

Integrate XMC™ Lib LLD in Keil, IAR, Atollic and Rowley tool chains

XMC™ microcontrollers
July 2016



Agenda

1

Purpose: Integrate Infineon XMC™ Lib LLD into 3rd party compilers

2

Concept

3

Prerequisites to follow the tutorial

4

Tool chains

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Concept

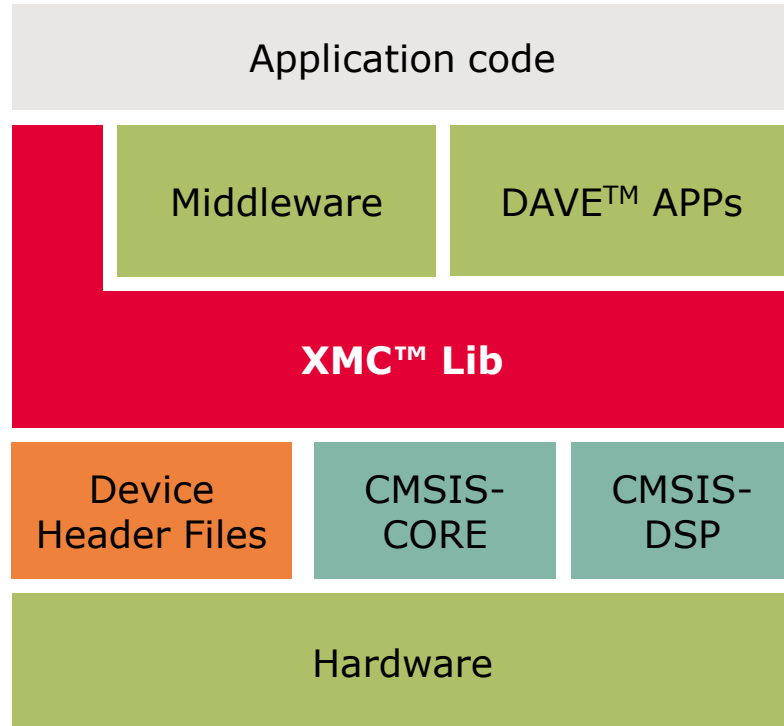
3

Prerequisites to follow the tutorial

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Purpose: Integrate Infineon XMC™ Lib LLD into 3rd party compilers



XMC™ application software layer

- › **XMC™ Lib** is a free library consisting of low-level drivers for Infineon XMC™ product family peripherals
- › Collection of API routines and data structures which covers all peripheral functions
- › MISRA-C 2004 compliant
- › 3rd Parties tool chain support:
 - Keil MDK
 - IAR Embedded Workbench® for ARM®
 - Atollic TrueSTUDIO®
 - Rowley CrossWorks®
 - Tasking VX-toolset for ARM® Cortex®

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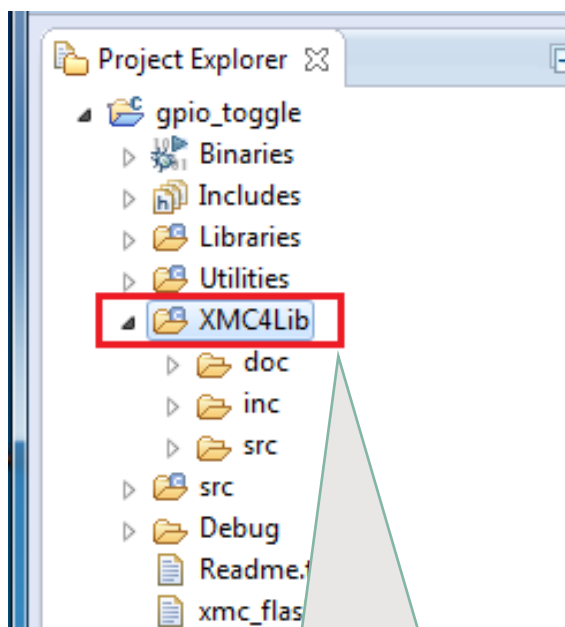
Prerequisites to follow the tutorial

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Tool chains

Concept

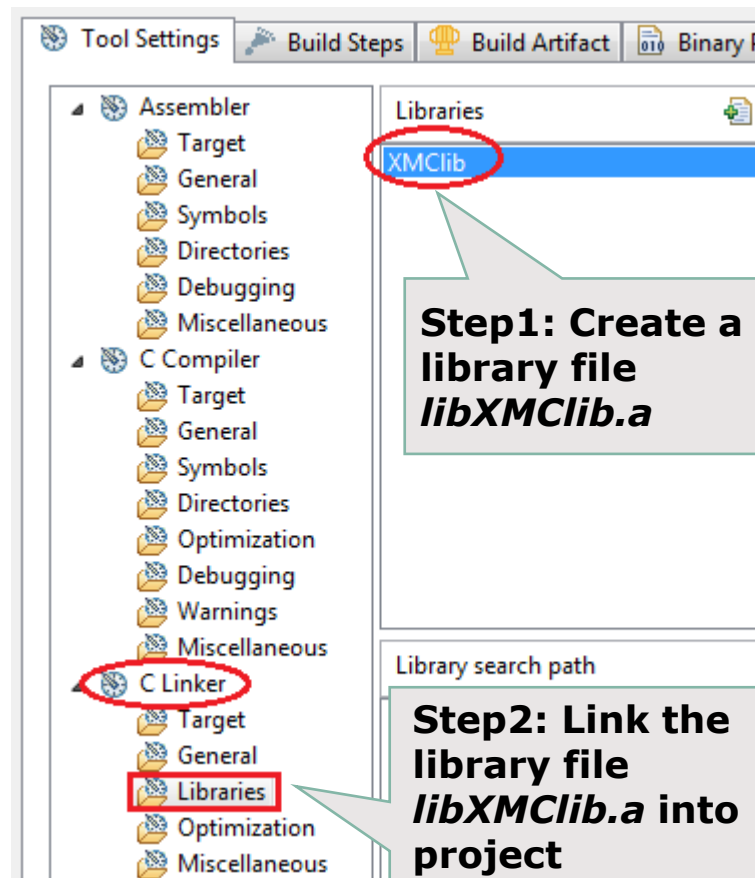
Approach 1: Integrate C source code in project



**Integrate directly
XMC™ Lib C source
functions in project**

Approach 2:

1. Create precompiled library
2. Link the library into project



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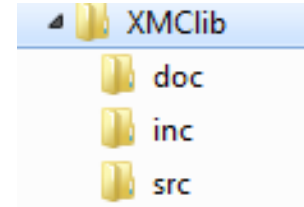
4

Tool chains

Prerequisites to follow the tutorial

- › Download XMC™ Lib source codes here:

http://dave.infineon.com/Libraries/XMCLib/XMC_Peripheral_Library_v2.1.2.zip



- › Choose one of following tool chains:
 - Keil MDK, µVision v5.0 or higher
 - IAR Embedded Workbench® for ARM®, **v7.40.02** or higher
 - Atollic TrueSTUDIO®, v5.30 or higher
 - Rowley CrossWorks® version 3.3.1 or higher
- › Open the used **Compiler IDE**
- › Go to the pages where the corresponding tool chain is described, then follow description...

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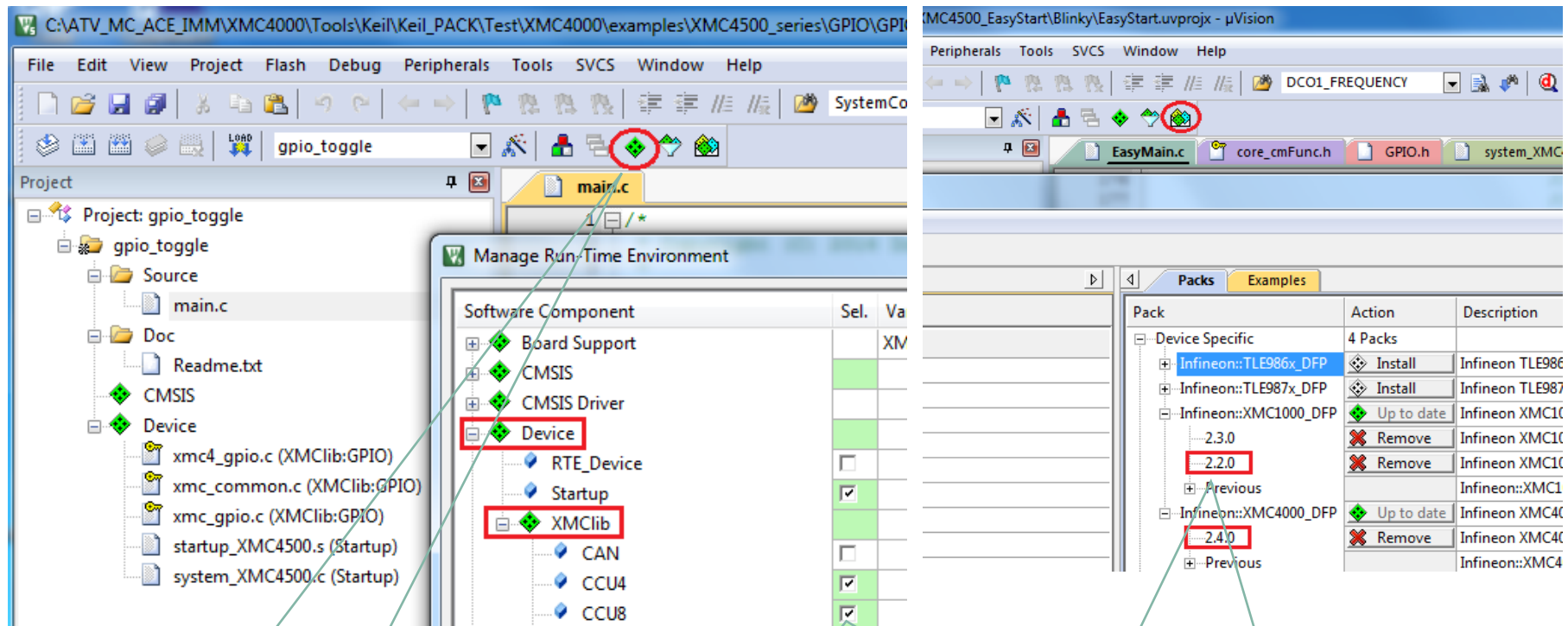
Prerequisites to follow the tutorial

4

Tool chains

Keil: Integrate XMC™ Lib source code in project

Infineon MDK PACK contains XMC™ Lib source functions. The user can integrate XMC™ Lib functions in project through selecting the LLD under Device Component



The screenshot shows the Keil MDK-ARM IDE interface. The Project window on the left displays the 'gpio_toggle' project structure, including 'main.c'. The 'Manage Run-Time Environment' dialog is open, showing the 'Device' component selected under 'CMSIS Driver'. The 'XMClib' component is also selected. The 'Packs' window on the right shows the 'Infineon::XMC1000_DFP' and 'Infineon::XMC4000_DFP' packs, with the '2.2.0' and '2.4.0' versions highlighted.

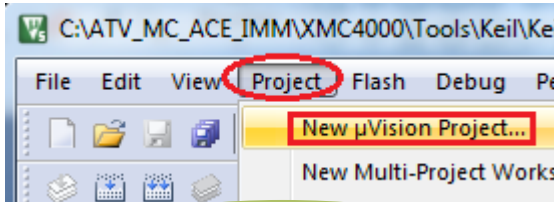
Pack	Action	Description
Infineon::TLE986x_DFP	Install	Infineon TLE986
Infineon::TLE987x_DFP	Install	Infineon TLE987
Infineon::XMC1000_DFP	Up to date	Infineon XMC1000
2.3.0	Remove	Infineon XMC1000
2.2.0	Remove	Infineon XMC1000
Previous		Infineon::XMC1000
Infineon::XMC4000_DFP	Up to date	Infineon XMC4000
2.4.0	Remove	Infineon XMC4000
Previous		Infineon::XMC4000

Step 2: Open Manage Run-Time Environment

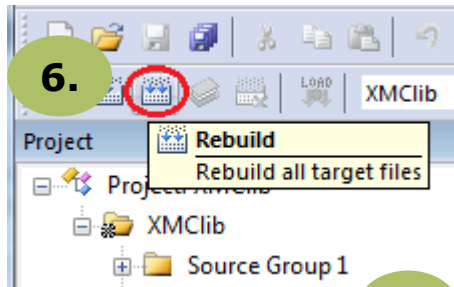
Step 3: Go to **Device**->**XMClib**, select the driver LLD needed

Step 1: Install the **newest Infineon PACK** for both **XMC1000** and **XMC4000**

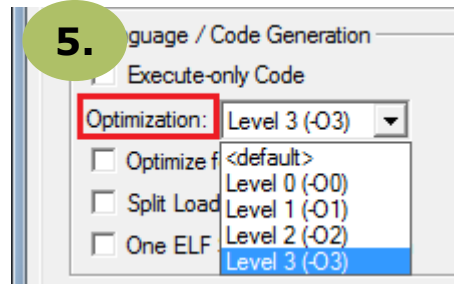
Keil: Create precompiled XMC™ Lib library (XMClb.lib)



1. Define a new project

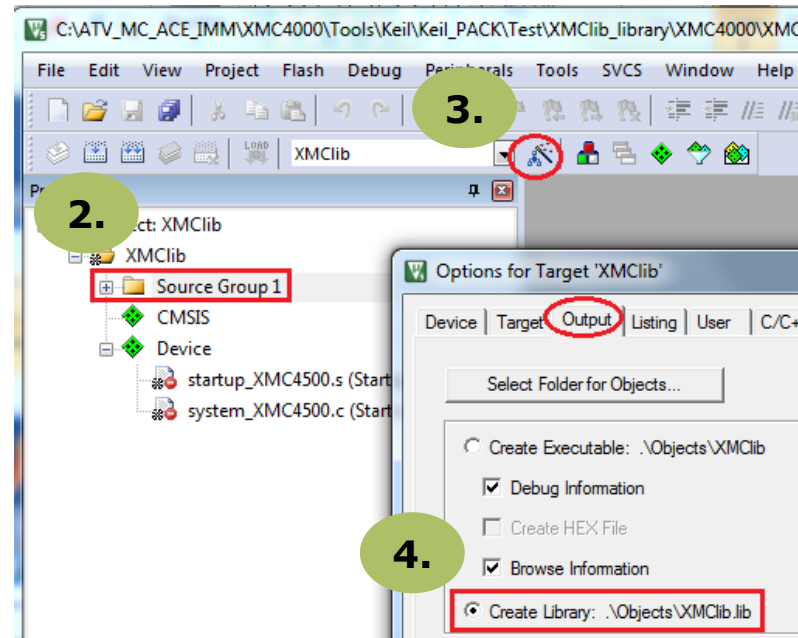


6. Build the project



5. Select optimization level

A precompiled XMC™ Lib library can be created in Keil MDK in advance, which can be linked in Keil project later

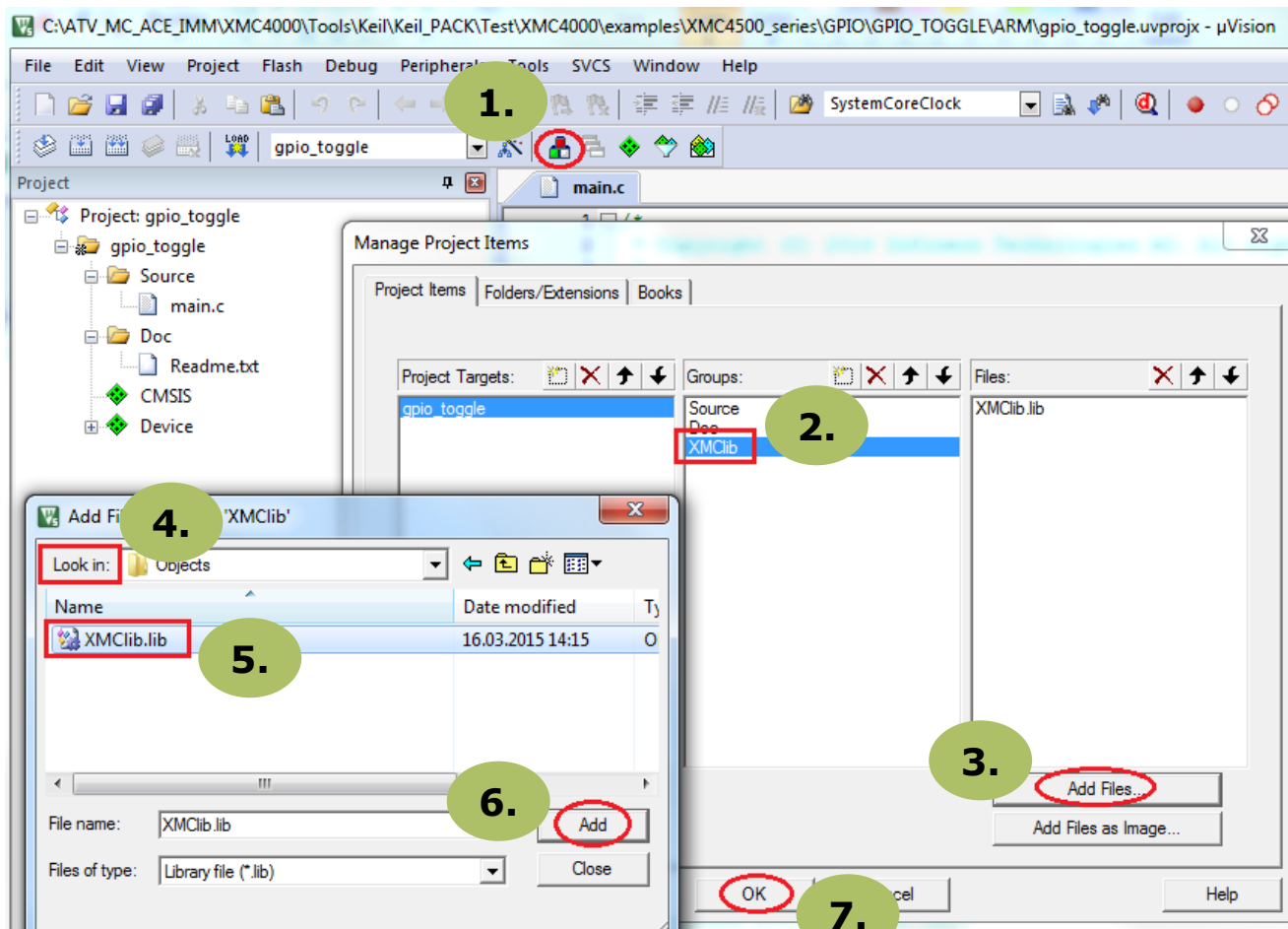


2. Add the **XMClb** source files under **Source Group**

3. Open **Options for Target XMClb**

4. Select **Create Library**

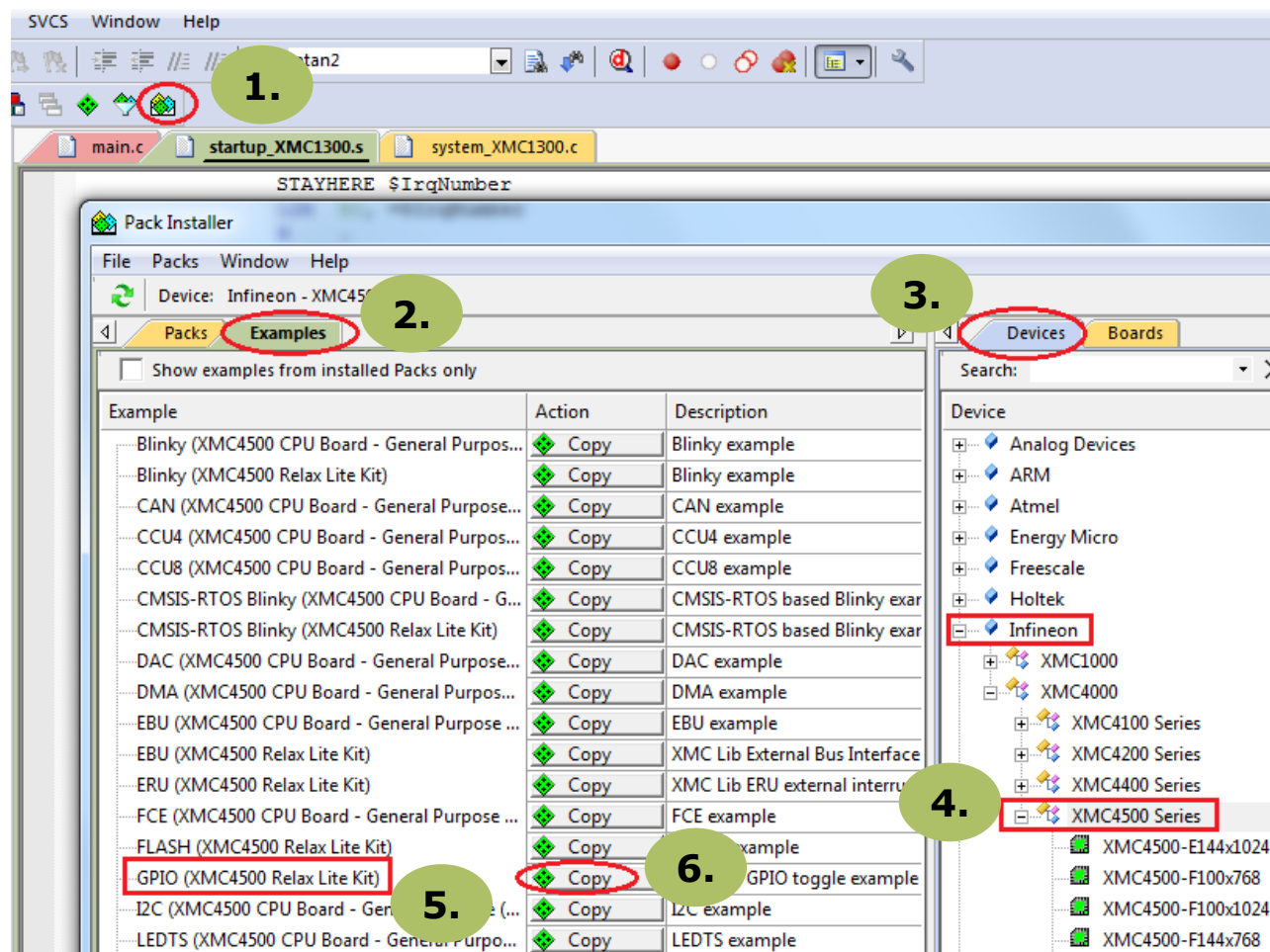
Keil: Link the XMClb.lib into project



- 1.** Open **Project Manager Items**
- 2.** Define group **XMClb**
- 3.** Click **Add Files**
- 4.** Browse to **XMClb.lib** folder
- 5.** Select **XMClb.lib**
- 6.** Click **Add**
- 7.** Click **OK**

Keil: Usage of LLD example projects

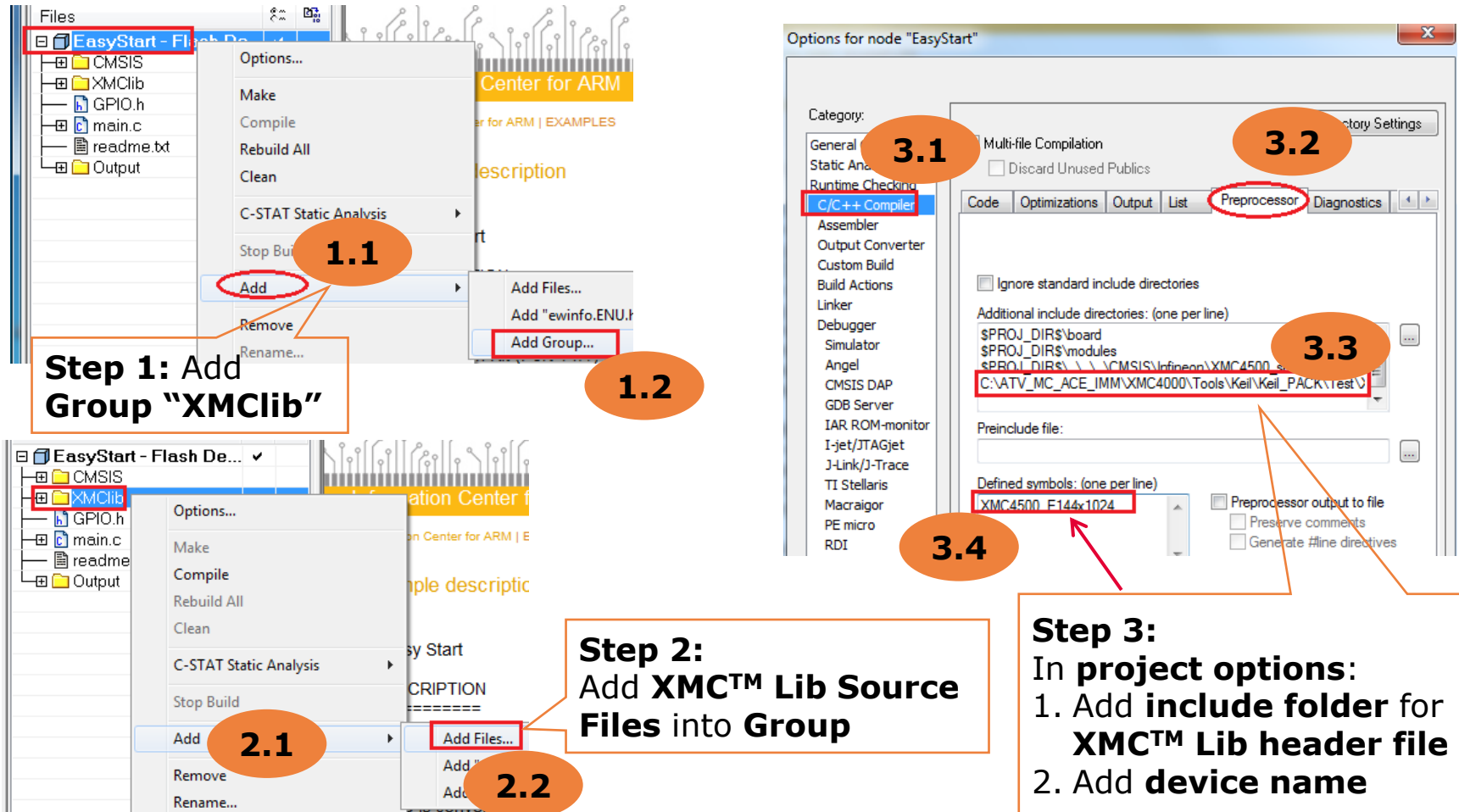
LLD example projects for all Infineon devices are included in PACK as reference



- 1.** Open **Pack Installer**
- 2.** Click **Example**
- 3.** Click **Devices**
- 4.** Select **Infineon** device
- 5.** Select example project
- 6.** Click **Copy**

IAR: Integrate XMC™ Lib source code in project

For IAR project the XMC™ Lib source code needs to be integrated in project manually



The image shows two screenshots of the IAR IDE interface with numbered callouts indicating the steps to integrate XMC Lib source code.

Step 1: Add Group "XMCLib"

1.1: Right-click on the project node "EasyStart - Flash De..." in the Project Explorer.

1.2: Select "Add" from the context menu.

2.1: Select "Add" from the context menu.

2.2: Select "Add Group..." from the sub-menu.

Step 2: Add XMC™ Lib Source Files into Group

3.1: Select "C/C++ Compiler" from the "Options for node 'EasyStart'" dialog.

3.2: Select the "Preprocessor" tab.

3.3: Add the include folder path to the "Additional include directories" list.

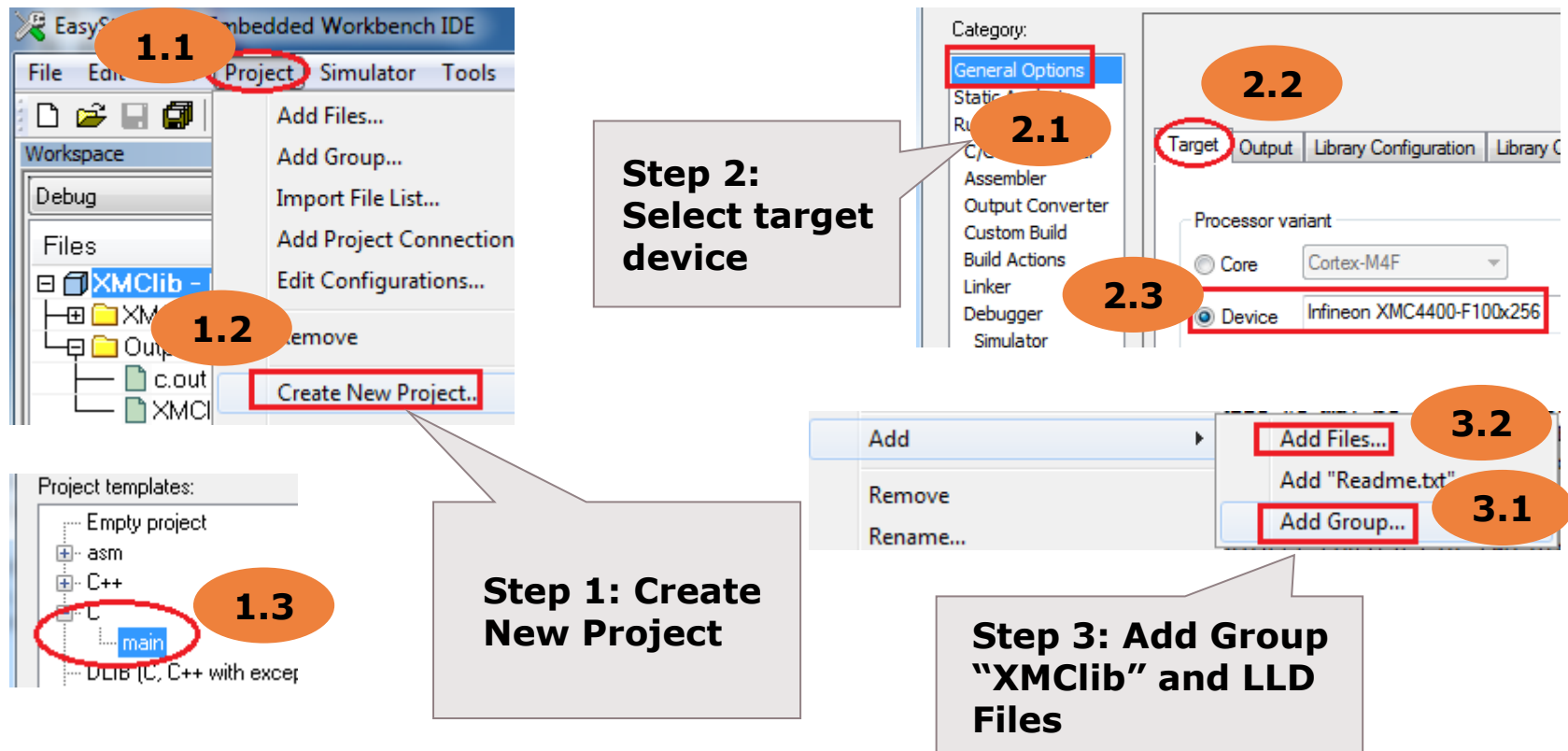
3.4: Add the device name to the "Defined symbols" list.

Step 3: In project options:

1. Add **include folder** for **XMC™ Lib header file**
2. Add **device name**

IAR: Create precompiled XMC™ Lib library (XMClib.a) (1/2)

A precompiled XMC™ Lib library can be created in IAR EWARM in advance, which can be linked in IAR project later



Step 1: Create New Project

1.1: File > Project > Create New Project...

1.2: XMClib -

1.3: C > main

Step 2: Select target device

2.1: General Options

2.2: Target

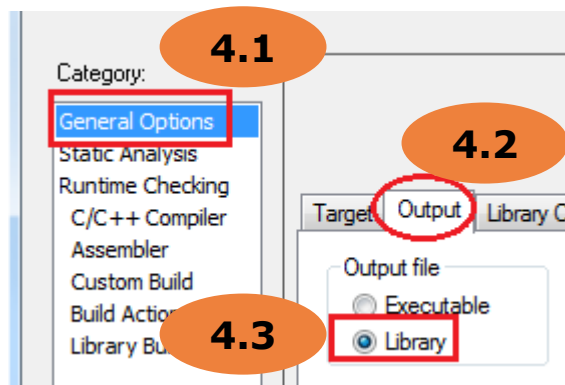
2.3: Processor variant > Device > Infineon XMC4400-F100x256

Step 3: Add Group "XMClib" and LLD Files

3.1: Add Group...

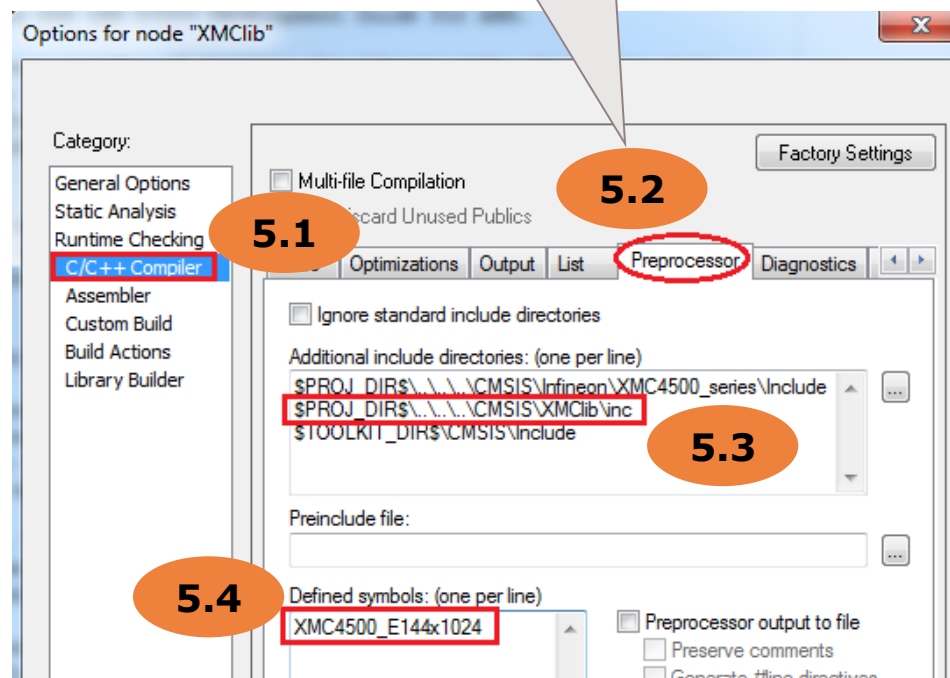
3.2: Add Files...

IAR: Create XMC™ Lib library (XMClib.a) (2/2)



Step 4: Select Library

Step 5: Add include directions and Preprocessor



Step 6: Build

IAR: Link the XMClib.a into IAR project

Link a precompiled XMC™ Lib library in IAR project that needs to use XMC™ Lib LLD

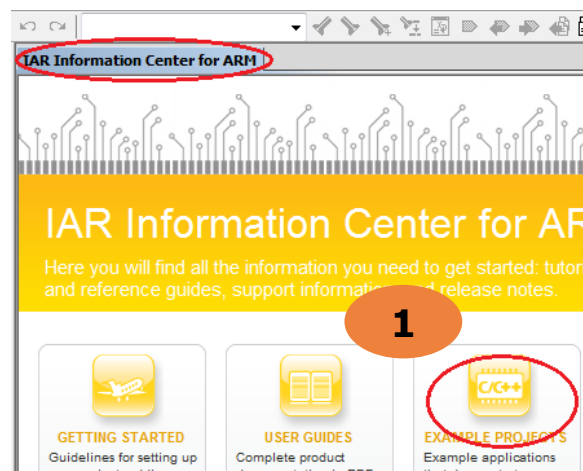
The screenshot shows the IAR Embedded Workbench IDE interface. The 'Project' menu is open, and the 'Options...' option is selected. The 'Linker' option is also visible in the menu. The 'Linker' dialog box is open, showing the 'Library' tab. The 'Additional libraries' field contains the path '\$PROJ_DIR\$\..\XMClib\Debug\Exe\XMClib.a'. The 'Override default program entry' checkbox is unchecked, and the 'Entry symbol' is set to '_iar_program_start'. The 'OK' button is highlighted.

Step 1: Open project options

Step 2: Link XMClib.a library in project

IAR: Usage of example projects

XMC™ Lib LLD example projects are included in the Infineon device example package, and can be directly imported in IAR EWARM as reference



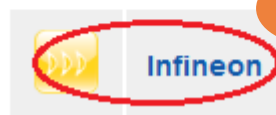
Examples for the XMC4500 family

Info	Open project	Name
		CAN
		CCU4

EXAMPLE PROJECTS

Example applications that demon

Installed example projects



XMC4xxx examples



1 Open **Example Projects** in **Information Center for ARM®**

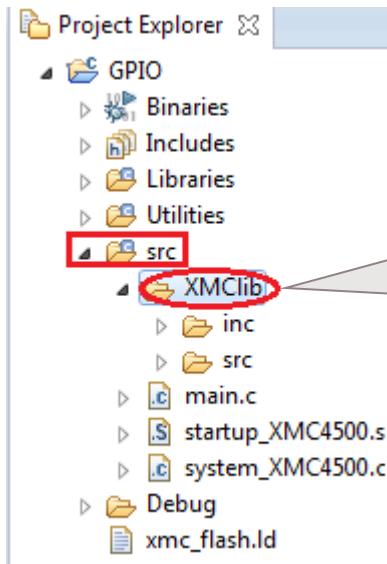
2 Open **"Infineon" example** (if Infineon example package is not installed, please install it)

3 Select **XMC4xxx LLD examples** or **XMC1xxx LLD examples**

4 Open the selected **LLD example**

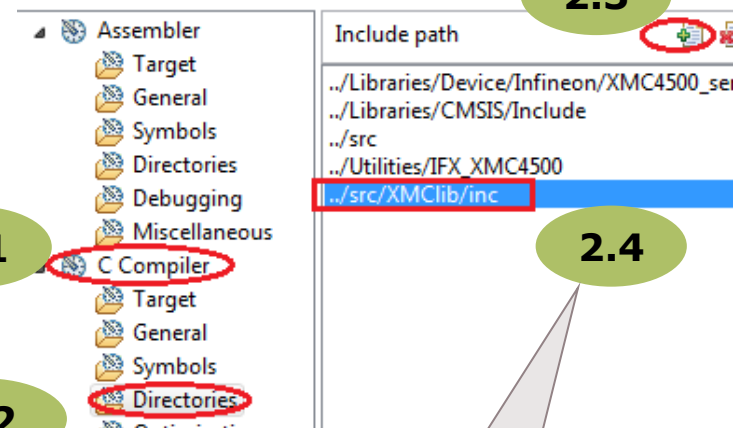
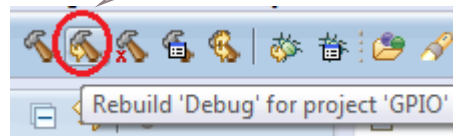
Atollic: Integrate XMClib source code in project

For Atollic project the XMClib source code must be added in project manually



Step 1:
Copy the **XMClib**
source files under
..\src

Step 3: Build



2.1

2.2

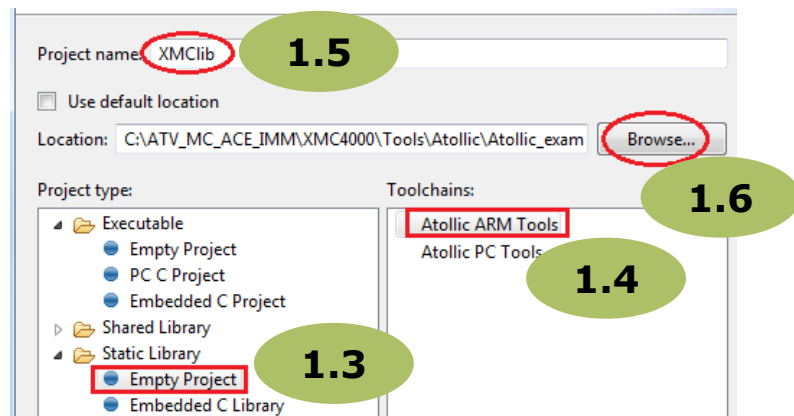
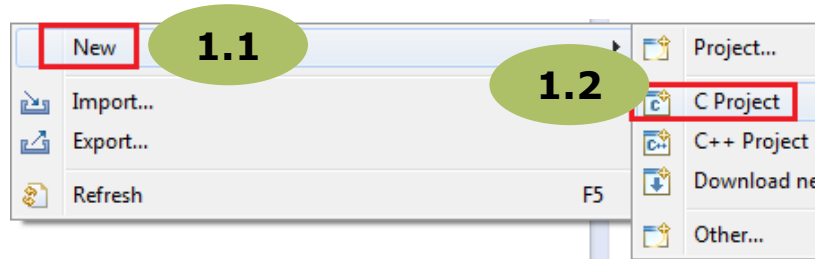
2.3

2.4

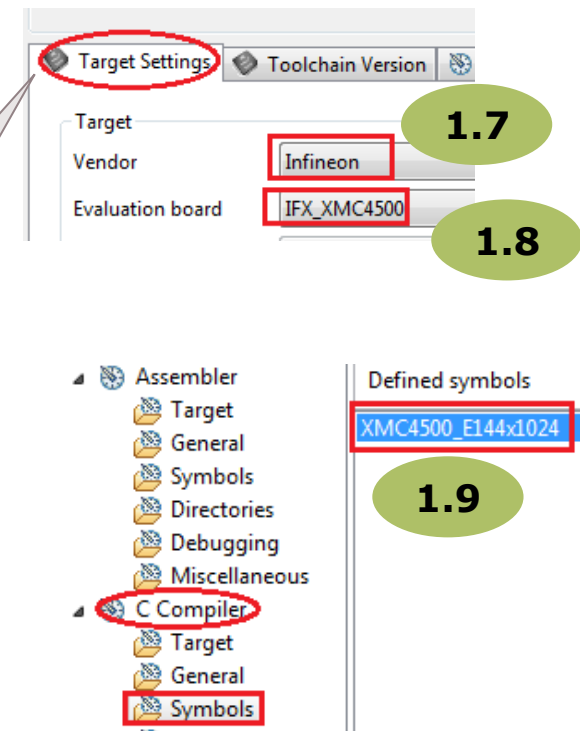
Step 2:
Add **XMClib**
header file folder

Atollic: Create a precompiled XMC™ Lib library (libXMCLib.a) (1/2)

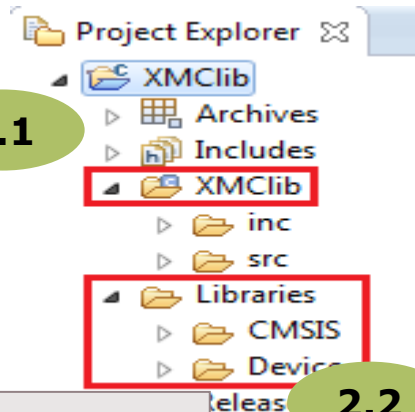
A precompiled XMC™ Lib library can be created in Atollic in advance, which can be linked in Atollic project later



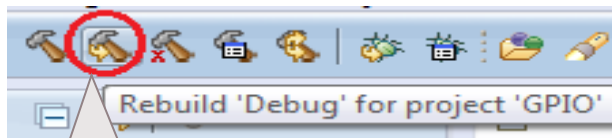
**Step 1:
Define a new
library
project**



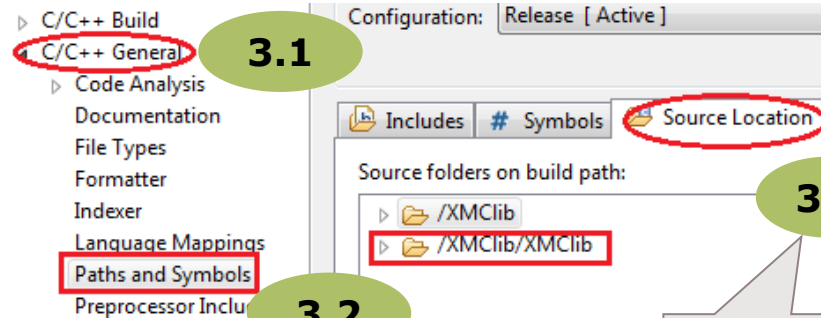
Atollic: Create a precompiled XMC™ Lib library (libXMCLib.a) (2/2)



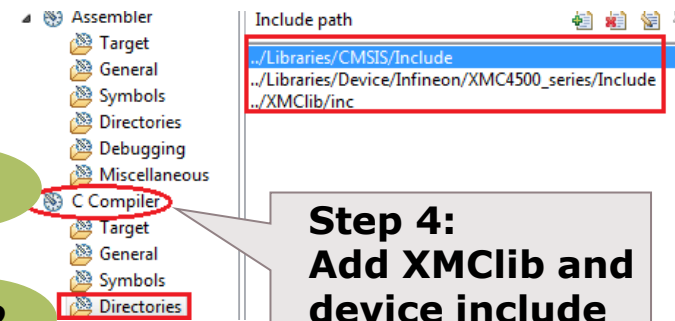
Step 2:
Copy XMCLib files and
device header file
into project



Step 5: Build



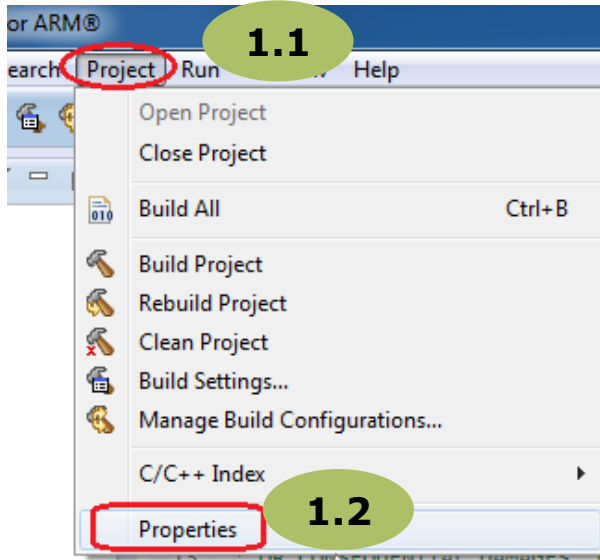
Step 3:
Add XMCLib
source path



Step 4:
Add XMCLib and
device include
path

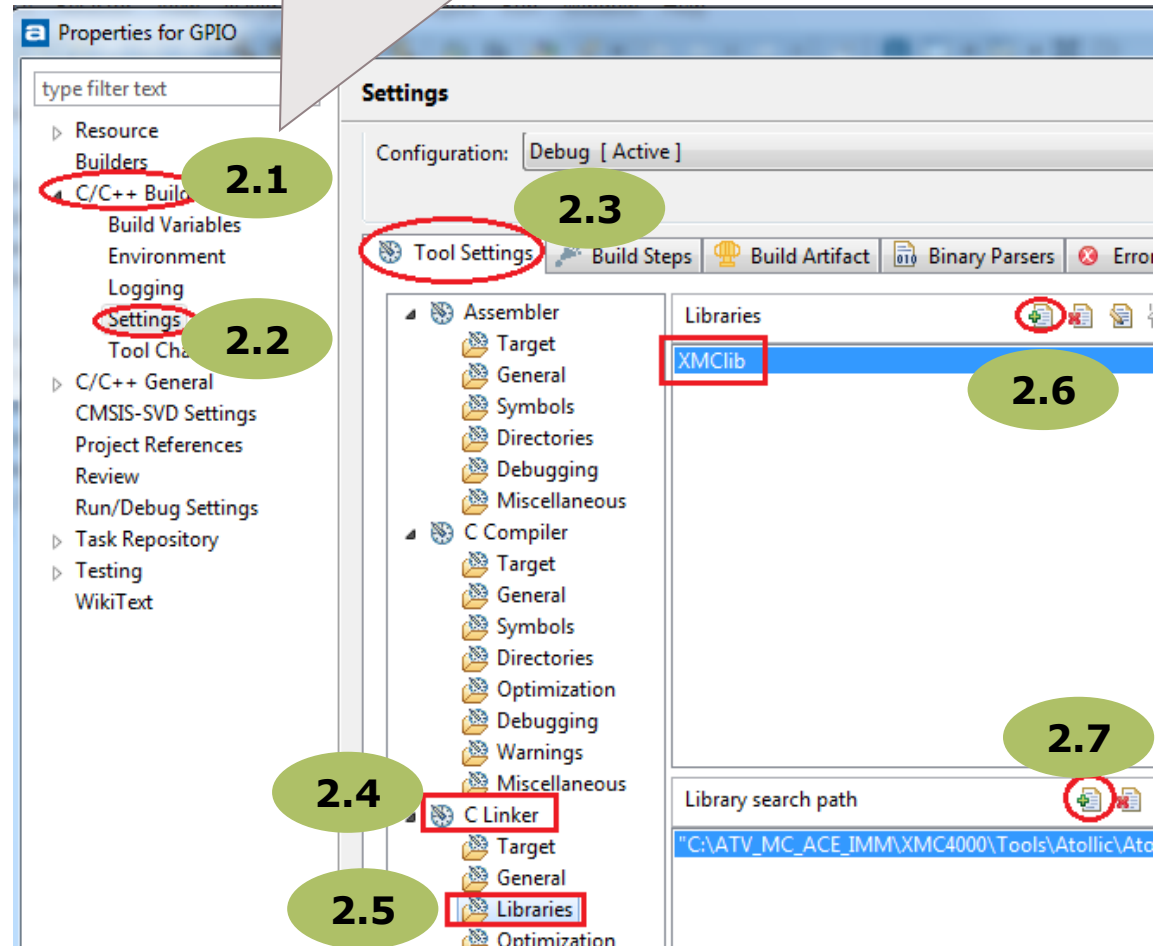
Atollic: Link the XMCLib.a into Atollic project

Link a precompiled XMCTM Lib library in Atollic project that needs to use XMCTM Lib LLD

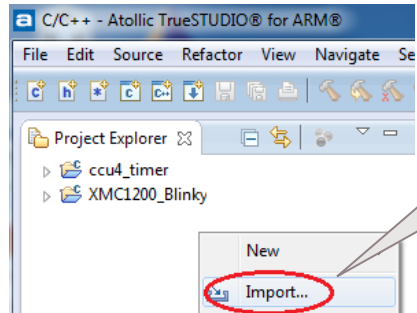


Step 1:
Open **Project Properties**

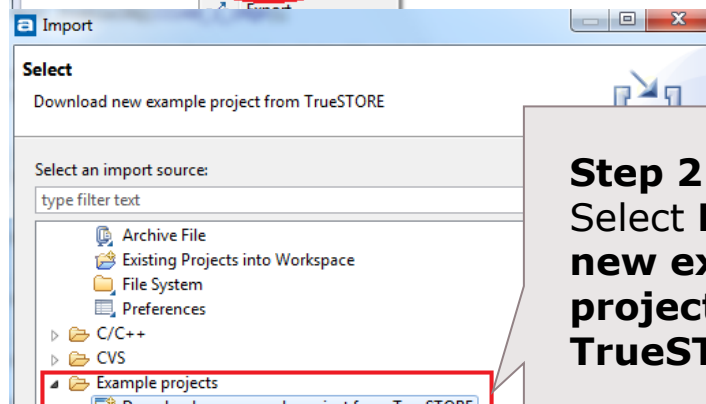
Step 2: Add XMCLib in Linker options



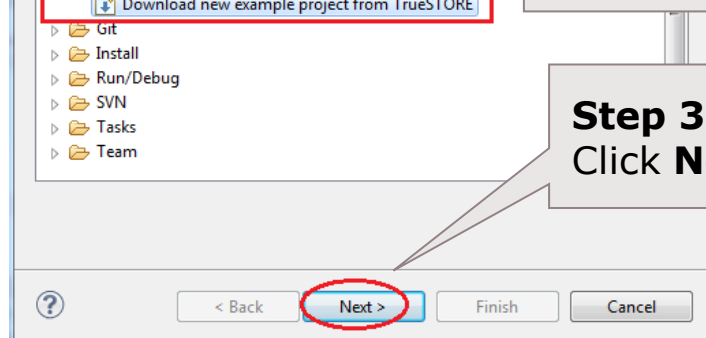
Atollic: Import example projects from TrueSTORE



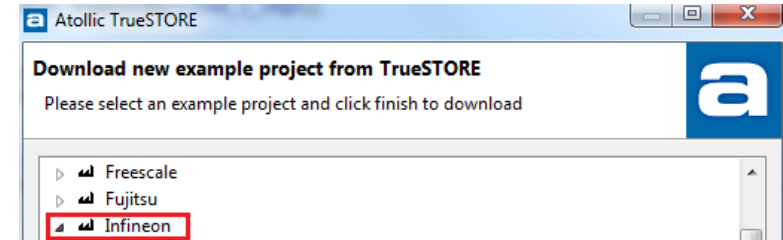
Step 1:
Click right mouse, select **Import**



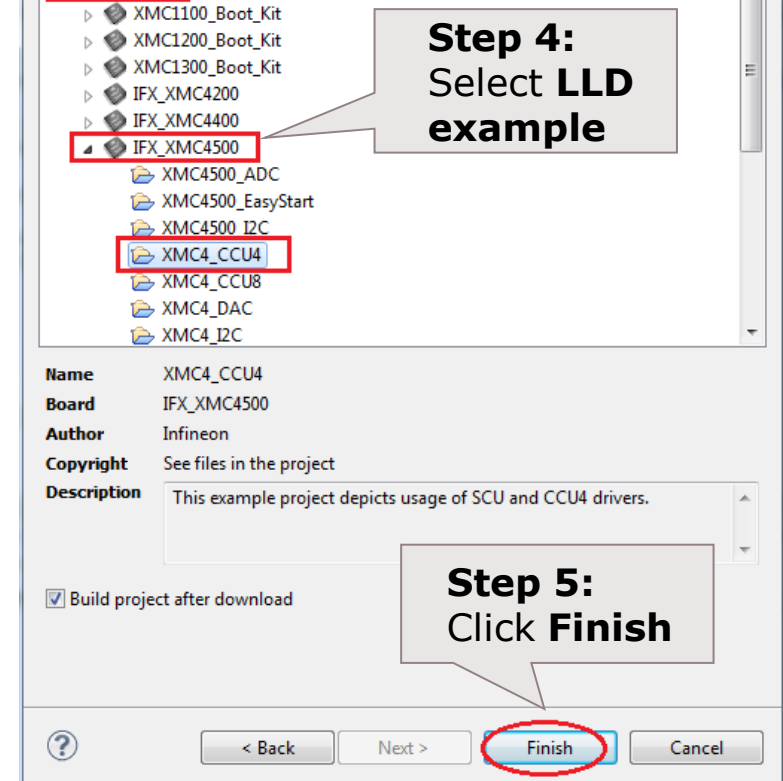
Step 2:
Select **Download new example project from TrueSTORE**



Step 3:
Click **Next**

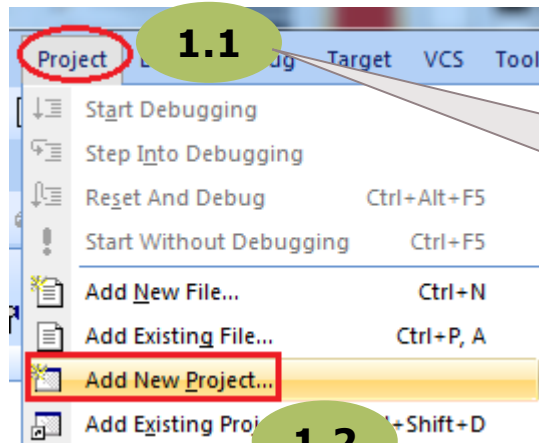


Step 4:
Select **LLD example**

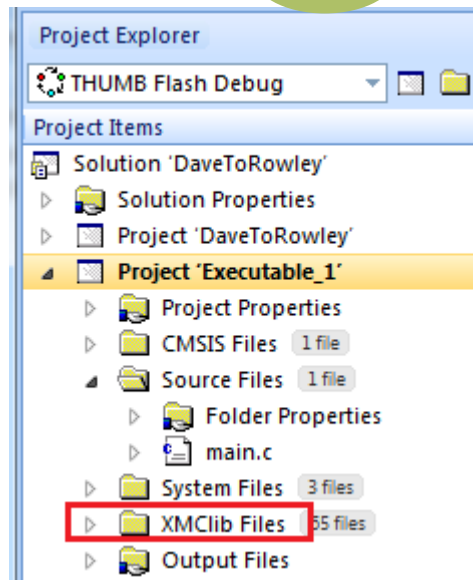


Step 5:
Click **Finish**

Rowley: Using template project to integrate XMC™ Lib source code in project



**Step 1:
Add a new
project in
solution**



**XMClib source
files are
automatically
included in
project**



A CrossWorks Tasking Library executable for Infineon Boot Kit
A CrossWorks Tasking Library executable for Infineon Boot Kit
A CrossWorks Tasking Library executable for Infineon Boot Kit
A CrossWorks Tasking Library executable for Infineon XMC 2G
A CrossWorks Tasking Library executable for Infineon XMC100
A CrossWorks Tasking Library executable for Infineon XMC400
A CrossWorks Tasking Library executable for Infineon XMC420
A CrossWorks Tasking Library executable for Infineon XMC440
A CrossWorks Tasking Library executable for Infineon XMC450
A CrossWorks Tasking Library executable for Infineon XMC450
A CrossWorks Tasking Library executable for Infineon XMC450
An executable for Infineon Boot Kit XMC1100.
An executable for Infineon Boot Kit XMC1200.
An executable for Infineon Boot Kit XMC1300.
An executable for Infineon XMC 2Go Kit with XMC1100.
An executable for Infineon XMC1000 that uses XMClib.
An executable for Infineon XMC1000.
An executable for Infineon XMC4000 that uses XMClib.
An executable for Infineon XMC4000.

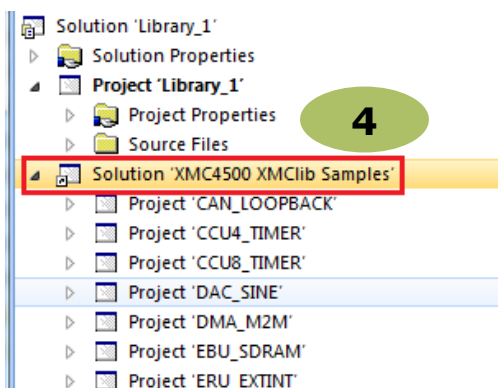
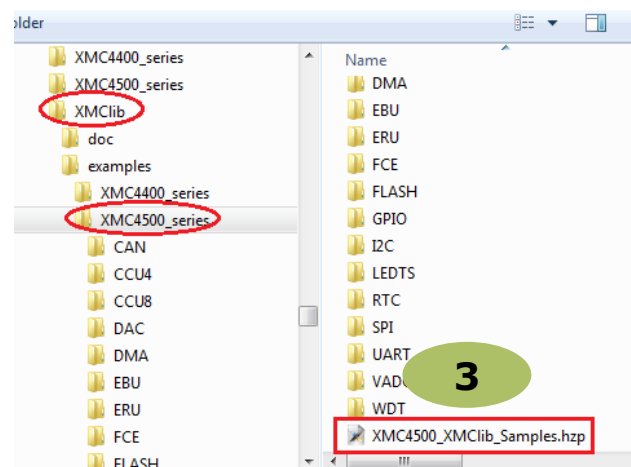
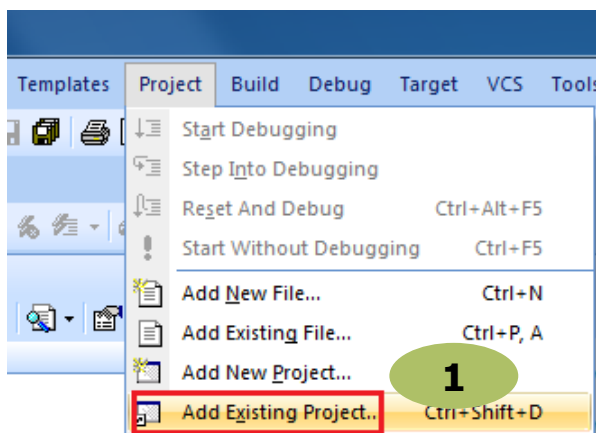
Step 2:
Choose template project
Infineon XMC1000 or
XMC4000 that uses XMClib

Rowley: Import example project

The LLD example projects are saved under Infineon package:

C:\Users\wanguan\AppData\Local\Rowley Associates Limited\CrossWorks for ARM\v3\packages\targets\XMC4000\CMSIS\Device\Infineon\XMClib\examples\XMC4500_series

2



1 Open **Add Existing Projects**

2 Go to **Infineon package folder**

3 Open ***XMC4500_XMClib_Sample.hzp***

4 Activate the **LLD example project**

Support material

Collaterals and Brochures



- › Product Briefs
- › Selection Guides
- › Application Brochures
- › Presentations
- › Press Releases, Ads

› www.infineon.com/XMC

Technical Material



- › Application Notes
- › Technical Articles
- › Simulation Models
- › Datasheets, MCDS Files
- › PCB Design Data

- › www.infineon.com/XMC
- › [Kits and Boards](#)
- › [DAVE™](#)
- › [Software and Tool Ecosystem](#)

Videos



- › Technical Videos
- › Product Information Videos

- › [Infineon Media Center](#)
- › [XMC Mediathek](#)

Contact



- › Forums
- › Product Support

- › [Infineon Forums](#)
- › [Technical Assistance Center \(TAC\)](#)

Glossary abbreviations

- › MDK Microcontroller Development Kit
- › DAVE™ Free development IDE for XMC™
- › EWARM Embedded Workbench® for ARM®
- › LLD Low-Level Diver

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