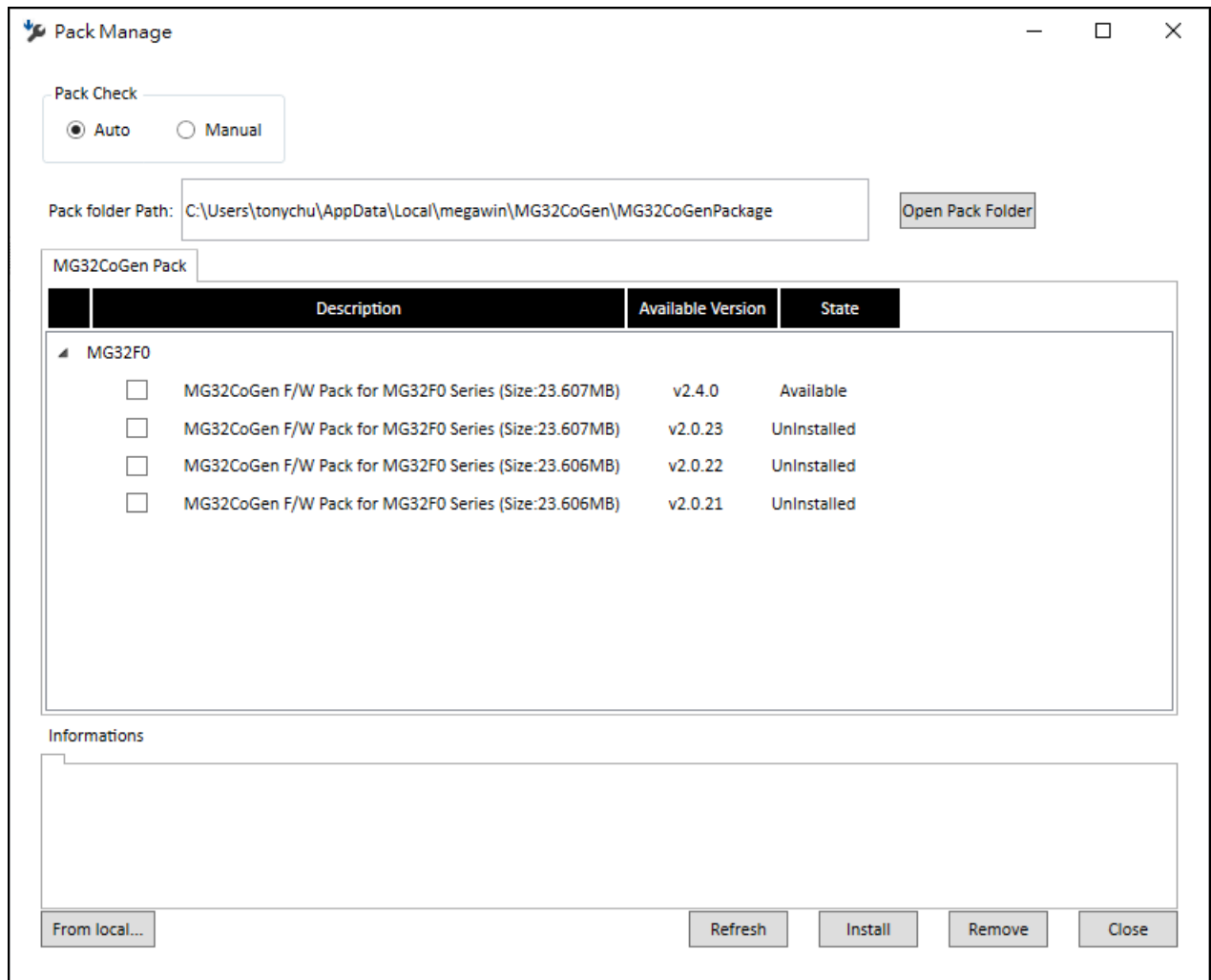
A dialog shows the current version of itself and the version in web site. If there is a new version available, user can click "Download" button to download the new version.



(Figure 45)

13. Pack Manage

“Pack Manage” is an independent program. Users can execute the program to manage the installation and removal of packs. When “Pack Manage” is executing, it shows as follow.



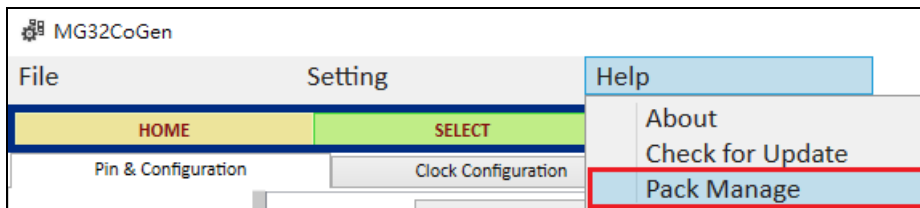
(Figure 46)

13.1. Pack check:

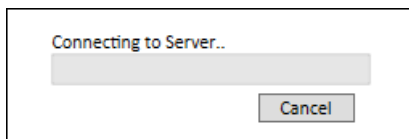
“Pack Manage” will be executed in background when MG32CoGen start running by default. User can change the trigger condition to select automatic or manual checking.

13.1.1. Auto: This is the default setting in MG32CoGen.

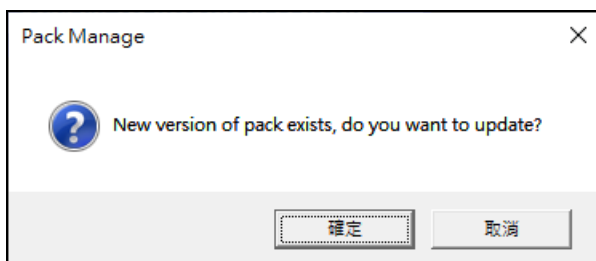
13.1.2. Manual: Users can also manually execute “Pack Manage”. Click the “Pack Manage” item in Help menu in main window as figure 47. It will display a dialog as figure 48. Users can click “Cancel” to stop the process of checking.



(Figure 47)



(Figure 48)



(Figure 49)

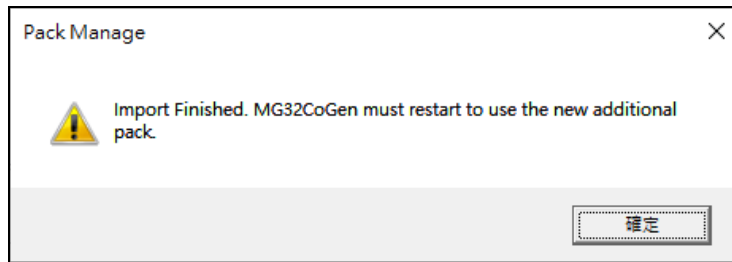
13.2. Pack folder Path: The path is where all the pack downloaded and stored. Click “Open Pack Folder” will open the folder with “File Explorer”.

13.3. MG32CoGen Pack List: Pack Manage lists all the packs available on the web and the current state of the packs on the computer. Users can install or remove by checking the box front of the list item.

MG32CoGen Pack			
	Description	Available Version	State
▲ MG32F0			
<input type="checkbox"/>	MG32CoGen F/W Pack for MG32F0 Series (Size:23.607MB)	v2.4.0	Available
<input checked="" type="checkbox"/>	MG32CoGen F/W Pack for MG32F0 Series (Size:23.607MB)	v2.0.23	UnInstalled
<input type="checkbox"/>	MG32CoGen F/W Pack for MG32F0 Series (Size:23.606MB)	v2.0.22	UnInstalled
<input type="checkbox"/>	MG32CoGen F/W Pack for MG32F0 Series (Size:23.606MB)	v2.0.21	UnInstalled

(Figure 50)

13.4. From local: Users can install the pack that exists in the local machine or the network disk. After installed, “Pack Manage” will prompt users to restart MG32CoGen as figure 51.

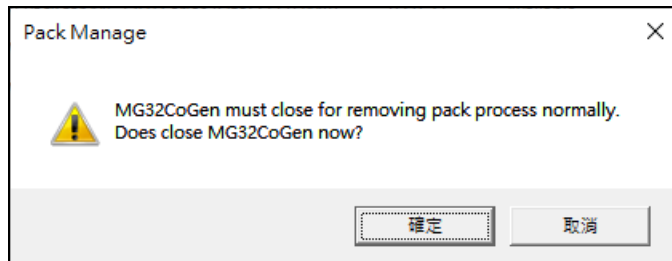


(Figure 51)

13.5. Refresh: Pack Manage will connect to server to update information about packs.

13.6. Install: Install the packs selected in pack lists from server.

13.7. Remove: Remove the packs selected in pack lists from current computer. If MG32CoGen is executing, Pack Manage will show a dialog to ask users if close MG32CoGen right now as follow.



(Figure 52)

13.8. Close: Close the "Pack Manage" application.

14. Revision History

Revision	Description	Date
v1.00	Initial version	2023/ 05/12