GOWIN MCU Designer

User Guide

SUG549-1.5E, 04/20/2023

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Revision History

Date	Version	Description
7/29/2019	1.0E	Initial version published.
9/12/2019	1.1E	● Integrated GNU ARM and RISC-V MCU compilation tool chain. ● Updated the Eclipse to the latest version at website. ● Updated the GNU ARM MCU compilation tool chain to the latest version at website. ● Updated and optimized Interface Configuration.
11/12/2019	1.2E	● Updated the GNU RISC-V MCU compilation tool chain to the latest version at GNU website. ● IDE integrated with Java Development Kit and IDE installation flow simplified. ● IDE integrated with Gowin Programmer. ● Gowin Customized IDE interface and simplified options to improve the ease of use. ● Known issues of IDE installation and usage fixed.
12/10/2019	1.3E	● License Management. ● IDE Interface optimized.
06/01/2020	1.4E	● Gowin_EMPU (GW1NS-4C) and Gowin_EMPU_M3 programming design, compilation, downloading and online debugging supported. ● Gowin_PicoRV32 software online debugging supported. ● The debugging software called OpenOCD integrated. ● Olimex debugging emulator driver software integrated. ● The download tool called Programmer updated and download of Gowin_EMPU (GW1NS-4C) supported. ● Gowin_EMPU (GW1NS-2C), Gowin_EMPU_M1, Gowin_EMPU (GW1NS-4C), Gowin_EMPU_M3, and Gowin_PicoRV32 software programming reference design example updated. ● Help system and online viewing of GMD and Gowin MCU user manuals supported.
10/28/2022	1.4.1E	Gowin_EMPU(GW1NS-2C) removed.
02/22/2023	1.4.2E	Table 3-1 Components to Install updated.
04/20/2023	1.5E	● GW5AT-138/GW5AST-138 Version B added. ● Help manuals updated. ● Programmer updated. ● Installation path and software toolchain configurations added. ● MCU software development library, application cases, and user manuals added. ● RTOS application cases added.

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1 About This Guide

1.1 Purpose

This manual describes GOWIN MCU Designer (GMD) installation and operation and aims to help users learn the software functions to improve design efficiency. The software screenshots and the supported products listed in this manual are based on GOWIN MCU Designer V1.2. As the software is subject to change without notice, some information may not remain relevant and may need to be adjusted according to the software that is in use.

1.2 Related Documents

The latest user guides are available on GOWINSEMI Website. You can find the related documents at www.gowinsemi.com:

- IPUG536, Gowin_EMPU_M1 IDE Software Reference Manual
- IPUG928, Gowin_EMPU(GW1NS-4C) IDE Software Reference Manual
- IPUG919, Gowin_EMPU_M3 IDE Software Reference Manual
- IPUG910, Gowin_PicoRV32 IDE Software Reference Manual

1.3 Terminology and Abbreviation

Table 1-1 shows the abbreviations and terminology used in this manual.

Table 1-1 Terminology and Abbreviations

Terminology and Abbreviation	Full Name
ARM	Advanced RISC Machine
FPGA	Field-Programmable Gate Array
IDE	Integrated Development Environment
GCC	GNU Compiler Collection
GDB	GNU Debug
GMD	GOWIN MCU Designer
GNU	GNU is Not Unix

Terminology and Abbreviation	Full Name
MCU	Microcontroller Unit
OpenOCD	Open On-Chip Debugger
PC	Personal Computer
RISC	Reduced Instruction-Set Computer
RISC-V	RISC Five

1.4 Support and Feedback

Gowin Semiconductor provides customers with comprehensive technical support. If you have any questions, comments, or suggestions, please feel free to contact us directly by the following ways:

Website: www.gowinsemi.com

E-mail: support@gowinsemi.com

2 GMD Software Overview

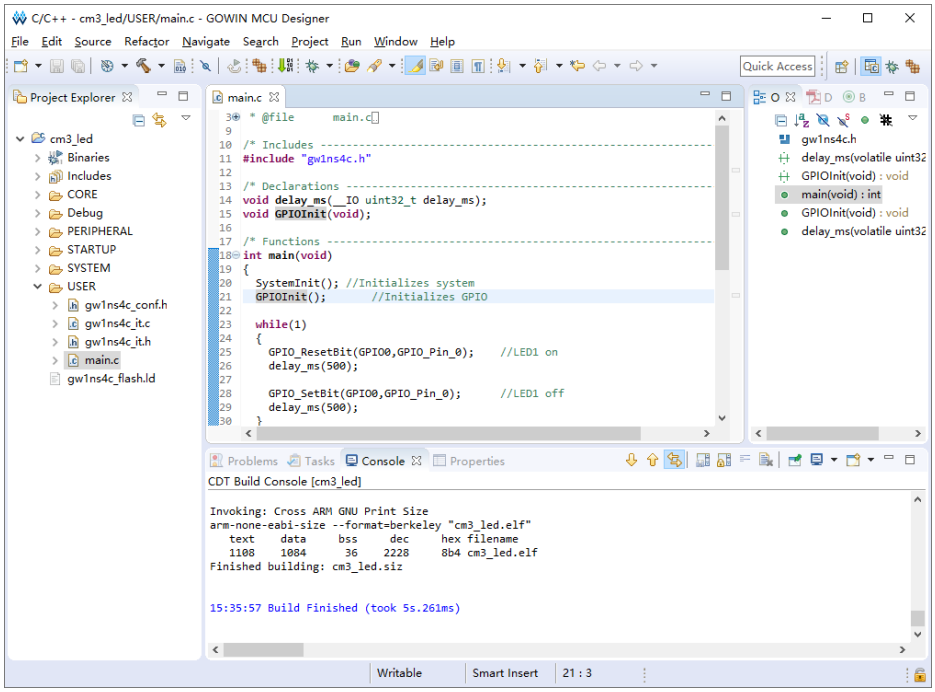
2.1 Introduction

GMD is a new generation of MCU software development environment designed in-house by GOWIN according to its own FPGA+MCU SoC architecture features. It's based on GNU GCC compilation toolchain and open source Eclipse framework. It supports C/C++ embedded software programming language and helps users to quickly implement code compilation and linking, generate mapping files and download, etc. GND also integrates an on-line debugging tool for users to quickly locate and analyze software programming issues.

GMD supports the MCU compilation toolchain of ARM architecture and RISC-V architecture and also supports MCU compilation, linking, downloading and debugging of ARM Cortex-M1, ARM Cortex-M3 and RISC-V architecture.

GMD provides a GUI for projects. Users can employ this software to quickly edit codes, check the running results, and start the GOWINSEMI FPGA download tool immediately to download the mapping file to the chip and implement the required functions. GMD GUI is as shown in Figure 2-1.

Figure 2-1 GMD Software Interface



2.2 Processors Supported

The processors, architectures, and chips that GMD supports are listed in Table 2-1.

Table 2-1 Processors Supported by GMD

Processor	Architecture	Chip
Gowin_EMPU (GW1NS-4C)	ARM Cortex-M3	● GW1NS-4C ● GW1NSR-4C ● GW1NRSER-4C
Gowin_EMPU_M1	ARM Cortex-M1	● GW1N-9 ● GW1NR-9 ● GW1N-9 Version C ● GW1NR-9 Version C ● GW2A-18 ● GW2AR-18 ● GW2A-18 Version C ● GW2AR-18 Version C ● GW2ANR-18 Version C ● GW2A-55 ● GW2A-55 Version C ● GW2AN-18X ● GW2AN-9X ● GW2AN-55 Version C ● GW5AT-138 Version B ● GW5AST-138 Version B
Gowin_EMPU_M3	ARM Cortex-M3	● GW2A-55 ● GW2A-55 Version C ● GW2AN-55 Version C

Processor	Architecture	Chip
Gowin_PicoRV32	RISC-V	● GW1N-9 ● GW1NR-9 ● GW1N-9 Version C ● GW1NR-9 Version C ● GW2A-18 ● GW2AR-18 ● GW2A-18 Version C ● GW2AR-18 Version C ● GW2ANR-18 Version C ● GW2A-55 ● GW2A-55 Version C ● GW2AN-18X ● GW2AN-9X ● GW2AN-55 Version C

Note!

The supported processors may vary according to the software version in use. Please refer to the software you use for more detailed processor information.

3 Install GMD Software

3.1 Environment Requirement

Windows: Win7/8/10(64bit)

3.2 Software Download

You can download GMD installation package (GMD_V1.2.exe) via Gowin official website: https://www.gowinsemi.com/en/support/database

Note!

Users need to register and log on to the Gowin website before downloading the installation package;

3.3 Software Installation

Note!

- You must close anti-virus programs, such as 360 or Kingsoft AntiVirus, etc. before installing GMD.
- The installation path should not contain any Chinese characters or spaces.
- Before installing any new versions of GMD, old versions should be uninstalled.
- Table 3-1 shows the product options for the installation of GOWIN MCU Designer.

Table 3-1 Components to Install

Components	Description	MCU Supported	Remarks
GMD Framework	GMD frame	–	Executable file: GMD_V1.2.exe
SEGGER J-Link Debugger Driver	SEGGER J-LINK debugger driver software	ARM Cortex M1 and M3	–
Olimex Debugger Driver	Olimex debugger driver software	RISC-V	–

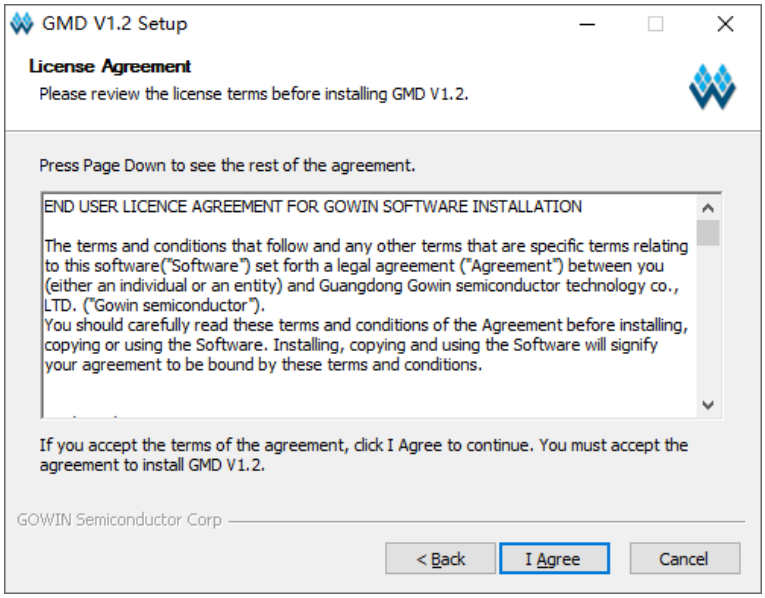
The steps of installing GMD Software is as follows:

1. Double click the installation package to open the wizard; click "Next", as shown in Figure 3-1.

Figure 3-1 Wizard

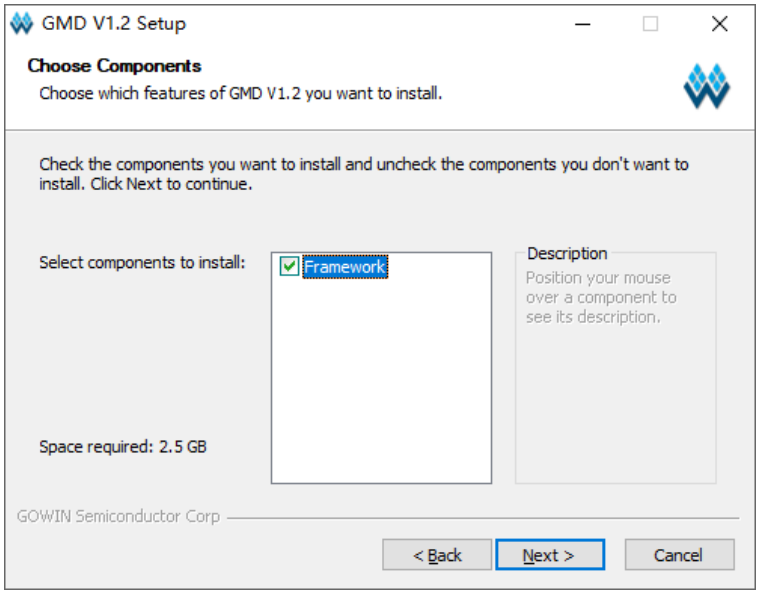
2. Click "I Agree", as shown in Figure 3-2.

Figure 3-2 License Agreement



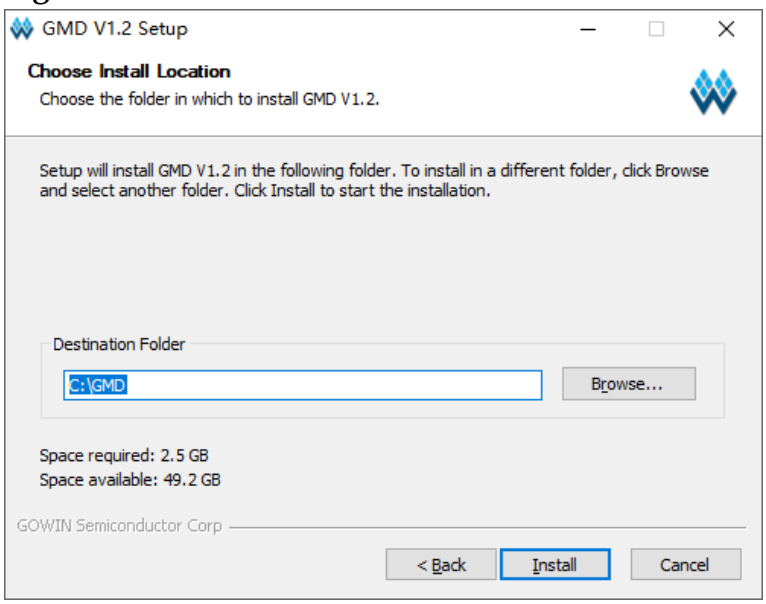
3. Select "Framework", and click "Next", as shown in Figure 3-3.

Figure 3-3 Choose Components



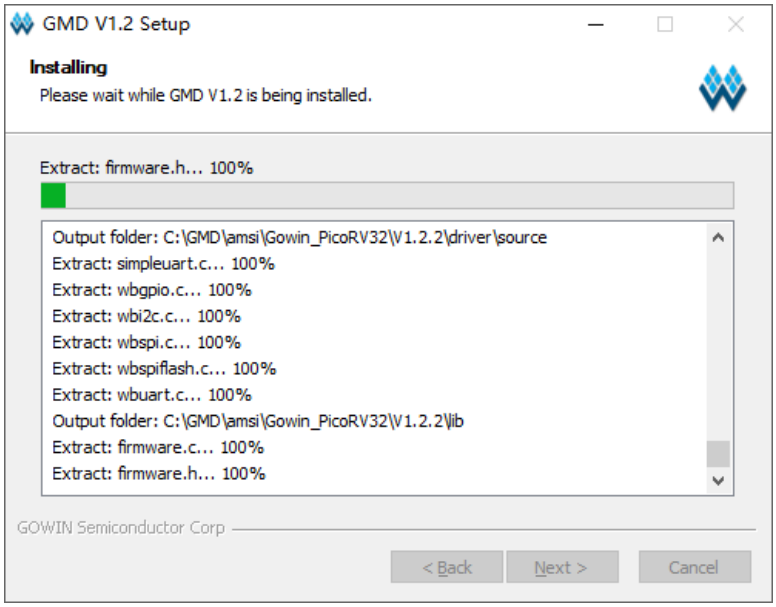
4. Select the installation path, and the default path C:\GMD is recommended; click "Install", as shown in Figure 3-4.

Figure 3-4 Choose Installation Location



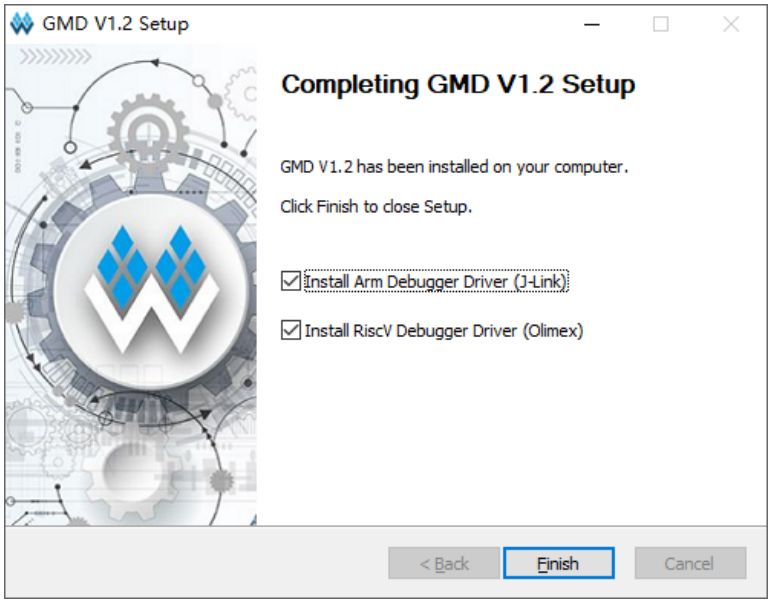
5. The installation process is as shown in Figure 3-5.

Figure 3-5 Installing



6. After installing GMD, select whether to install Arm Debugger Driver (J-Link) and RiscV Debugger Driver (Olimex). If you choose to install, you can go on; if you do not choose to install, the GMD installation is completed. Click "Finish", as shown in Figure 3-6.

Figure 3-6 Debug Driver Installation Option

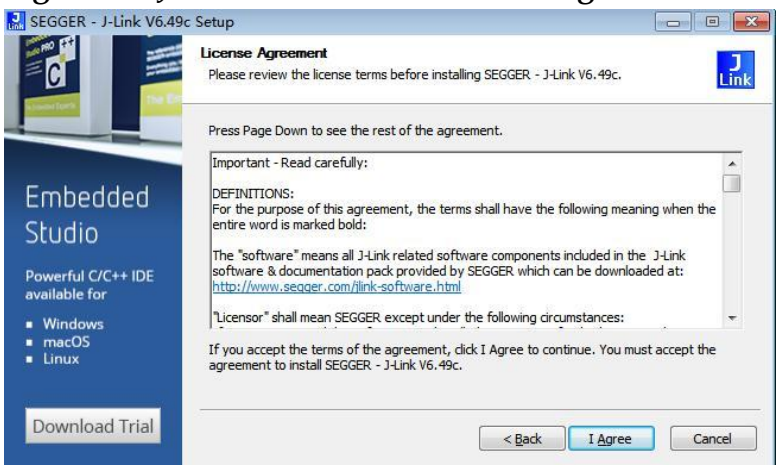


7. If you choose "Install Arm Debugger Driver (J-Link)", then J-Link wizard pops up. Click "Next", as shown in Figure 3-7.

Figure 3-7 J-Link Wizard

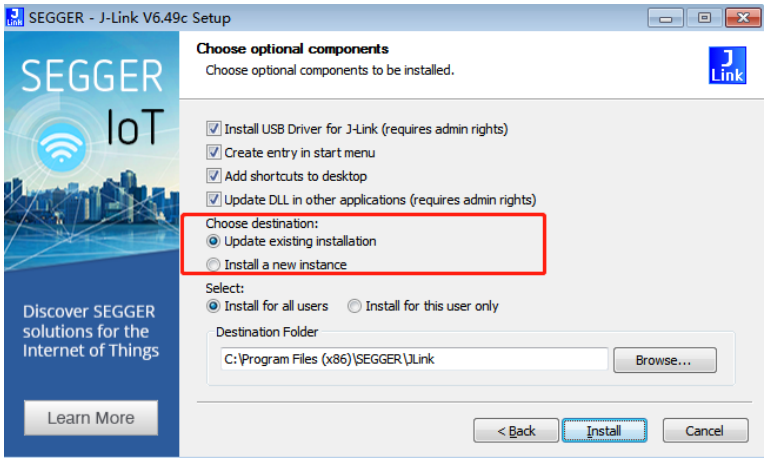
8. Figure 3-8 shows the license agreement, and click "I Agree".

Figure 3-8 J-Link Installation License Agreement



9. Select J-Link driver components. select "Update existing installation" in "Choose destination" option. Default settings are recommended. Click "Install", as shown in Figure 3-9.

Figure 3-9 J-Link Components Selection



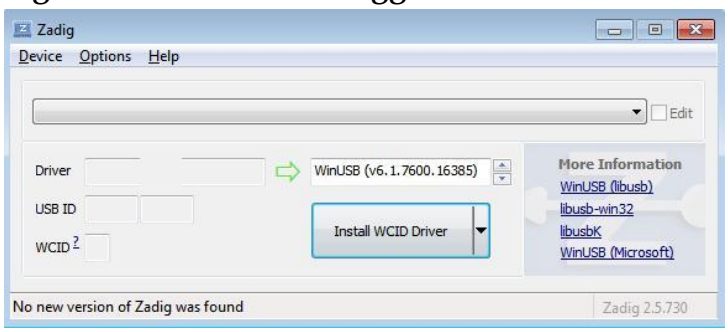
10. Click "Finish" when J-Link driver installation is completed, as shown in

Figure 3-10

Figure 3-10 J-Link Installation Complete

11. If you select "Install RiscV Debugger Driver (Olimex)" in step 6, the Olimex driver software installation wizard pops up, as shown in Figure 3-11.

Figure 3-11 Olimex Debugger Driver

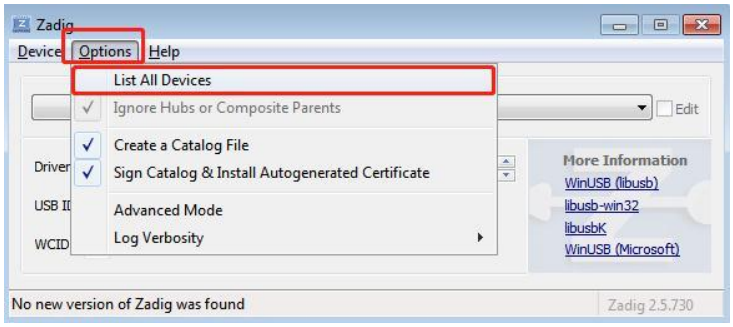


Note!

Make sure that the Olimex debugger is connected to PC before the driver installation.

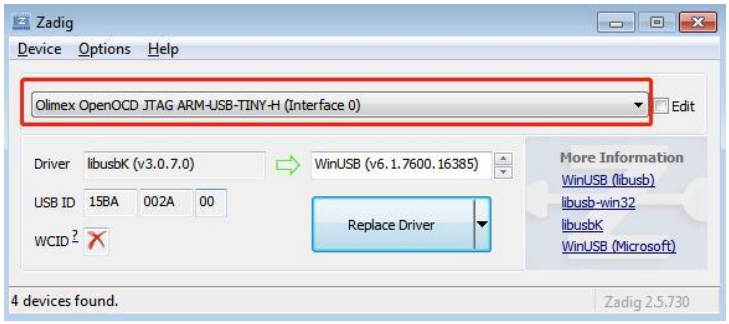
12. Select "Options > List All Devices" in the menu bar, as shown in Figure 3-12.

Figure 3-12 Configure List All Devices



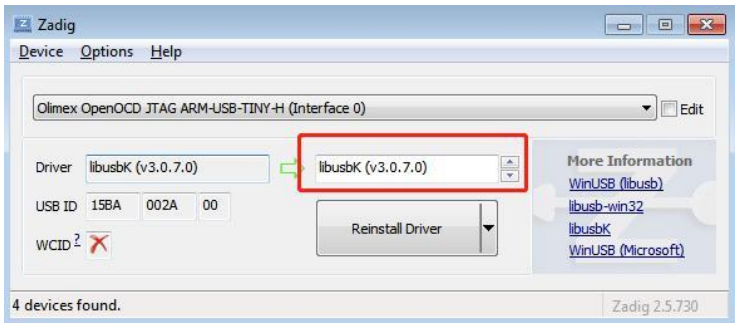
13. After selecting "List All Devices", you can see all the devices connected to the PC, select "Olimex OpenOCD JTAG ARM-USB-TINY-H (Interface 0)", as shown in Figure 3-13.

Figure 3-13 Olimex OpenOCD JTAG ARM-USB-TINY-H (Interface 0)



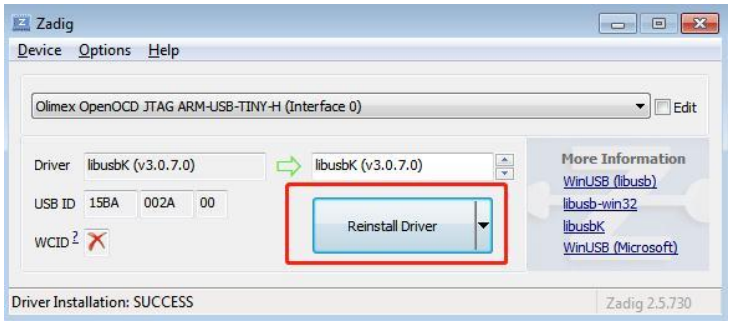
14. Select the driver type "libusbK (v3.0.7.0)", as shown in Figure 3-14.

Figure 3-14 Driver Type



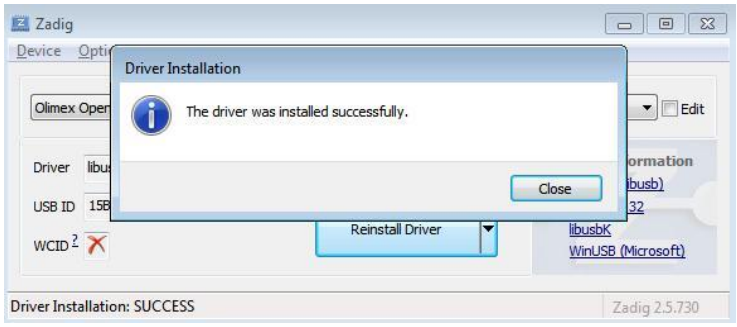
15. Click "Install Driver" or "Reinstall Driver" to start installing Olimex Debugger Driver software, as shown in Figure 3-15.

Figure 3-15 Install Olimex Debugger Driver Software



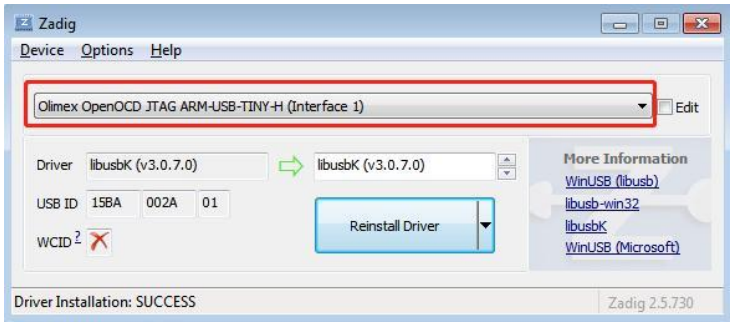
16. Figure 3-16 shows the Olimex degugger driver software installation process, and the Interface 0 device is successfully installed.

Figure 3-16 Interface 0 Device Installation Successful



17. After "Olimex OpenOCD JTAG ARM-USB-TINY-H (Interface 0)" is installed successfully, please continue to select "Olimex OpenOCD JTAG ARM-USB-TINY-H (Interface 1)" in the list of devices, as shown in Figure 3-17.

Figure 3-17 Configure Interface 1

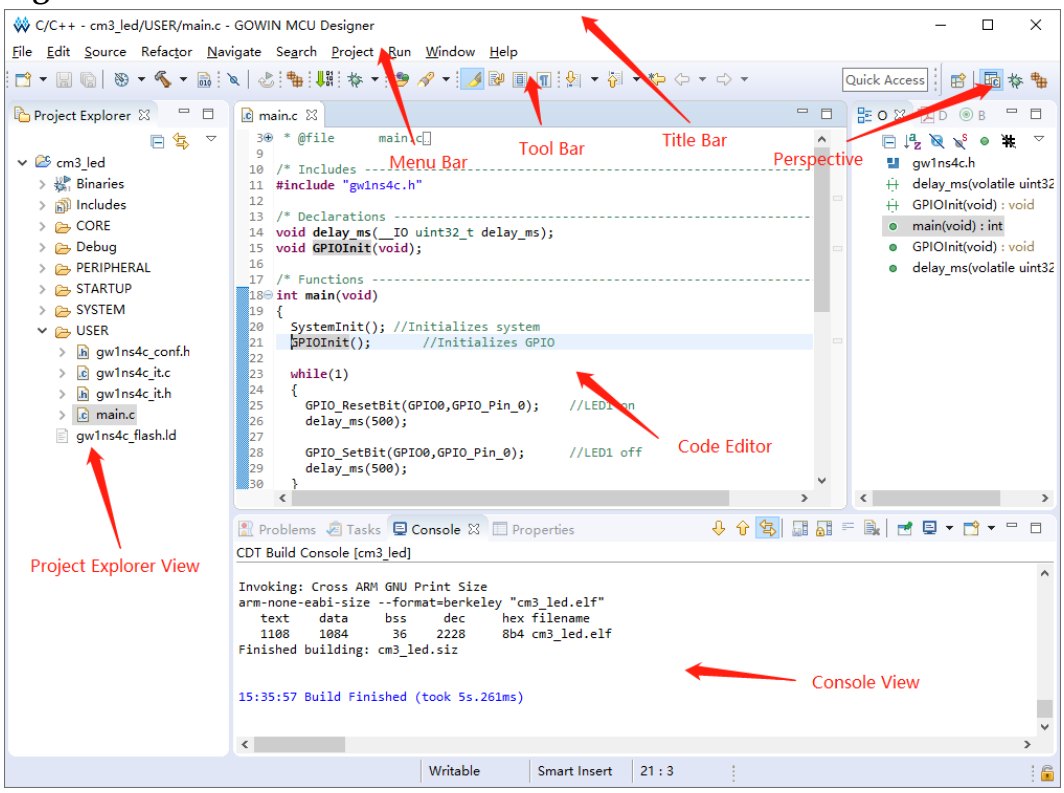


18. Repeat steps 5 to 7 to install "Olimex OpenOCD JTAG ARM-USB-TINY-H (Interface 1)".
19. After "Olimex OpenOCD JTAG ARM-USB-TINY-H (Interface 0)" and "Olimex OpenOCD JTAG ARM-USB-TINY-H (Interface 1)" are installed successfully, " libusbK USB Devices > Olimex OpenOCD JTAG ARM-USB-TINY-H (Interface 0)" and " Olimex OpenOCD JTAG ARM-USB-TINY-H (Interface 1)" can be displayed in the PC device management.

4 GMD Software GUI

Figure 4-1 shows GMD software GUI. It consists of the title bar, menu bar, tool bar, Project Explorer View, Code Editor, Console View, C/C++ Perspective, etc.

Figure 4-1 GUI



4.1 Title Bar

Title bar shows the current project path, name, and the name of the file that is currently open.

4.2 Menu Bar

Menu bar provides common used menus and start tools for projects, including the options of File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, and Help. See the following for details.

4.2.1 File

The file menu is as shown in Table 4-1.

Table 4-1 File Menu

Menu Item	Sub-menu Item	Shortcut	Functional Description
New	Makefile Project with Existing Code	Alt+Shift+N	Create C/C++ project containing makefile
	C++ Project		Create C++ project
	C Project		Create C project
	C/C++ Project		Create C/C++ project
	Project…		Create C, C++, C/C++project
	Convert to a C/C++ Project (Adds C/C++ Nature)		None-C/C++ project addsC/C++ features, C/C++ tool chain enable
	Source File		Create C/C++ source file
	Header File		Create C/C++ header file
	File from Template		Create C/C++ template file
	Class		Create C/C++ class structure
	Source Folder		Create a source folder
	Folder		Create a folder
Open File…	-	-	Open the existed file
Open Projects from File System…	-	-	Import the project wizard from file system
Close	-	Ctrl+W	Close the active editor
Close All	-	Ctrl+Shift+W	Close all editors
Save	-	Ctrl+S	Save the content of the active editor
Save As…	-	-	Save the content of the active editor under a new name
Save All	-	Ctrl+Shift+S	Save all editor's content and the unsaved changes
Revert	-	-	Revert the content of the active editor as the saved content
Move…	-	-	Move resources
Rename…	-	F2	Rename resources
Refresh	-	F5	Refresh selected elements based on local file system (If not started from the specified option, refresh all)
Convert Line Delimiters To	Windows	-	Windows system format
	Unix	-	Unix system format
Print…	-	Ctrl+P	Print the content of the active editor
Switch Workspace	-	-	Switch workspace and restart workspace
Restart	-	-	Restart GMD

Menu Item	Sub-menu Item	Shortcut	Functional Description
Import…	-	-	Import the project wizard
Export…	-	-	Export the project wizard
Properties	-	Alt+Enter	Properities configuration
Exit	-	-	Exit GMD

4.2.2 Edit

The edit menu is as shown in Table 4-2.

Table 4-2 Edit Menu

Menu Item	Shortcut	Functional Description
Undo	Ctrl+Z	Undo the previous step
Redo	Ctrl+Y	Redo the cancelled changes
Cut	Ctrl+X	Cut
Copy	Ctrl+C	Copy
Paste	Ctrl+V	Paste
Delete	Delete	Delete the selected text or element option
Select All	Ctrl+A	Select all the editor's content
Find/Replace	Ctrl+F	Find/Replace
Find Word	-	Find the selected word
Find Next	Ctrl+K	Find the next word of the current selected text
Find Previous	Ctrl+Shift+K	Find the previous word of the current selected
Incremental Find Next	Ctrl+J	Start incremental find mode to find the next
Incremental Find Previous	Ctrl+Shift+J	Start incremental find mode to find the previous
Add Bookmark…	–	Add bookmark to the current selected text or elements
Add Task…	–	Add user-defined task to the current selected text or elements
Show Tooltip Description	F2	Display the value of the current cursor position as floating instructions
Content Assist	Alt+/	Open content assist view at the current cursor position to display the auxiliary syntax sample of the programming code
Quick Fix	Ctrl+1	If the cursor is at the location of the problem, the content assist view will be opened and the possible corrections will be provided.
Parameter Hints	Alt+?	If the cursor is at the location of the referential parameters, the parameter information will be displayed as floating instructions
Set Encoding	-	Switch the current content coding

4.2.3 Source

The source menu is as shown in Table 4-3.

Table 4-3 Source Menu

Menu Item	Shortcut	Functional Description
Toggle Comment	Ctrl+7	Toggle comment on all lines containing the selected text of the current line
Add Block Comment	Ctrl+Shift+/	Comment on all blocks containing the selected text of the current line
Remove Block Comment	Ctrl+Shift+\	Remove the blocks containing the selected text of the current line
Shift Right	–	Increase indent in the selected line
Shift Left	Shift+Tab	Reduce indent in the selected line
Correct Indentation	Ctrl+I	Indent rule applying to the selected line
Format	Ctrl+Shift+F	Program code formatter can be used to format the current text selection
Add Include	Ctrl+Shift+N	Add include to the reference of the selected type
Organize Includes	Ctrl+Shfit+O	Add Include to the selected compilation organizes
Sort Lines	Ctrl+Shift+S	Sort lines according to the specified order
Implement Method…	–	The method of replacing or implementing the current type
Generate Getters and Setters…	–	Generate Getters and Setters for the field of the current line type
Surround With	Alt+Shift+Z	Evaluate all exceptions that must be caught for the selected statement

4.2.4 Refactor

The Refactor menu is as shown in Table 4-4.

Table 4-4 Refactor Menu

Menu Item	Shortcut	Functional Description
Rename…	Alt+Shift+R	Rename the selected element and update all the reference of the elements
Extract Local Variable	Alt+Shift+L	Create a new variable and specify it to the selected expression and replace the selected as the new variable's reference
Extract Constant…	Alt+C	Creates the static final field from the selected expression and replaces the field reference, rewriting to the other locations where the same expression occurs
Extract Function…	Alt+Shift+M	Create a new variable and specify it to the selected statement and replace the selected as the new variable's reference
Toggle Function	Alt+Shift+T	Move the selected function from the header file to the implementation file or return
Hide Method…	–	Hide Method…
Apply Script…	–	Apply the saved refactor list
Create Script…	–	Export the refactor list for later use

Menu Item	Shortcut	Functional Description
History…	–	Display the refactor history

4.2.5 Navigate

The Navigate menu is listed in Table 4-5.

Table 4-5 Navigate Menu

Menu Item	Sub-menu Item	Shortcut	Functional Description
Go Into	-	-	Set the view input to the current selected element
Go To	Back	-	Back: Set the view input to the previous input
	Forward	-	Forward: Set the view input to the next input
	Up One Level	-	Up One Level: Set the current view input to the input parent element
	Resource…	-	Browse to find resources and display them in the current view
Open Declaration	-	F3	Display the Open Declaraction view to open a declaration in the editor
Open Type Hierarchy	-	F4	Parse the element referenced by the current program code options and open it in the Type Hierarchy view
Open Call Hierarchy	-	Ctrl+Alt+H	Open Call the element referenced by the current program code options and open it in the Call Hierarchy view
Open Include Browser	-	Ctrl+Alt+I	Display Include Browser
Open Element…	-	Ctrl+Shift+T	Display the Open Element view to open an element in the editor
Open Type In Hierarchy…	-	Ctrl+Shift+H	Display the Open Type view to open a type in the editor and Type Hierarchy view
Open Element in Call Hierarchy…	-	-	Display the Open Element view to open an element in the editor and Call Hierarchy view
Open Resource…	-	Ctrl+Shift+R	Display all resources
Show In	Problem Details	Alt+Shift+W	Display Problem Details view
	Include Browser		Display Include Browser view
	C/C++ Projects		Display C/C++ Projects view
	Project Explorer		Display Project Explorer view
	System Explorer		Display System Explorer view
	Properties		Display Properties view
Quick Outline	-	Ctrl+O	Open quick outline for the current selected type
Next Annotation	-	Ctrl+.	Navigate to the next item
Previous Annotation	-	Ctrl+,	Navigate to the previous item
Last Edit Location	-	Ctrl+Q	Display the last edit location
Go to Line…	-	Ctrl+L	Open a dialog box to enter the line number to indicate which line the editor should move

Menu Item	Sub-menu Item	Shortcut	Functional Description
Back	–	Alt+Left	Navigate to the previous resource that previously viewed in the editor
Forward	–	Alt+Right	Navigate and restore the result of previous commands

4.2.6 Search

The search menu is as shown in Table 4-6.

Table 4-6 Search Menu

Menu Item	Sub-menu Item	Shortcut	Functional Description
Search…	–	Ctrl+H	Search
File…	–	–	Search File
C/C++…	–	–	Search C/C++
Remote…	–	–	Search Remote
Text	Workspace	Ctrl+Alt+G	Search for the selected element throughout the workspace
	Project	–	Search for the selected element in the projects that contains the selected element
	File	–	Search for the selected element in the files that contains the selected element
	Working Set…	–	Search for the selected element in the working set

4.2.7 Project

The project menu is as shown in Table 4-7.

Table 4-7 Project Menu

Menu Item	Sub-menu Item	Shortcut	Functional Description
Open Project	–	–	Select to open the closed items
Close Project	–	–	Close the currently selected items
Build All	–	Ctrl+B	Perform incremental compilation of all items in the workspace
Build Configurations	Set Active	–	SetRelease or Debug as active
	Manage…	–	Manage configuration
	Build by Working Set	–	Set to build the working set
	Set Active by Working Set	–	Set Working Set as active
	Manage Working Sets…	–	Manage Working Sets
Build Project	–	–	Perform incremental compilation on the selected projects

Menu Item	Sub-menu Item	Shortcut	Functional Description
Build Working Set	Select Working Set	-	Perform incremental building of all projects in the Working Set
Clean…	-	-	Clean building results
Build Automatically	-	-	Build all projects in the workspace automatically
Build Targets	Create…	-	Create
	Build…	Shift+F9	Build
	Rebuild Last Target	-	Rebuild the last target
Properties	-	-	Properities configuration

4.2.8 Run

The run menu is as shown in Table 4-8.

Table 4-8 Run Menu

Menu Item	Shortcut	Functional Description
Programmer	-	Start Gowin Programmer
Debug	F11	Start Debugging mode
Debug History	-	Use the last debug configuration in the history
Debug As	-	A shortcut to start the debug dialog box
Debug Configuration…	-	Configure debug options and start debugging
Toggle Breakpoint	Ctrl+Shift+B	Add or remove breakpoints based on the current content
Toggle Line Breakpoint	-	Add or remove breakpoints of current executable code line
Toggle Method Breakpoint	-	Add or remove breakpoints based on the current binary method
Toggle Watchpoint	-	Add or remove watchpoints of current field
Skip All Breakpoints	-	Skip all breakpoints in the workspace
Remove All Breakpoint	Ctrl+Alt+B	Remove all breakpoints in the workspace Permanently
Breakpoint Types	-	Configure breakpoint types（C/C++ Breakpoint or C/C++ Dynamic Printf）

4.2.9 Window

The window menu is as shown in Table 4-9.

Table 4-9 Window Menu

Menu Item	Sub-menu Item	Shortcut	Functional Description
New Window	-	-	Open a new workbench window with the same perspective as the current one
Edit	Toggle Split Editor (Horizontal)	Ctrl+_	Open a new copy of the active editor horizontally
	Toggle Split Editor (Vertical)	Ctrl+(	Open a new copy of the active editor vertically
	Clone	-	Copy a new copy of the active editor

Menu Item	Sub-menu Item	Shortcut	Functional Description
Appearance	Hide Toolbar	–	Hide Tool bar
	Toggle Full Screen	Alt+F11	Full screen toggle
Show View	Build Targets	–	Display the Build Targets view in the active perspective
	C/C++ Projects	–	Display C/C++ Projects view in the active perspective
	Console	Alt+Shift+Q,C	Display Console view in the active perspective
	Documents	–	Display documents in the active perspective
	Include Browser	–	Display Include Browser view in the active perspective
	Navigator	–	Display Navigator in the active perspective
	Outline	Alt+Shift+Q,O	Display Outline in the active perspective
	Problem Details	–	Display Problem Details view in the active perspective
	Problems	Alt+Shift+Q,X	Display Problem view in the active perspective
	Project Explorer	–	Display Problem Explorer view in the active perspective
	Properties	–	Display Properties view in the active perspective
	Search	Alt+Shift+Q,S	Display Search view in the active perspective
	Tasks	–	Display Tasks view in the active perspective
	Other…	Alt+Shift+Q,Q	Open all views
Perspective	Open Perspective	–	Open the perspective of sub-menus
	Customize Perspective …	–	Change the visibility of various elements in the active perspective
	Save Perspective As…	–	Save the active perspective as a new name view
	Reset Perspective…	–	Remove the user-defined perspectives
	Close Perspective	–	Close the active perspective
	Close All Perspectives	–	Close all perspectives
Navigation	Show System Menu	Alt+-	Show system menu
	Show View Menu	–	Show vew menu
	Quick Access	Ctrl+3	Open quick access
	Maximize Active View or Editor	Ctrl+M	Maximize active view or editor
	Minimize Active View or Editor	–	Minimize active view or editor
	Active Editor	F12	Start editor

Menu Item	Sub-menu Item	Shortcut	Functional Description
	Next Editor	Ctrl+F6	Start the next editor in the list of recently used editors
	Previous Editor	Ctrl+Shift+F6	Start the previous editor in the list of recently used editors
	Switch to Editor…	Ctrl+Shift+E	Switch to the open editor
	Next View	Ctrl+F7	Start the next view in the list of recently used views
	Previous View	Ctrl+Shift+F7	Start the previous view in the list of recently used views
	Next Perspective	Ctrl+F8	Start the next perspective in the list of recently used perspectives
	Previous Perspective	Ctrl+Shift+F8	Start the previous perspective in the list of recently used perspectives
Preferences	-	-	Configure the preferences for the active workspace

4.2.10 Help

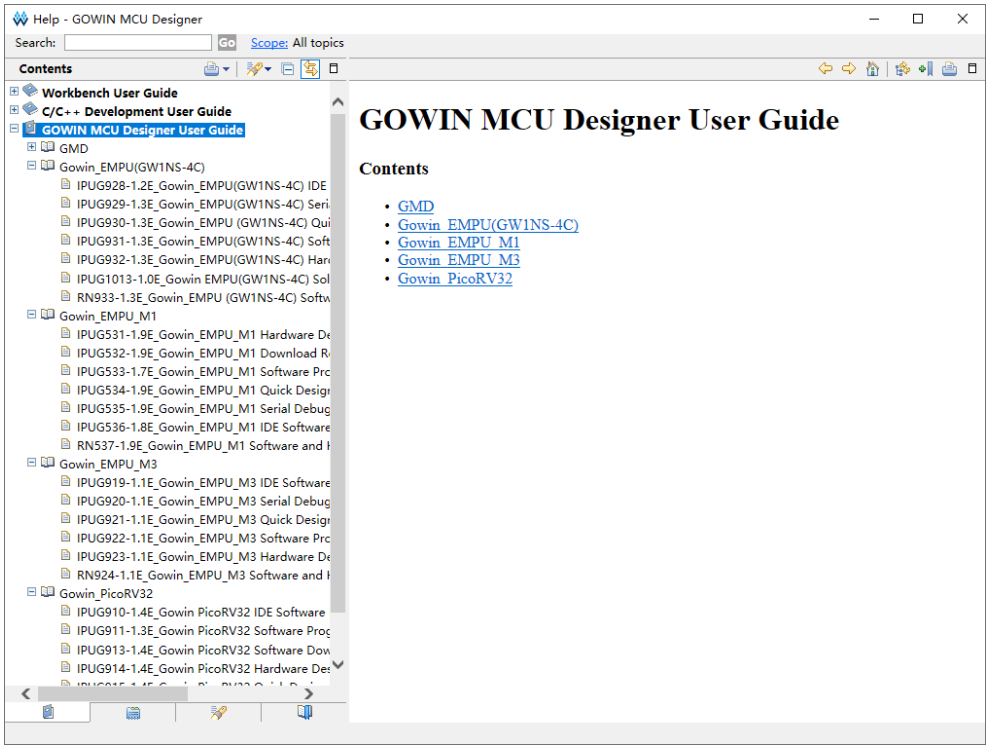
The Help menu is as shown in Table 4-10.

Table 4-10 Help Menu

Menu Item	Shortcut	Description
Welcome	-	Welcome page
Help Contents	-	Help page
Search	-	Search the Help contents
Show Contextual Help	-	Show the Help contents in related topics
Show Active Keybindings…	Ctrl+Shift+L	Show active keybindings
Tips and Tricks…	-	Tips and Tricks
Cheat Sheets…	-	Cheat Sheets…
License Content	-	Display license content
About GOWIN MCU Designer		Display GMD information

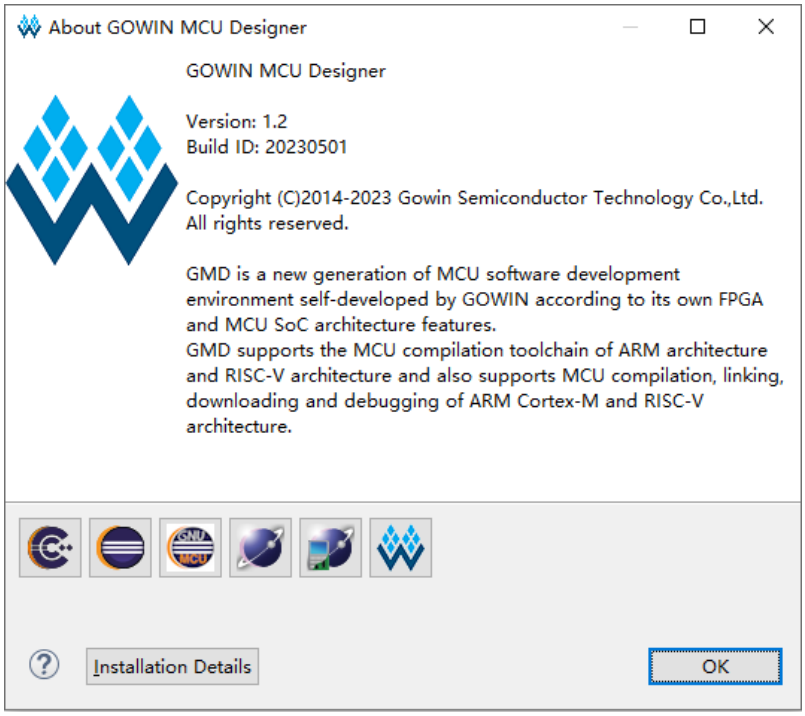
Click "Help > Help Contents" on the menu bar to view the user manuals of GMD, Gowin_EMPU (GW1NS-4C), Gowin_EMPU_M1, Gowin_EMPU_M3, and Gowin_PicoRV32, as shown in Figure 4-2.

Figure 4-2 Help Contents



Click "Help > About GOWIN MCU Designer" on the menu bar to view GMD information, as shown in Figure 4-3.

Figure 4-3 About GOWIN MCU Designer



4.3 Tool Bar

Tool bar provides quick accesses to some commonly used functions, mainly including Build, Run, Stop, New Wizards, Save, Save All, Manage, Restart, Debug, Search, etc. as shown in Table 4-11.

Table 4-11 Tool Bar Options

Tool Bar Options	Icon	Functional Description
New		New a project or a file
Save		Save the content of the active editor
Save All		Save the content of the active editor under a new name
Manage Configurations		Manage configurations (Debug and Release)
Build…		Perform incremental compilation on the selected projects
Build All		Perform incremental compilation of all items in the workspace
Skip All Breakpoints		Skip all breakpoints in the workspace during debugging
Restart		Restart GMD
Make the C/C++ Packs perspective visible		Load the device information of ARM processor
Debug		Debugging
Programmer		Start Programmer.
Open Element		Display the Open Element view to open an element in the editor
Search		Search
Toggle Mark Occurrences		Toggle mark occurrences of C/C++ editor
Toggle Work Wrap		Toggle Work Wrap
Toggle Block Selection Mode		Toggle Block Selection Mode
Show Whitespace Characters		Show Whitespace Characters
Next Annotation		Navigate to the next item
Previous Annotation		Navigate to the previous item
Last Edit Location		Display the last edit location
Back		Navigate to the previous resource that previously viewed in the editor
Forward		Navigate and restore the result of previous commands

4.4 Project Area

The project area shows projects and the related files. Users can check or change the project device information, user design files, etc.

4.5 Source File Editing Area

Users can view and edit source files in the source file editing area.

The newly-built or opened files from the File window will be displayed in the source file editing area.

To close the file currently displayed, click "File > Close" on the menu bar or click on the icon "  " that appears in the upper-right of the file editing area.

To close all the files in the file editing area, click "File > Close All" on the menu bar.

4.6 Information Output area

The information output area displays the processing information when the software is running. Users can verify different outputs by manually switching between the tabs:

- Console
- Problems

5 License Management

5.1 License Application

When users start GMD for the first time after it is installed, the prompt for the License installation and registration pops up. Please apply for a License before starting GMD for the first time.

The information as follows is required to apply for a license:

- MAC address (Mandatory)
- Computer name (Optional)

5.2 License Installation

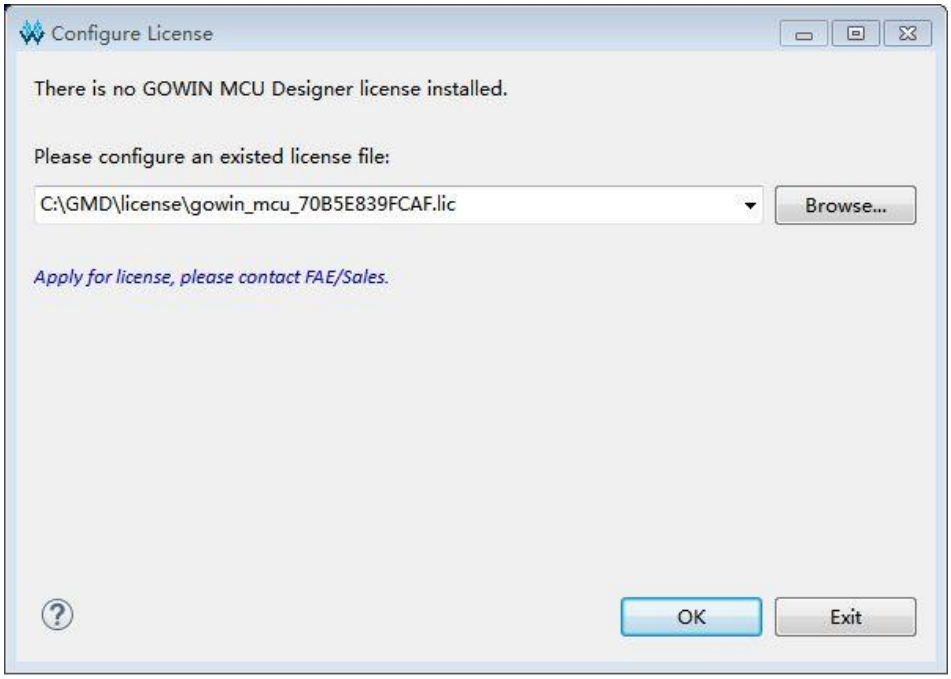
After GMD is installed and started for the first time, a license configuration dialog box pops up, as shown in Figure 5-1.

Figure 5-1 A Starting License Prompt

If users have no License, click "Exit" and apply for a License.

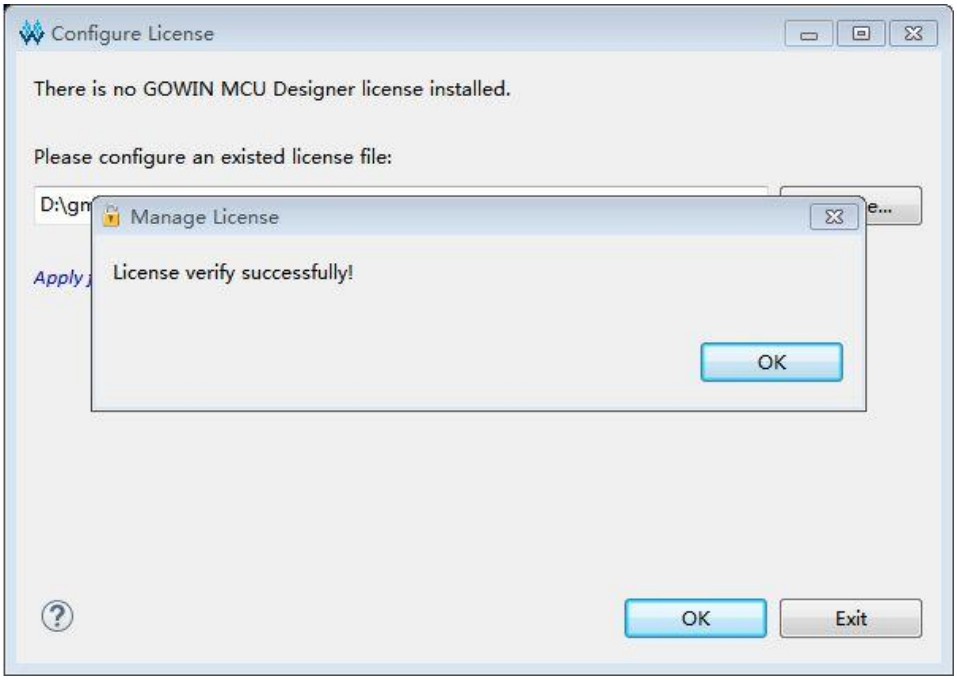
If users have the License, click "Install now", import the License file, and click "OK", as shown in Figure 5-2.

Figure 5-2 License Installation



As shown in Figure 5-3, when the License installation is complete, "License verify successfully!" pops up. Click "OK", and GMD starts.

Figure 5-3 License Verification

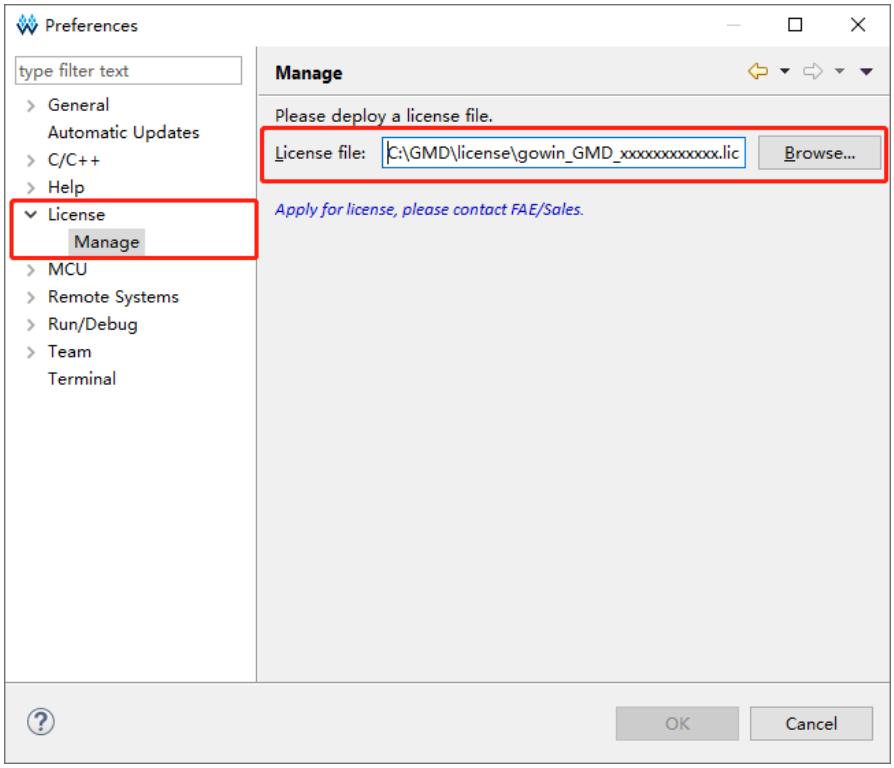


5.3 License Management

Before the License is due to expire, users can apply for a new License and reinstall.

Click Window > Perferences on the menu bar to open the "Perferences" view. Select "License > Manage" and import the new License file, as shown in Figure 5-4.

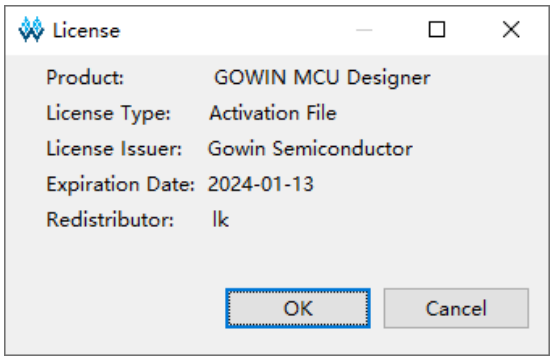
Figure 5-4 License Management



5.4 License Check

After the License is installed and verified, click "Help > License Content" on the menu bar to check the installed License information, as shown in Figure 5-5.

Figure 5-5 License Check

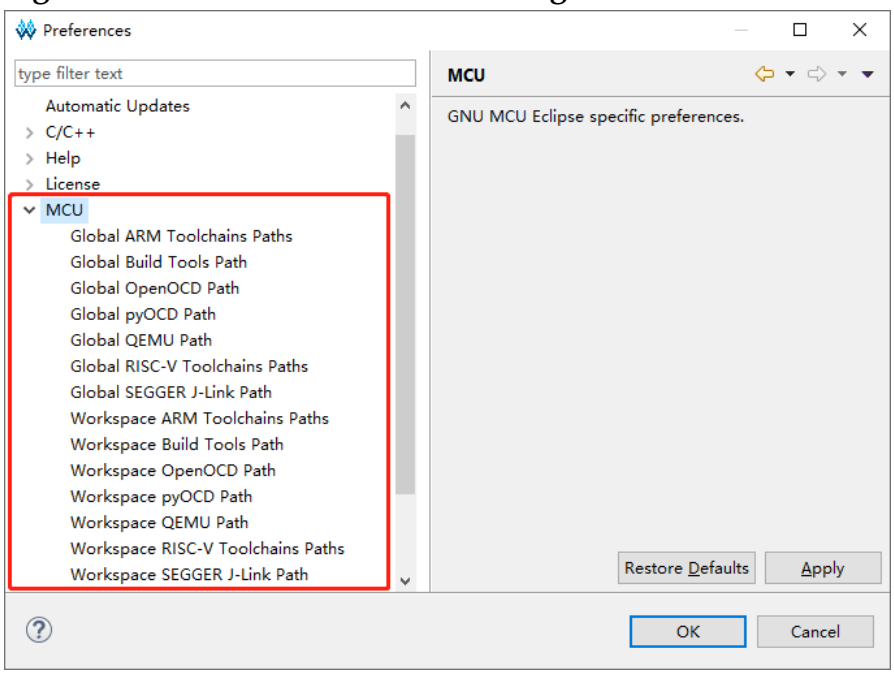


6 GMD Software Configuration

If the default path "C:\GMD" is used, GMD software is configured by default and users do not need to configure the toolchain; if you choose another path, re-configure the toolchain.

Click "Window > Perferences" on the menu bar to open the Perferences dialog box, configure "Global ARM Toolchains Paths", "Global Build Tools Path", "Global OpenOCD Path", "Global RISC-V Toolchain Path" and "Global RISC-V Toolchain Path", "Global RISC-V Toolchains Paths", and "Global SEGGER J-Link Path" in "MCU" option, as shown in Figure 6-1.

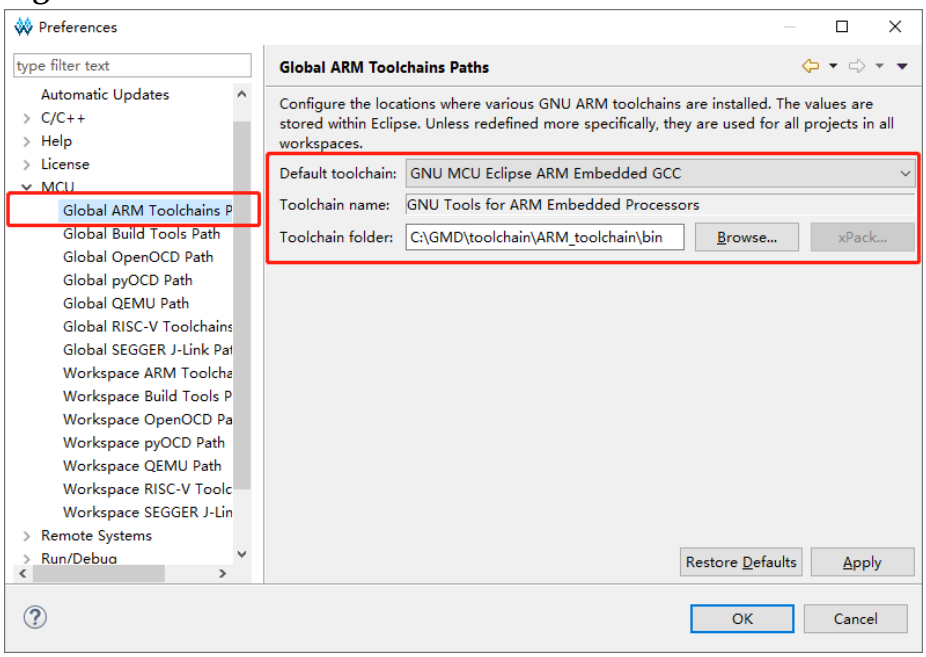
Figure 6-1 Software Toolchains Configuration



6.1 Global ARM Toolchains Paths Configuration

Click "Global ARM Toolchains Paths" to configure ARM MCU software toolchain, as shown in Figure 6-2 .

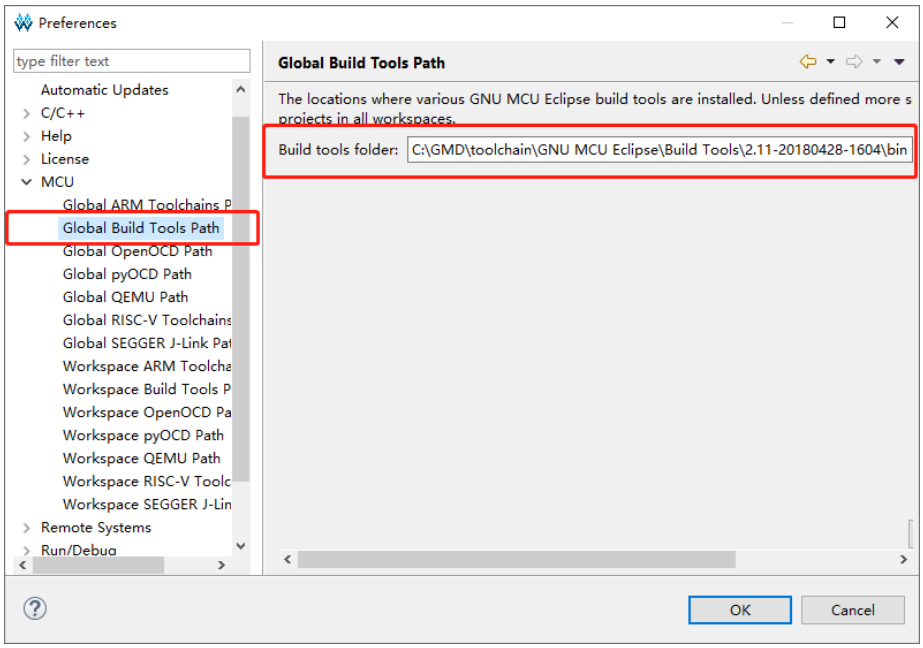
Figure 6-2 Global ARM Toolchains Paths



6.2 Global Build Tools Path Configuration

Click "Global Build Tools Path" to configure build software toolchain, as shown in Figure 6-3.

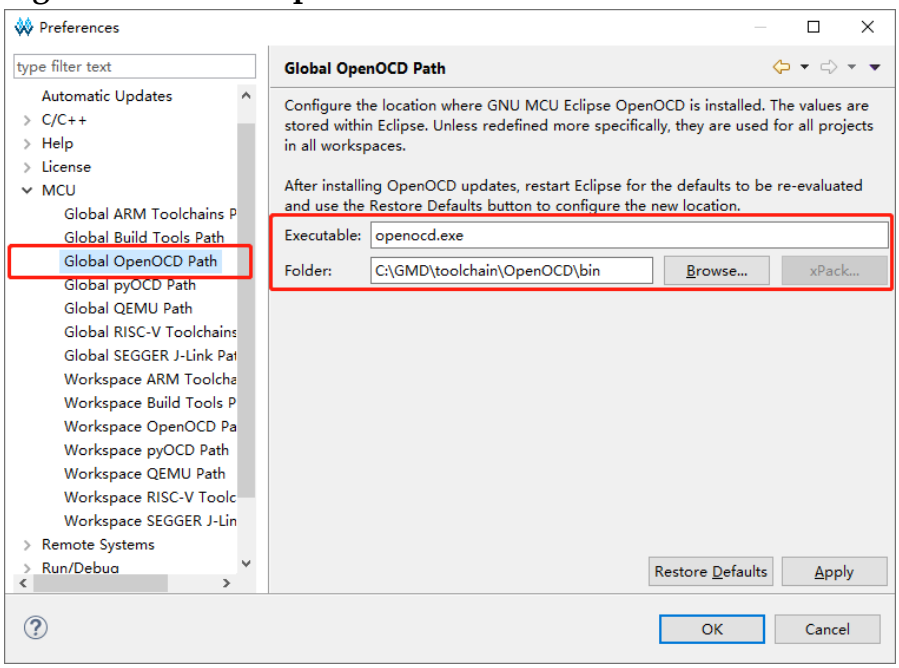
Figure 6-3 Global Build Tools Path



6.3 Global OpenOCD Path Configuration

Click "Global OpenOCD Path" to configure OpenOCD debugger, as shown in Figure 6-4.

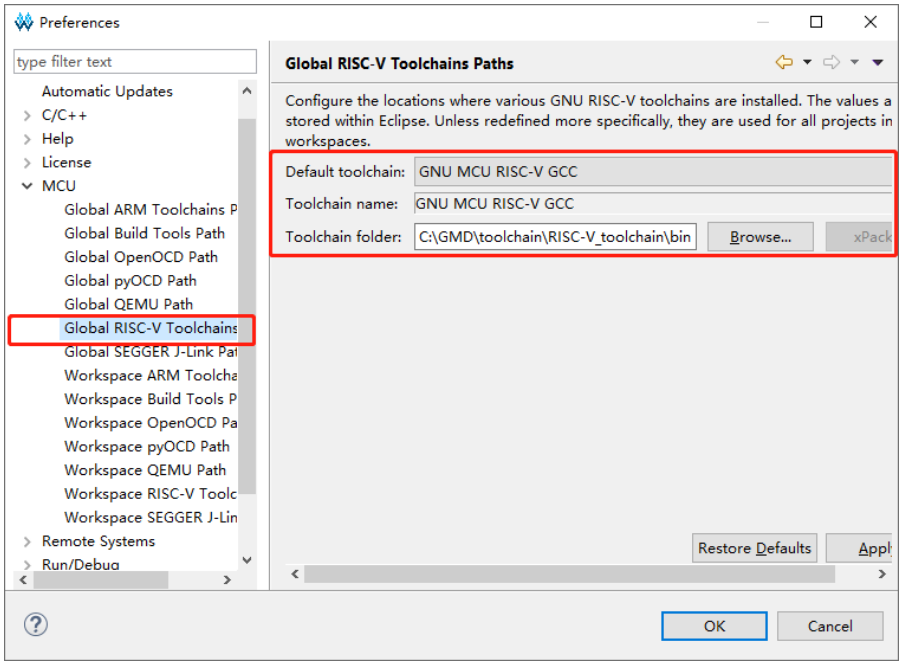
Figure 6-4 Global OpenOCD Path



6.4 Global RISC-V Toolchains Paths Configuration

Click "Global RISC-V Toolchains Paths" to configure the RISC-V MCU software toolchain, as shown in Figure 6-5.

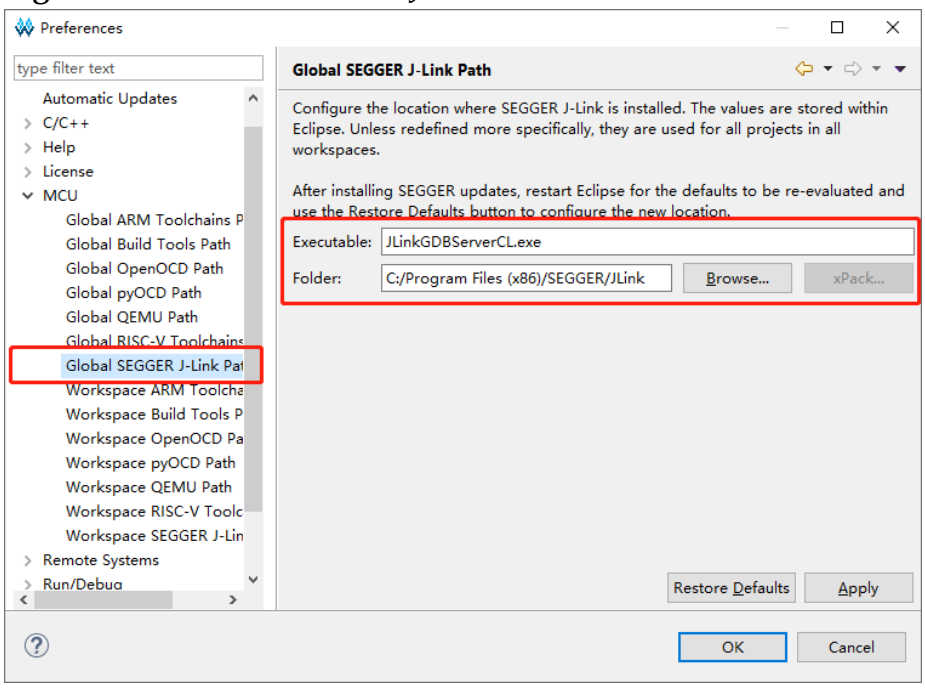
Figure 6-5 Global RISC-V Toolchains Paths



6.5 Global SEGGER J-Link Path Configuration

Click "Global SEGGER J-Link Path" to configure ARM MCU debugger, as shown in Figure 6-6.

Figure 6-6 Global SEGGER J-Link Path



7 Using GMD Software

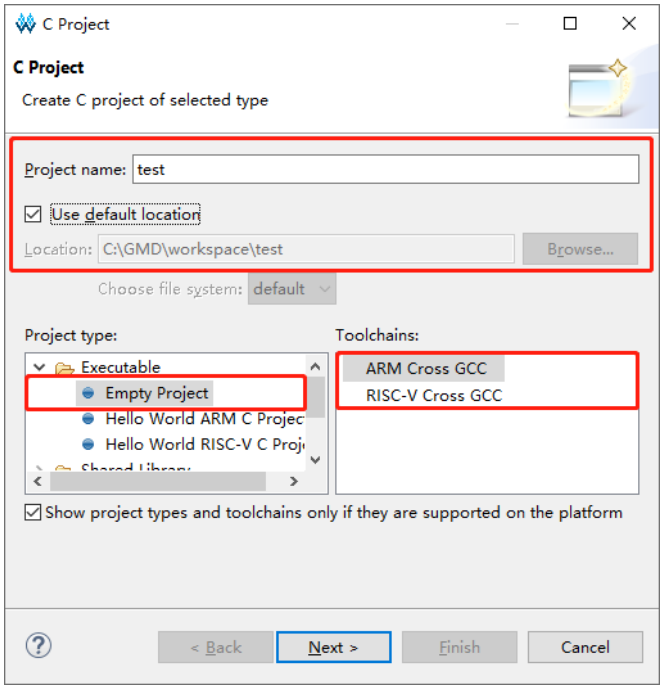
7.1 Create a New Project

Click "File > New > C Project" on the menu bar or "" on the toolbar to open "New C Project" dialog box.

Create a New Project

- Select "Empty Project" in "Project type".
- If you create a new ARM MCU software project, select "ARM Cross GCC" in "Toolchains".
- if you create a new RISC-V MCU software project, select "RISC-V Cross GCC" in "Toolchains".
- Select workspace, or use "Use default location" in "Location".
- Enter the new project name in "Project name".
- Click "Next", as shown in Figure 7-1.

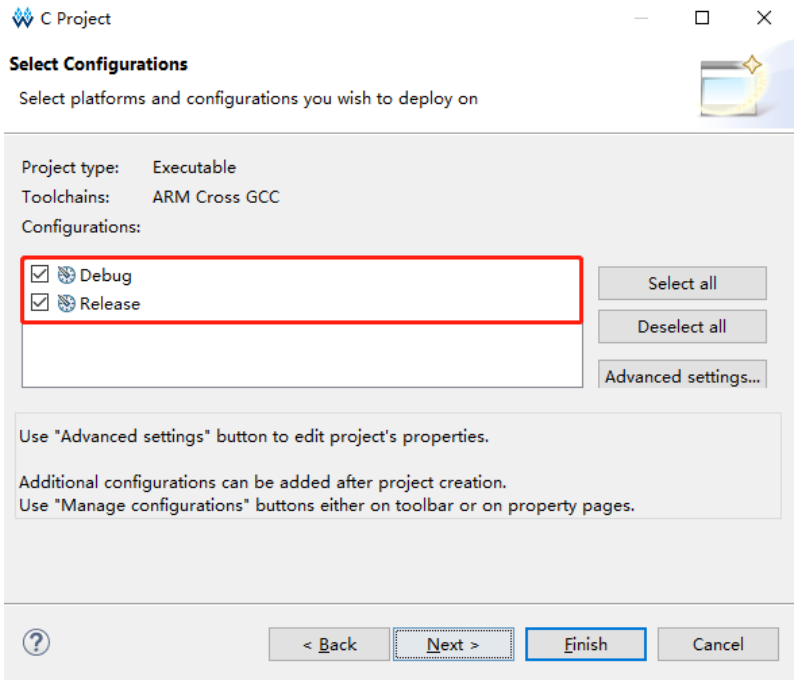
Figure 7-1 New C Project



Select Platforms and Configurations

Select "Debug" and "Release", and click "Next", as shown in Figure 7-2.

Figure 7-2 Select Platforms and Configurations

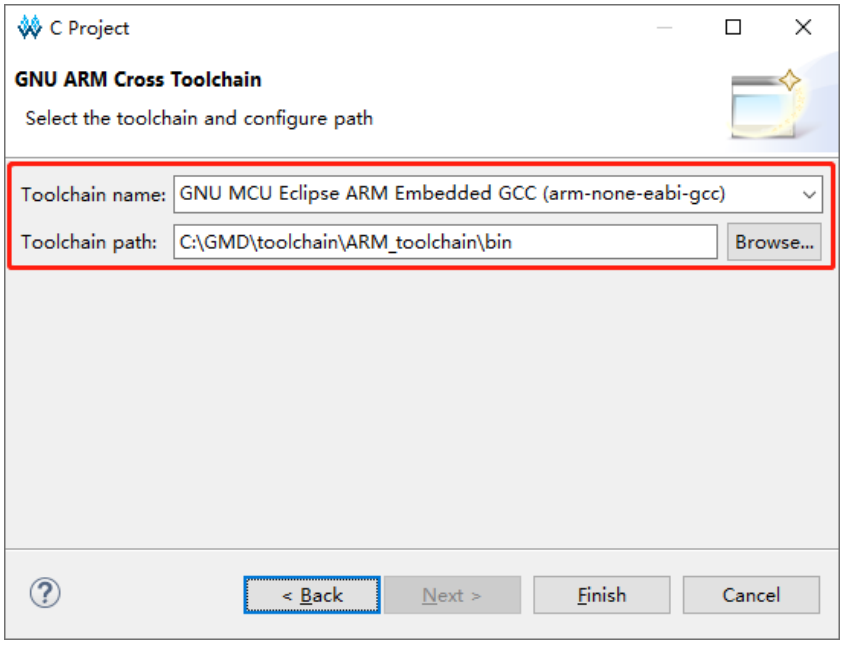


Select the Toolchain and Path

If the default path "C:\GMD" is used, GMD software is configured by default and users do not need to configure the software toolchain; if you choose another installation path, re-configure the software toolchain.

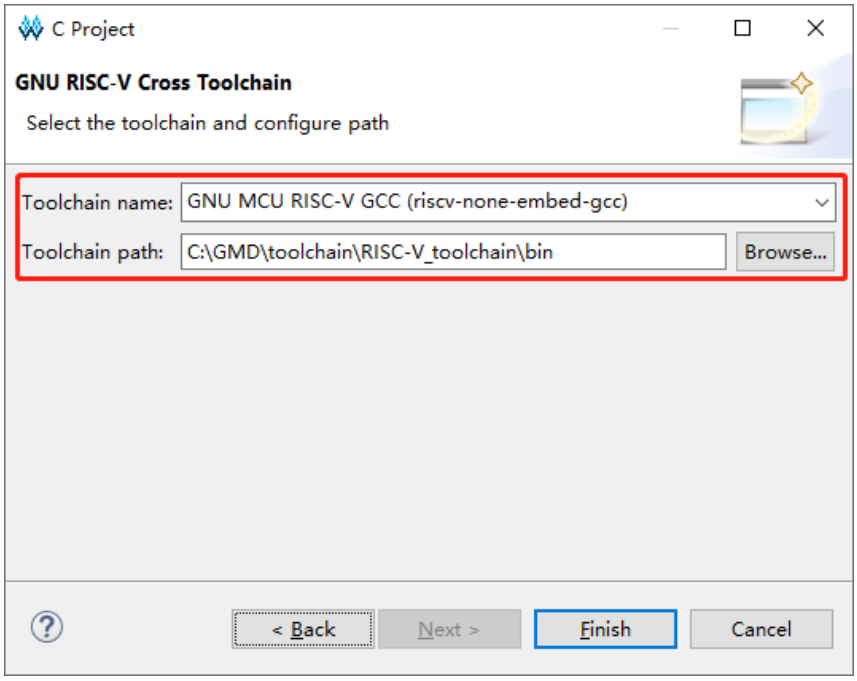
If it is an ARM MCU software project, select an ARM MCU software toolchain, as shown in Figure 7-3.

Figure 7-3 ARM MCU Toolchain and Path



If it is a RISC-V MCU software project, select a RISC-V MCU software toolchain, as shown in Figure 7-4.

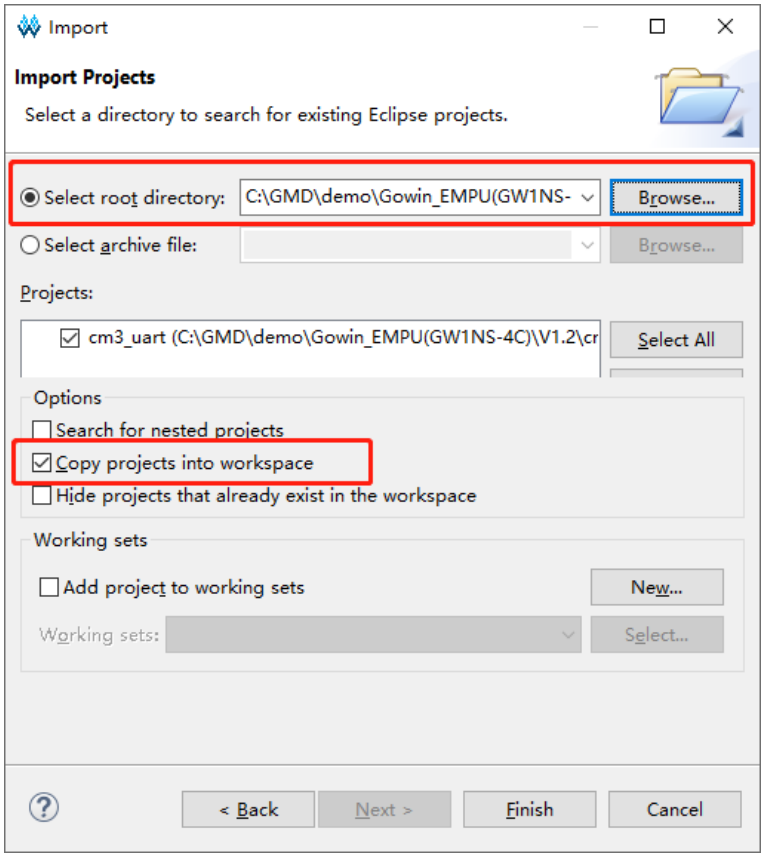
Figure 7-4 RISC-V MCU Toolchain and Path



7.2 Import Projects

Click "File > Import" on the menu bar, select "General > Existing Projects into Workspace", and the "Import Projects" dialog box opens to import the existing projects, as shown in Figure 7-5.

Figure 7-5 Import Projects



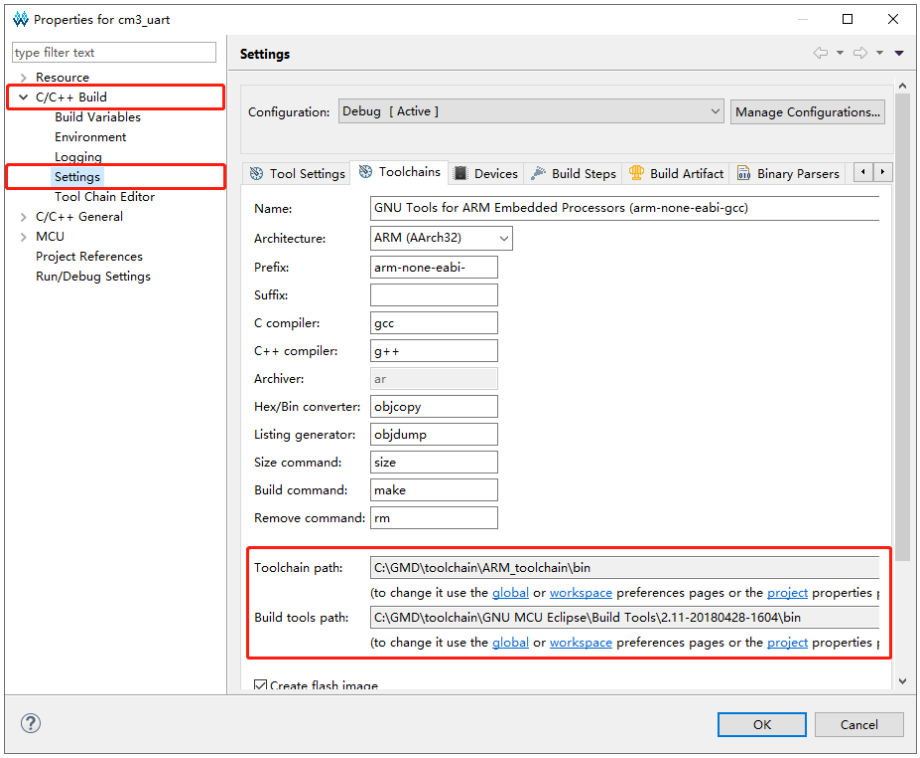
If the default path "C:\GMD" is used, GMD software is configured by default and users do not need to configure the software tool chain; if you choose another installation path, re-configure the software tool chain of the imported project.

Right-click the project in "Project Explorer", click "Properties" to open "Properties" dialog box; click "C/C++ Build > Settings", select the "Toolchains" tab, and configure "Toolchain path" and "Build tools Path", as shown in Figure 7-6.

In "Toolchain path", click "global"; if it is an ARM MCU software project, select "Global ARM Toolchains Paths"; if it is a RISC-V MCU software project, select "Global RISC-V Toolchains Paths".

In "Build tools Path", click "global" and select "Global Build Tools Path".

Figure 7-6 Software Toolchain Configuration



7.3 Project Configuration

7.3.1 Tool Settings Configuration

Right-click the project in "Project Explorer", and click "Properties" to open Properties dialog box; click "C/C++ Build > Settings", and select the "Tool Settings" tab; the ARM MCU "Tool Settings" configuration is shown in Figure 7-7, and the RISC-V MCU "Tool Settings" configuration is shown in Figure 7-8.

Figure 7-7 ARM MCU Tool Settings

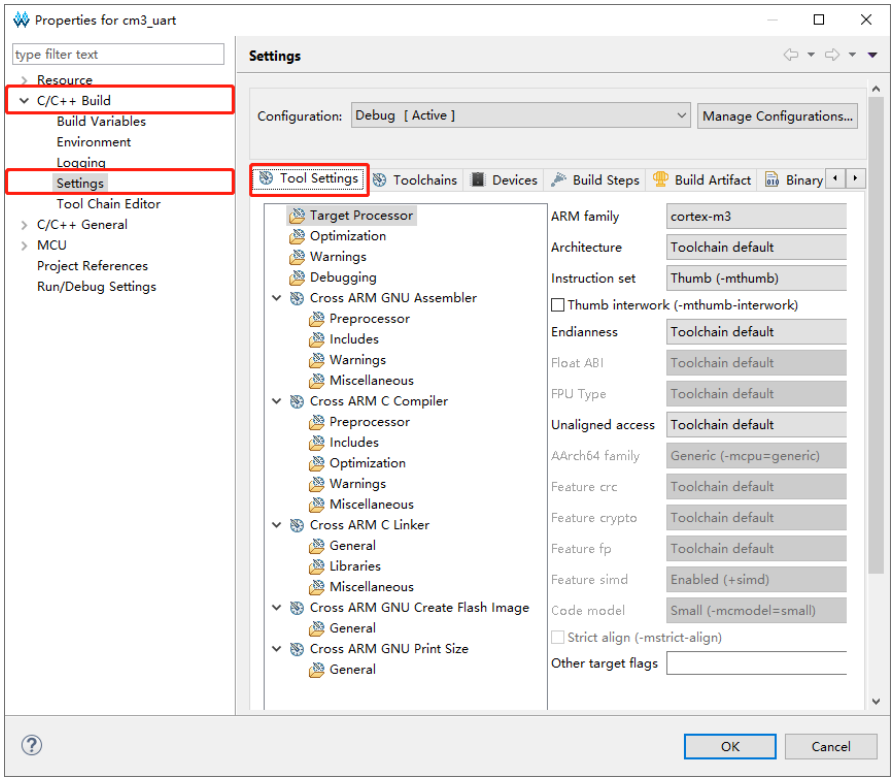
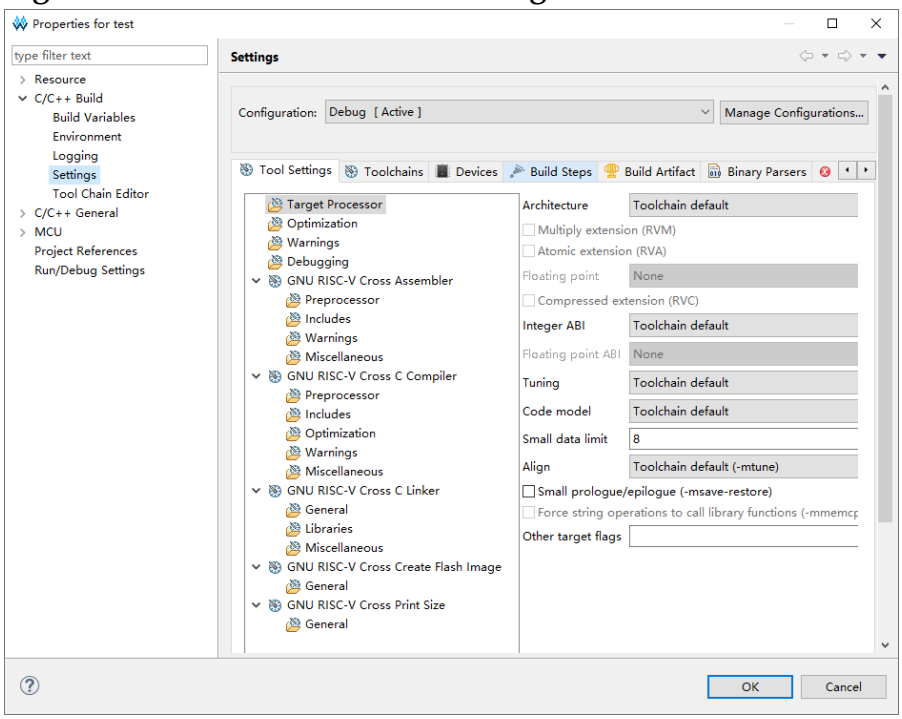


Figure 7-8 RISC-V MCU Tool Settings

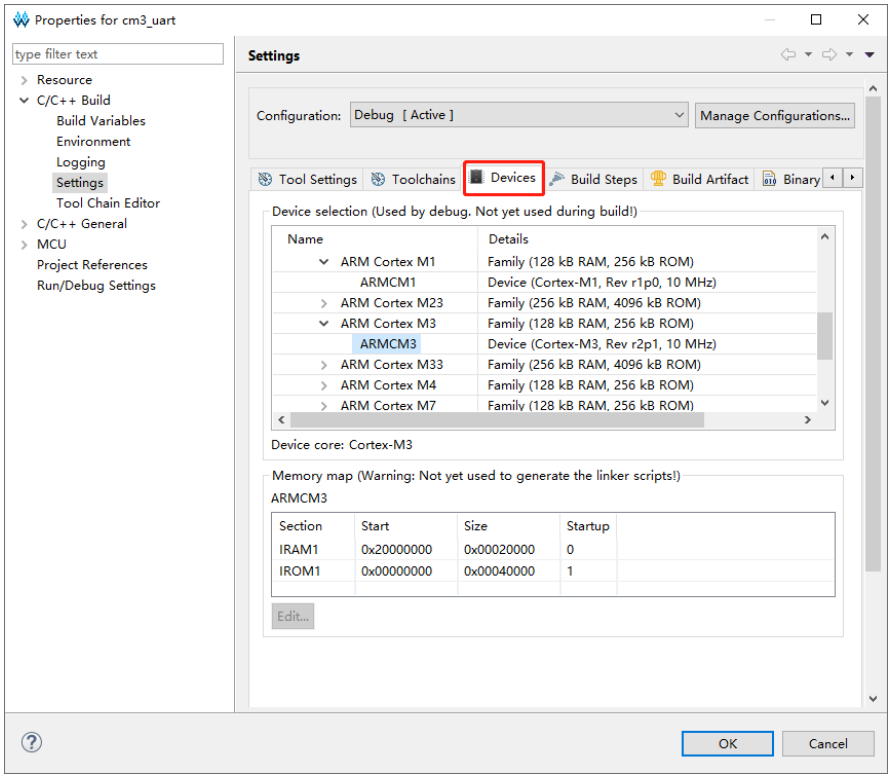


7.3.2 Devices Configuration

Configure "Devices > Device selection" of ARM MCU.

Select "ARM Cortex M3 > ARMCM3" for ARM Cortex-M3 and select "ARM Cortex M1 > ARMCM1" for ARM Cortex-M3 device, as shown in Figure 7-9.

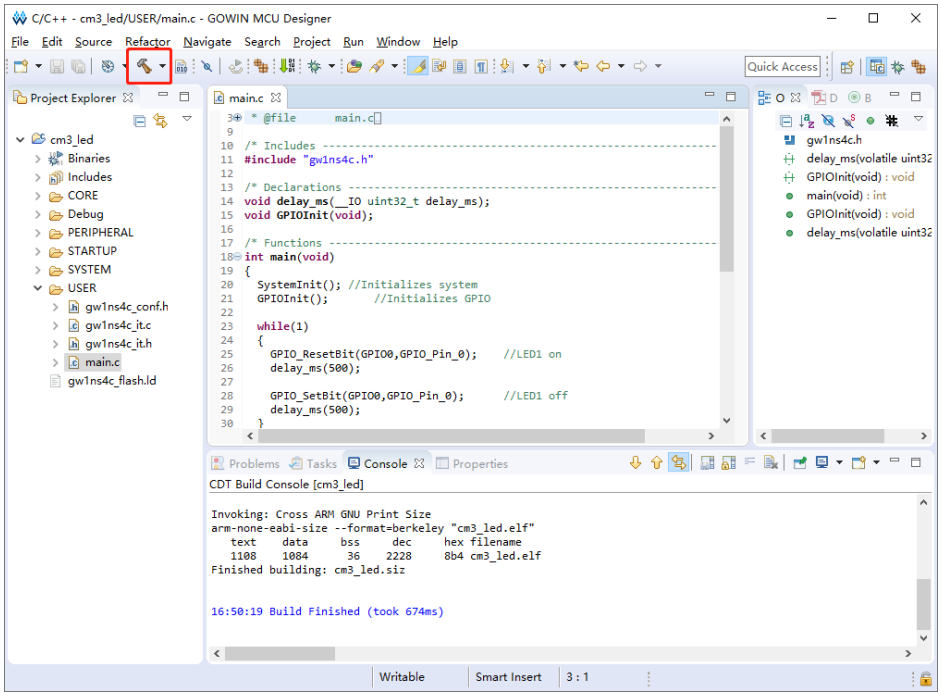
Figure 7-9 Devices Selection



7.4 Build Project

After completing the project configuration and coding, build the project; click build button "", or right-click the project to select "Build Project", as shown in Figure 7-10.

Figure 7-10 Build Project

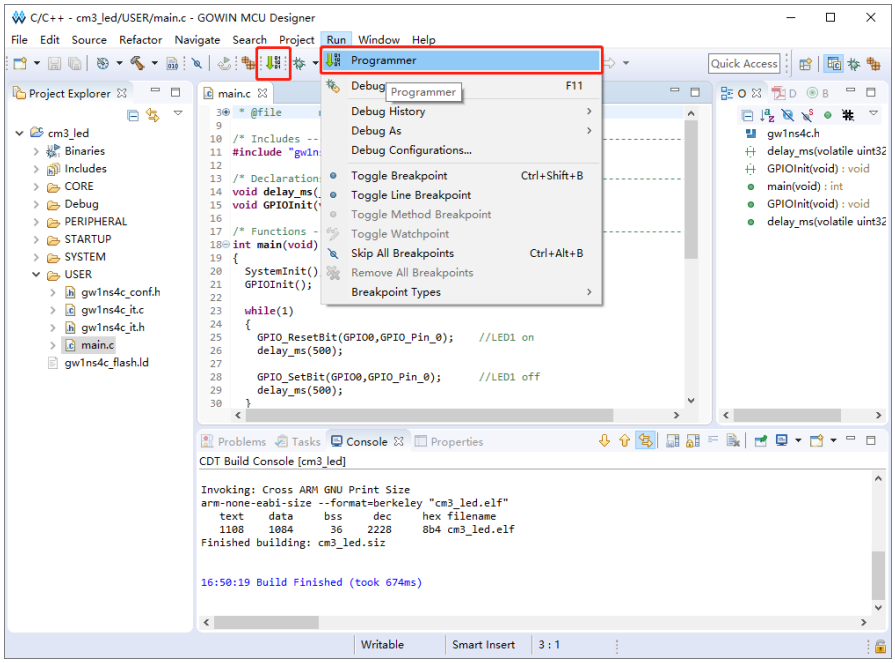


7.5 Download Project

Use the download tool Programmer to download the software programming Binary file.

Click "Run > Programmer" on the menu bar or "" on the toolbar to open Programmer, as shown in Figure 7-11.

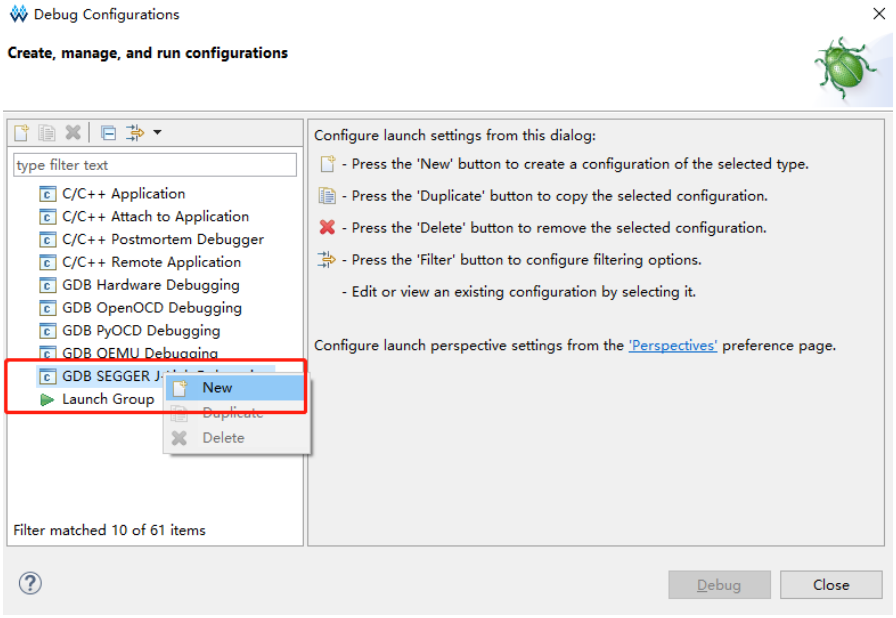
Figure 7-11 Download Project



7.6 Debug Projects

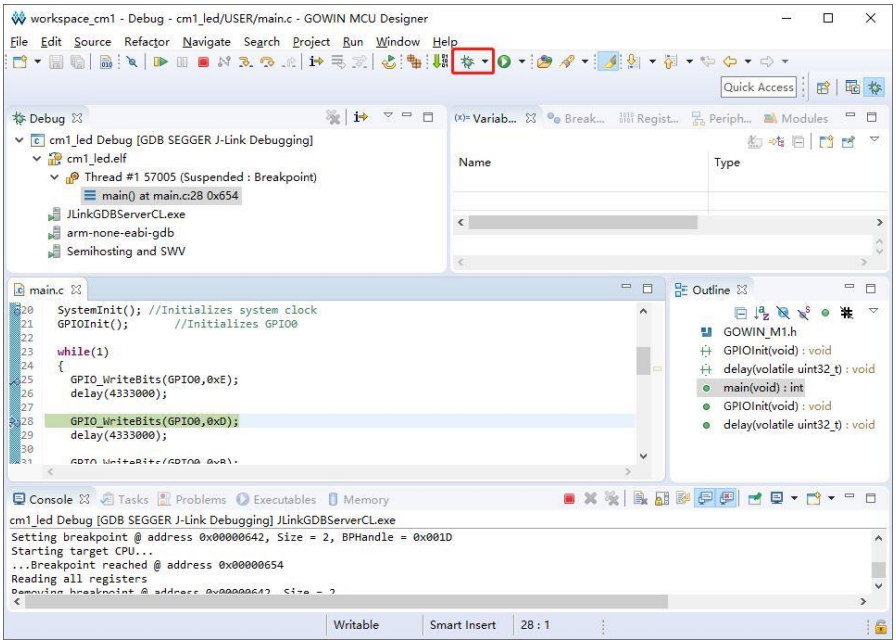
Select "Run > Debug Configurations > GDB SEGGER J-Link Debugging" on the menu bar, right-click and select "New" to configure debugging, as shown in Figure 7-12.

Figure 7-12 Debug Configurations



After debugging configuration, click "Debug" to step through, as shown in Figure 7-13.

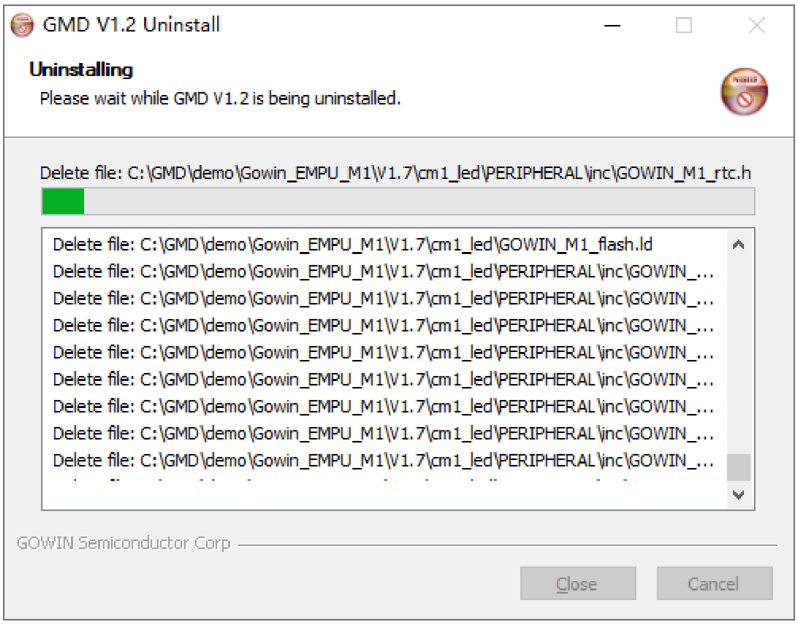
Figure 7-13 Start to Debug



8 GMD Software Uninstallation

Under GMD installation path, double-click "uninst.exe" to uninstall GMD software, as shown in Figure 8-1.

Figure 8-1 GMD Uninstallation

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