BSP Project Quick Start

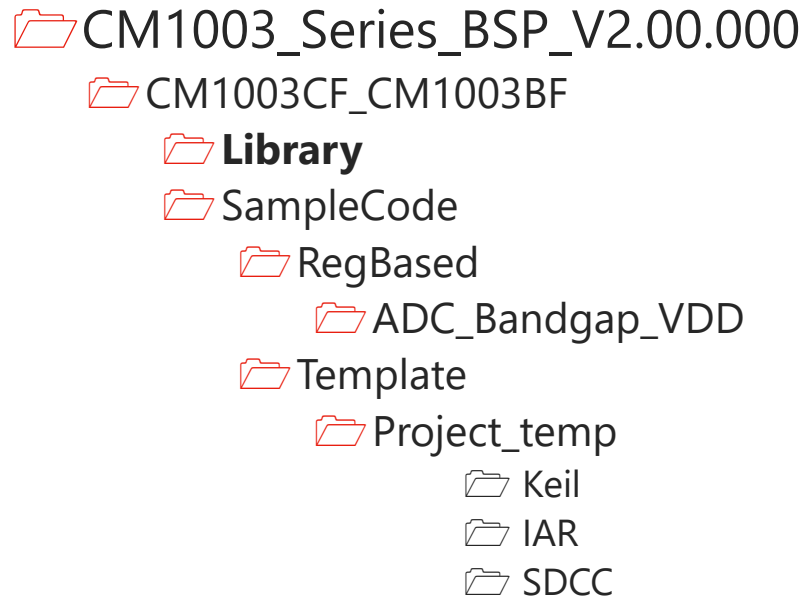For NuMicro 8051 Series

Jan, 2026

Agenda

- **The Structure Of BSP**
- **Build Your Project Utilizing BSP - KEIL**
- **Build Your Project Utilizing BSP - IAR**
- **Build Your Project Utilizing BSP - NuEclipse**

The BSP Structure

KEIL / IAR / SDCC NuEclipse

Folder structure

📂 CM1003_Series_BSP_V2.00.000
　📂 CM1003CF_CM1003BF
　　📂 **Library**
　　📂 SampleCode
　　　📂 RegBased
　　　　📂 ADC_Bandgap_VDD
　　　📂 Template
　　　　📂 Project_temp
　　　　　📂 Keil
　　　　　📂 IAR
　　　　　📂 SDCC

CM1003_Series_BSP_V2.00.000	>		

名称 ⌃	修改日期	类型	大小
📁 CM1003CF_CM1003BF	2026/1/21 17:16	文件夹	
📁 CM1003DL_CM1003DJ_CM1003CJ	2026/1/21 17:16	文件夹	
📁 Document	2026/1/21 17:16	文件夹	
📄 LICENSE.txt	2022/1/20 17:27	文本文档	12 KB
📄 NOTICE.txt	2024/6/4 15:17	文本文档	1 KB
📄 Readme.pdf	2025/6/17 17:19	PDF 文件	295 KB

- It is recommended to create a new project folder at the same level as the subfolder within either the "Template" or "RegBased" directory.

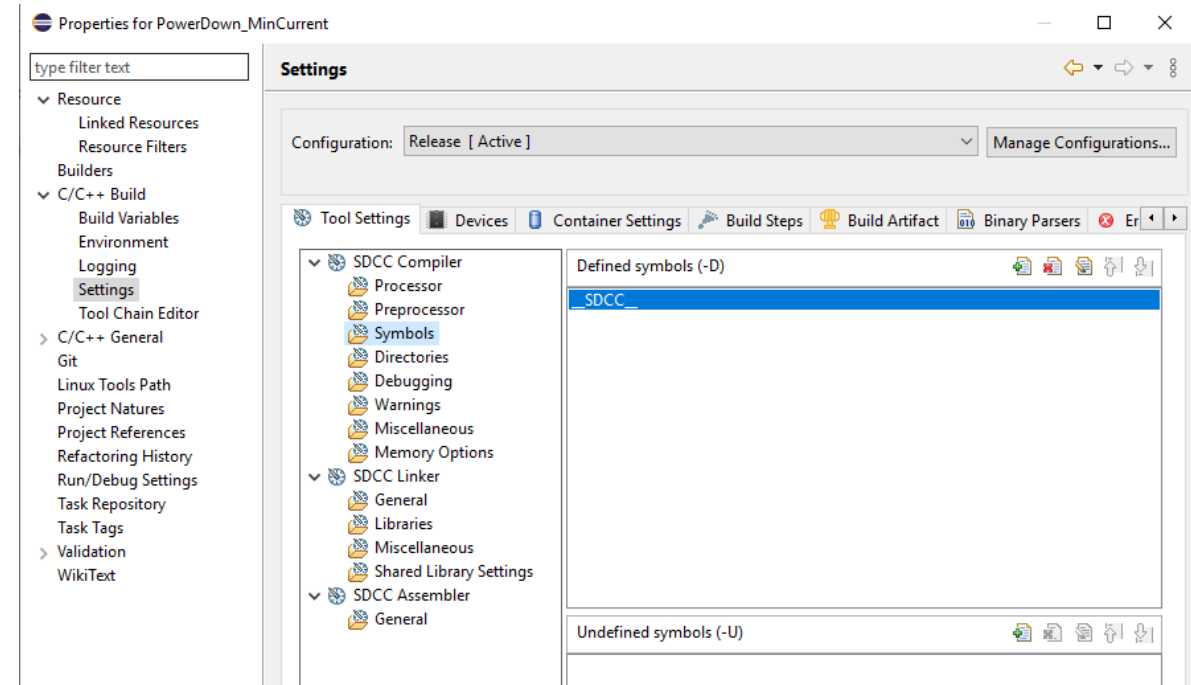- The "Library" folder and all subfolders should always be remained.

The .c File Define For Different Compiler

- Different Coding Rule

  __**C51**__ is for KEIL PK51

  __**ICC8051**__ is for IAR 8051 workbench

  __**SDCC**__ is for NuEclipse

```
11  #if defined __C51__
12  uint8_t data  TA_REG_TMP,BYTE_TMP,SFRS_TMP;
13
14  #elif defined __ICC8051__
15  uint8_t __data  TA_REG_TMP,BYTE_TMP,SFRS_TMP;
16
17  #elif defined __SDCC__
18  __data uint8_t TA_REG_TMP,BYTE_TMP,SFRS_TMP;
19  #endif
```

NuEclipse defined symbols window

- Simplify code

  When you decide to use a certain compiler, you can remove the definitions of other compilers whole group.

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Build Your Project Utilizing BSP - KEIL

Copying from the existing project
is often more advantageous
than creating a new one

- Copy A Folder From Template " Project_temp"

| CM1003_Series_BSP_V2.00.000 | > | CM1003CF_CM1003BF | > | SampleCode | > | Template | > |

名称	修改日期	类型	大小
Project_temp	2026/1/21 17:16	文件夹	
Project_temp - copy	2026/1/22 14:22	文件夹	

- Rename the "project_temp.uvproj" to "Rename.uvproj"

| > | CM1003_Series_BSP_V2.00.000 | > | CM1003DL_CM1003DJ_CM1003CJ | > | SampleCode | > | Template | > | Rename | > | KEIL |

名称	修改日期	类型	大小
Nu_Link_8051_Driver.ini	2022/11/14 14:26	INI 文件	1 KB
Rename.uvopt	2023/12/1 14:19	UVOPT 文件	15 KB
Rename.uvproj	2025/6/17 17:14	μVision4 Project	19 KB

For KEIL

- Modify the Project name in KEIL.
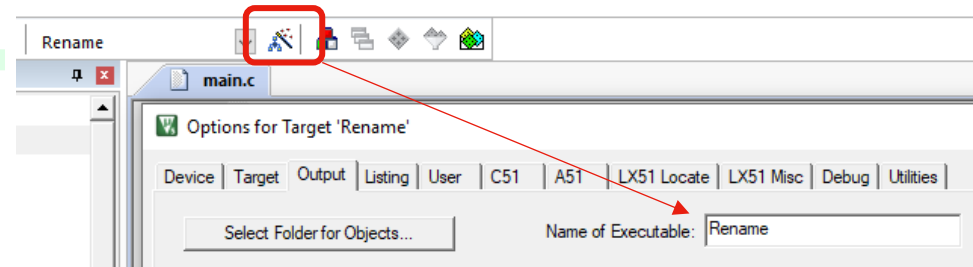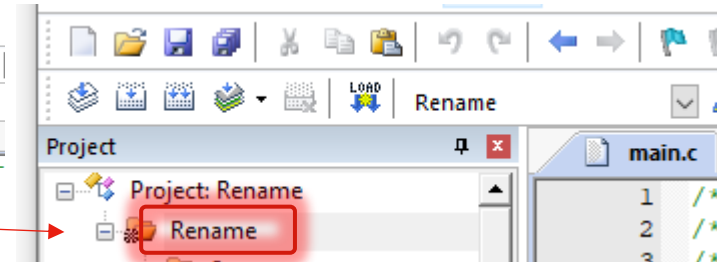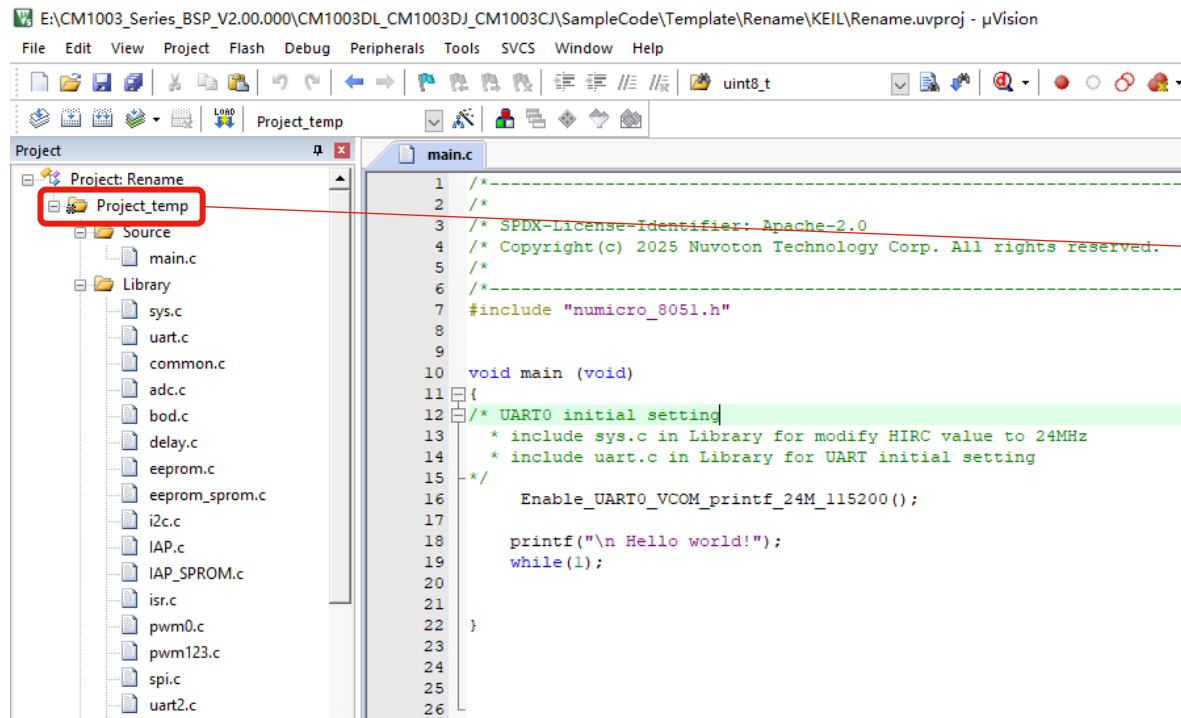
For KEIL

- Compile with the new application .c file. Find the output hex and bin file.

Options of KEIL PK51

- The following introduction focuses on the special definition of Nuvoton 8051 series.

- For a comprehensive description of all options, please consult the official Keil documentation.

  https://www.keil.com/support/man/docs/uv4cl/uv4cl_dg_options.htm

For KEIL - Device

- Confirm "Nuvoton 8051 Device" is selectable.

- If this option is unavailable, please install the Nuvoton Keil driver package.
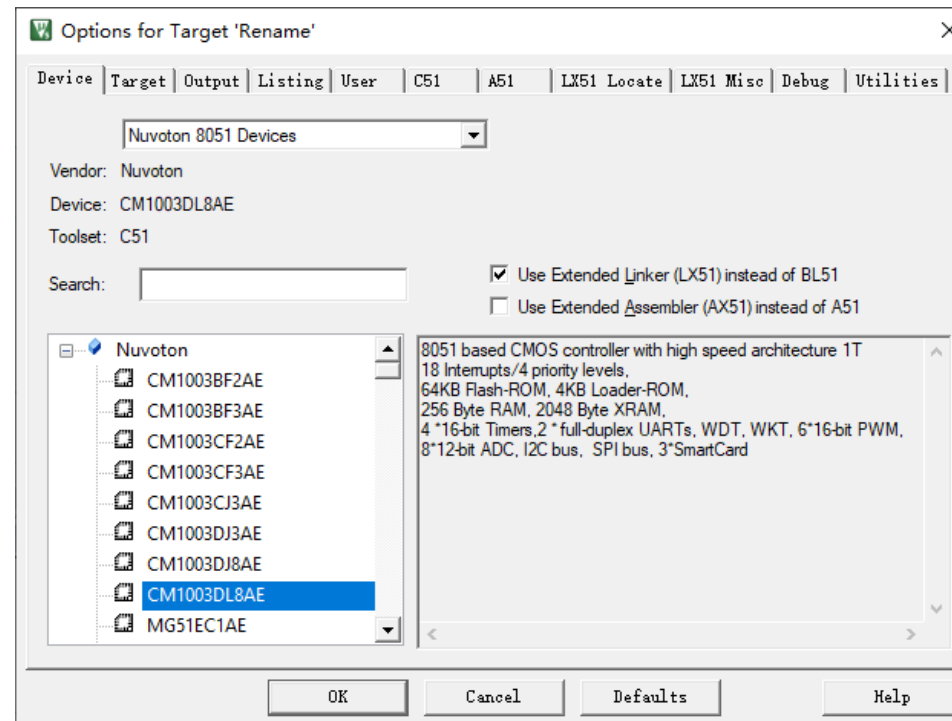
For KEIL - Target

- Check with the device. If not match, select the correct device in "Device" page.

- Memory Model: Large for variable default using XDATA
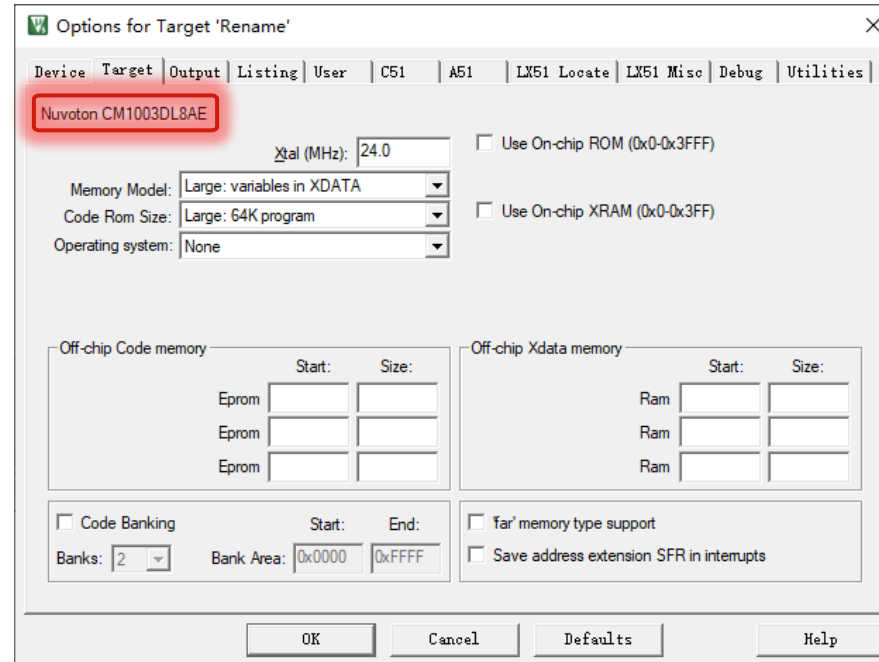
For KEIL - Output

- "Name of Executable" define the output .hex file name
- Keil exclusively generates HEX format files, while BIN files are produced using the Nuvoton command line. The command line we introduce in next page.
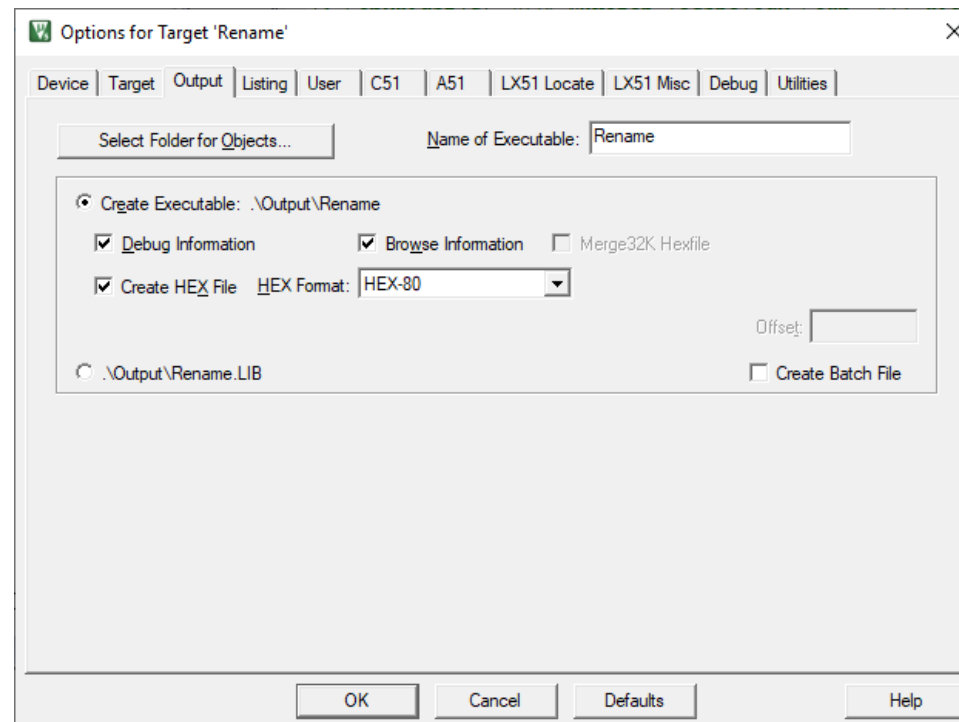
For KEIL - User

- This file is located within the Keil setup folder. For example: C:\Keil_v5\C51\NULink
  - By default, unused locations will be filled with 0xFF.
  - Users can also include the parameter –P 0x00 means unused locations are filled with zeros.
  - Parameter <start address> <data length>
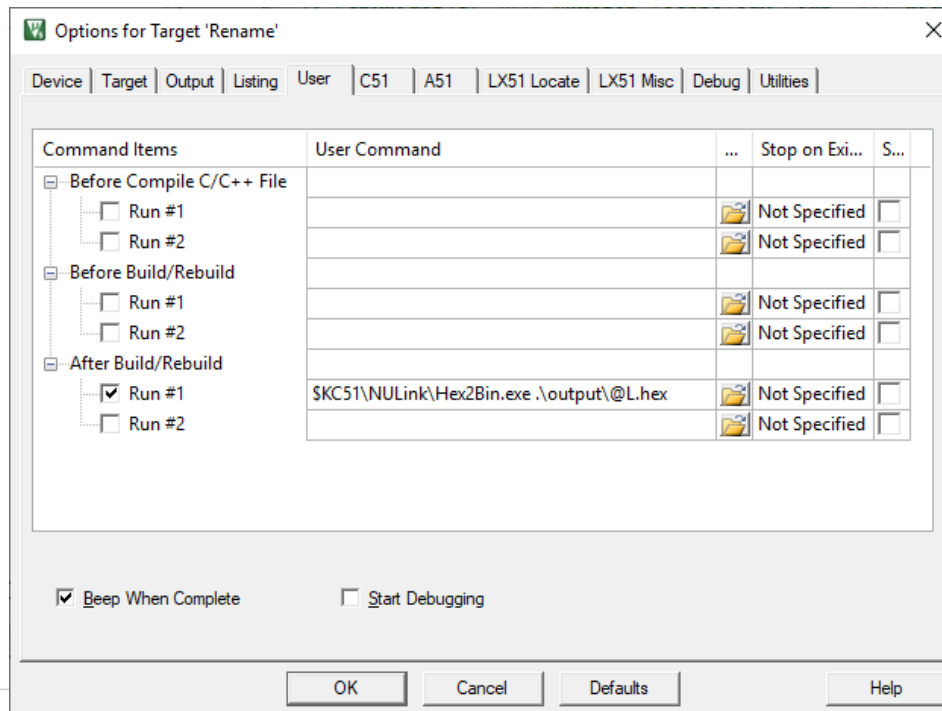
For KEIL – C51

- Code Optimization

Levels 7 and 4 are recommended especially when considering code size.

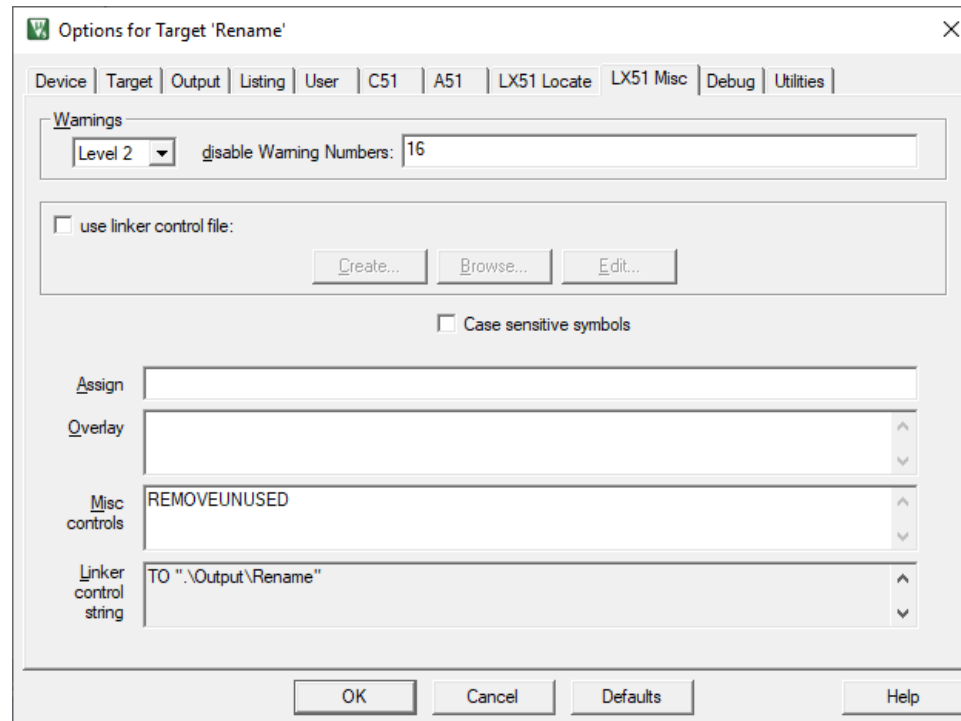- Include Paths

Defined the header file path of device and library.

- Following shows the most popular define
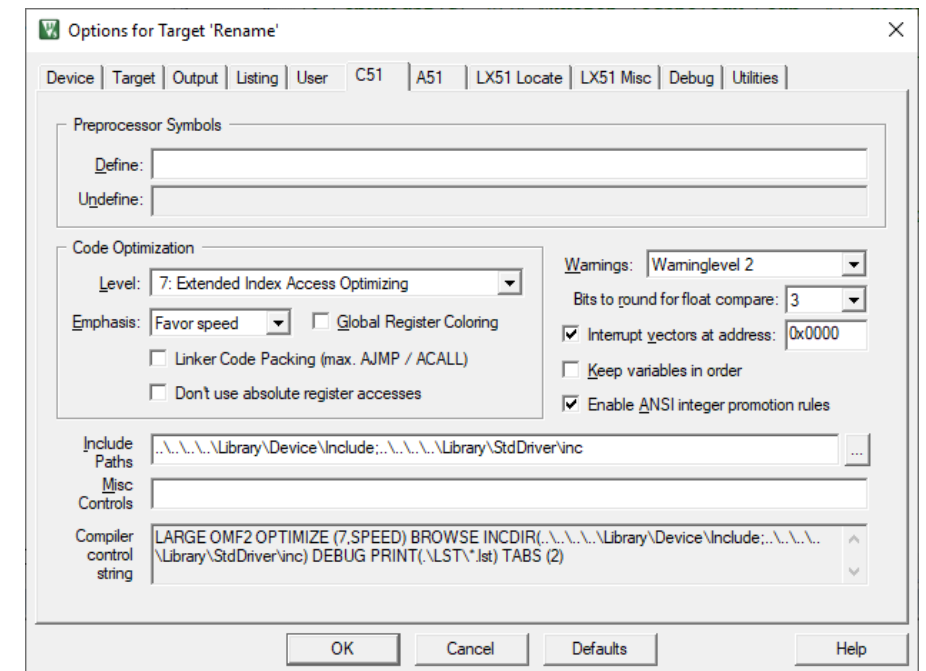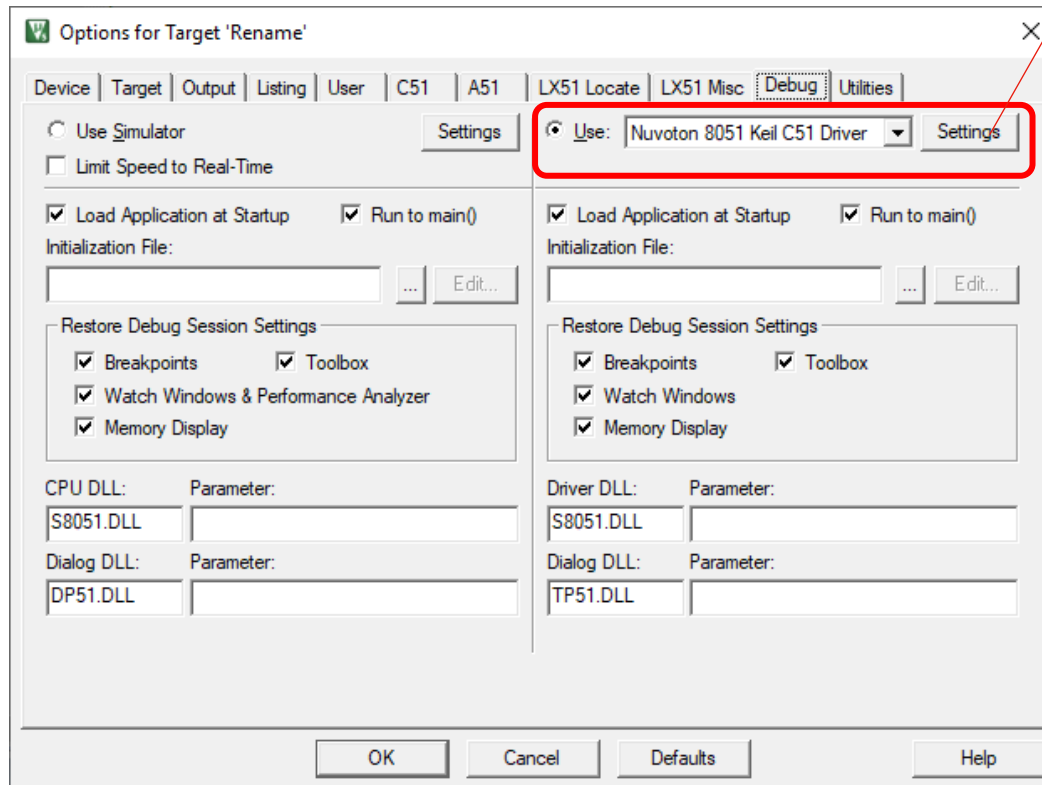
For KEIL – LX51 Misc

- The Parameter for code size.

"REMOVEUNUSED" to uncalled subroutine not linked into the project to compile. This can reduce the bin file code size.
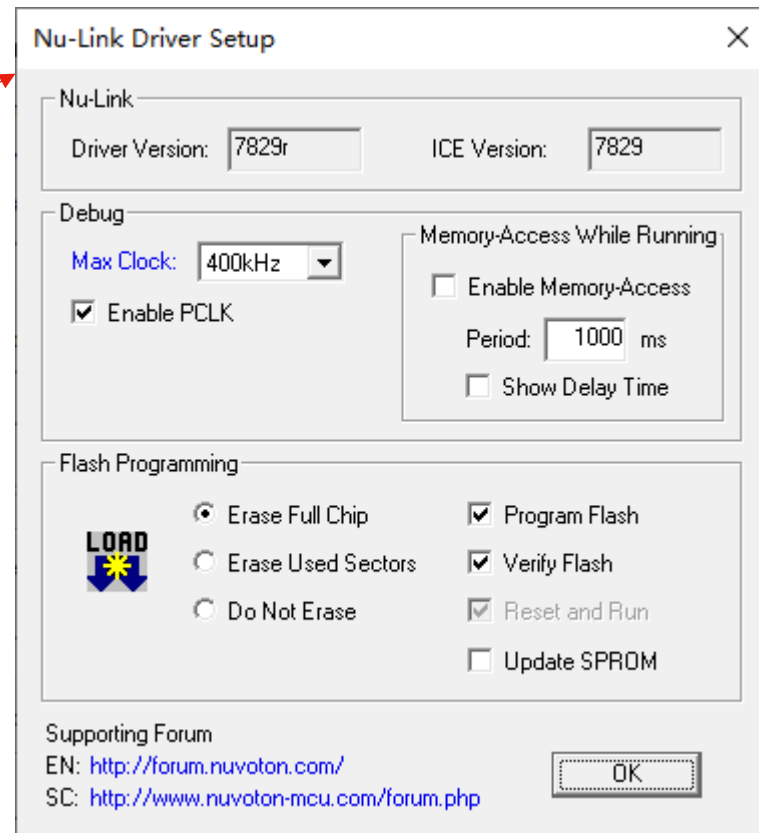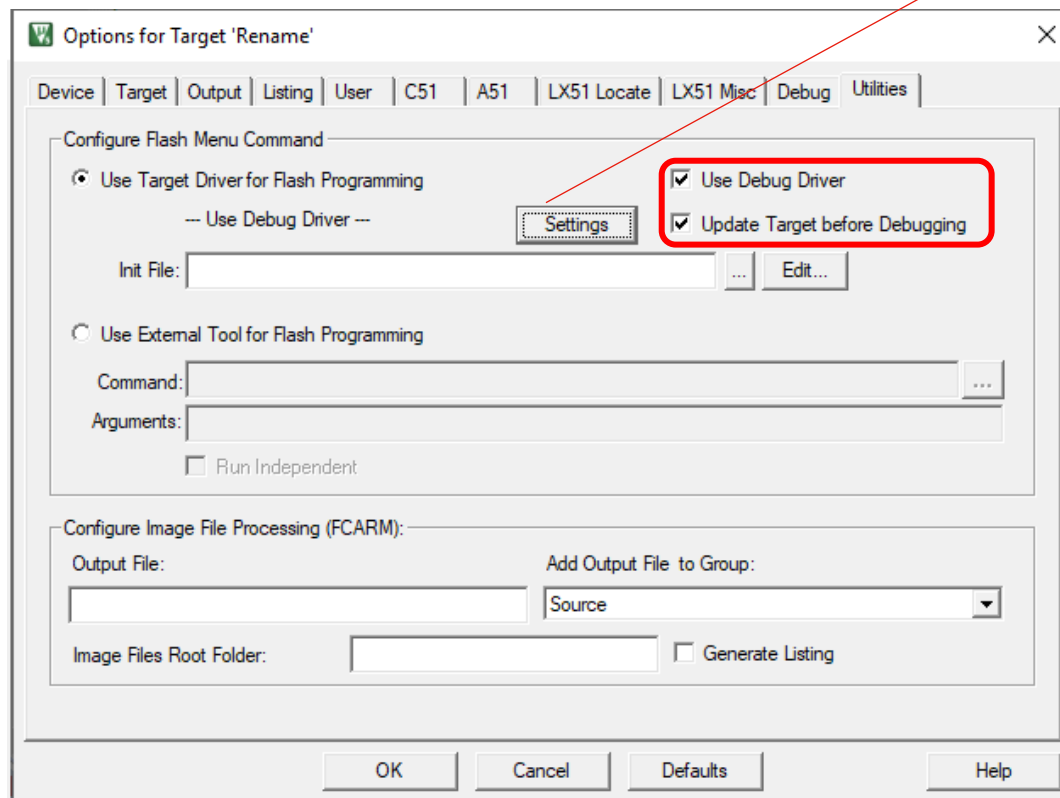
For KEIL – Debug

CONFIG setup page
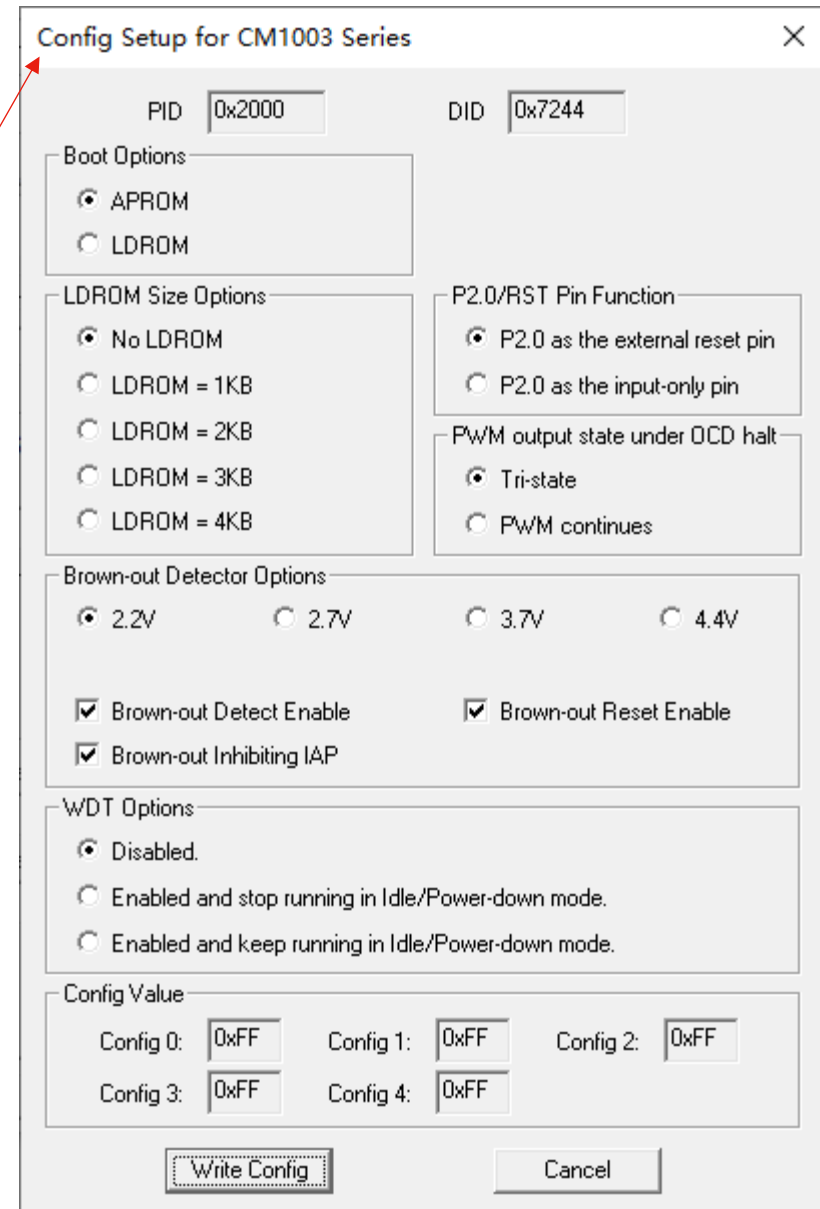
For KEIL – Utilities

Nu-Link setup

Build Your Project Utilizing BSP - IAR

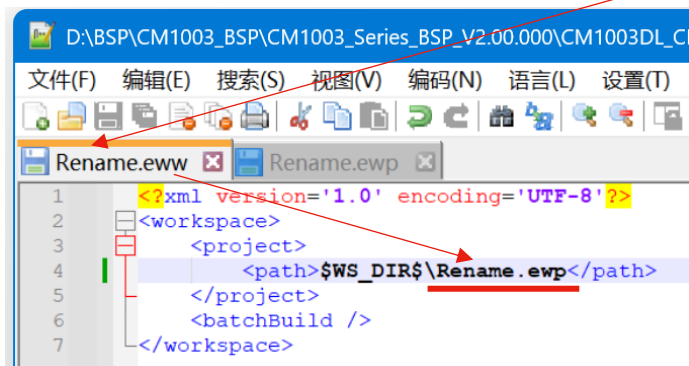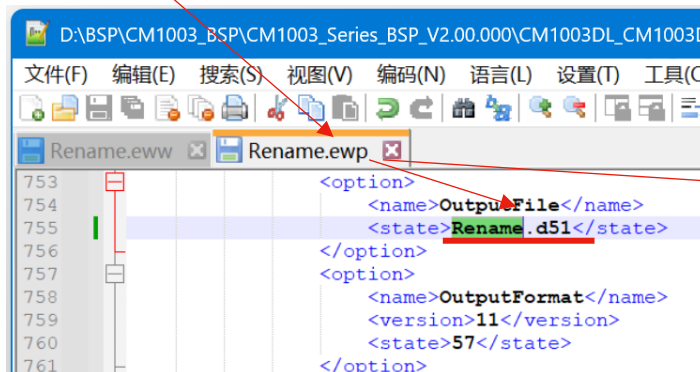Copying from the existing project is often more advantageous than creating a new one

For IAR

- Duplicate a folder from the template "Project_temp"
- then rename the ".ewd," ".ewp," and ".eww" file names accordingly.
- Open the ".eww" file and modify the project <path>to reflect the new name, "Rename.ewp."

For IAR

- Compile with the new application .c file. Find the output hex and bin file.
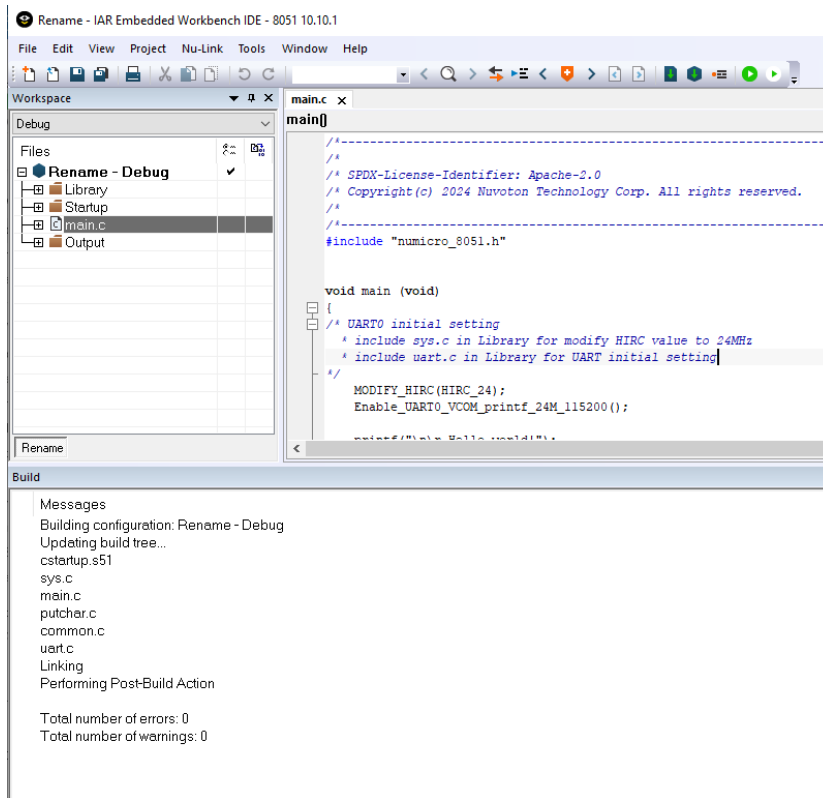
Options of IAR workbench

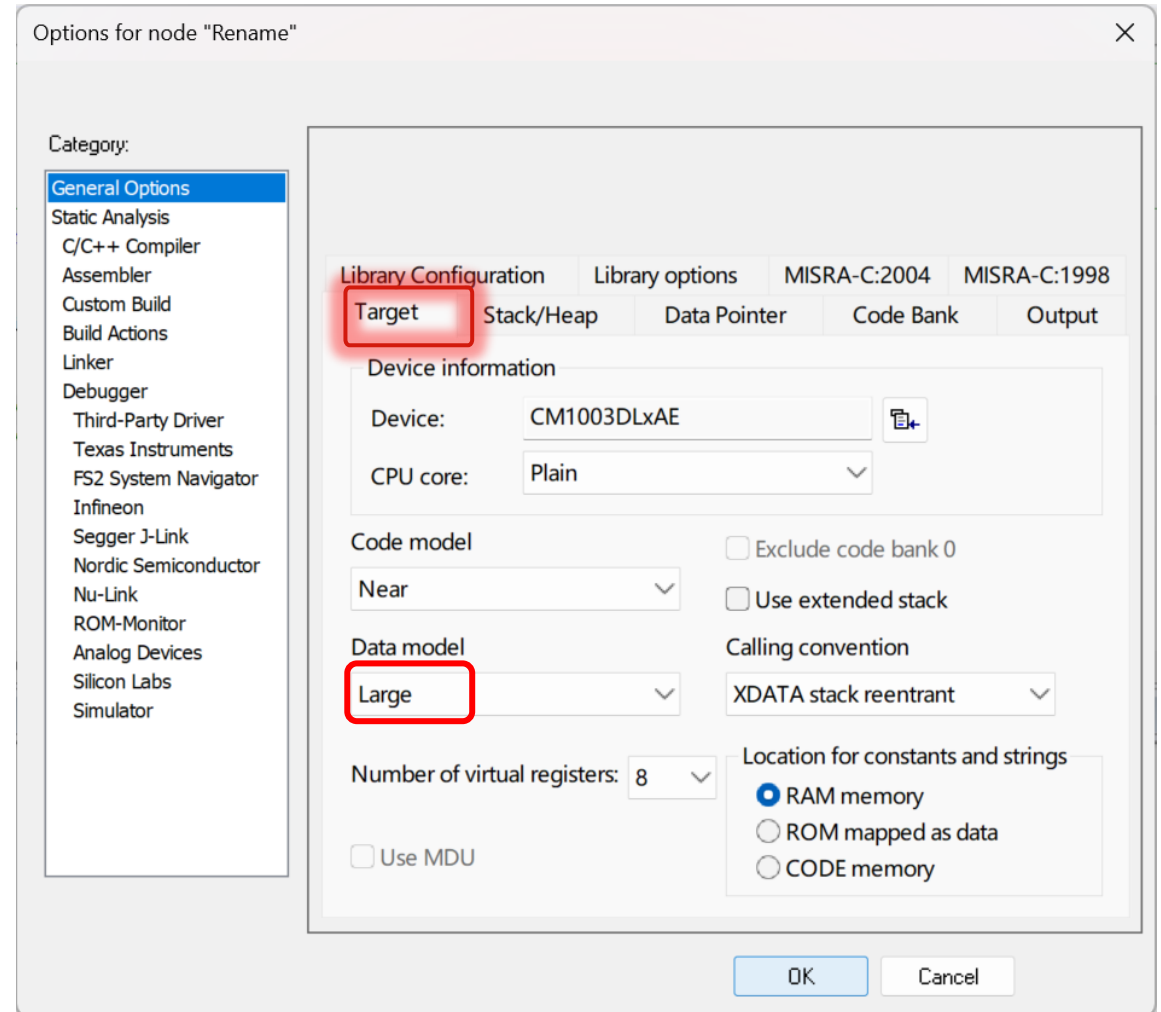- The following introduction focuses on the special definition of nuvoton 8051 series.

- For a comprehensive description of all options, please consult the official IAR documentation.

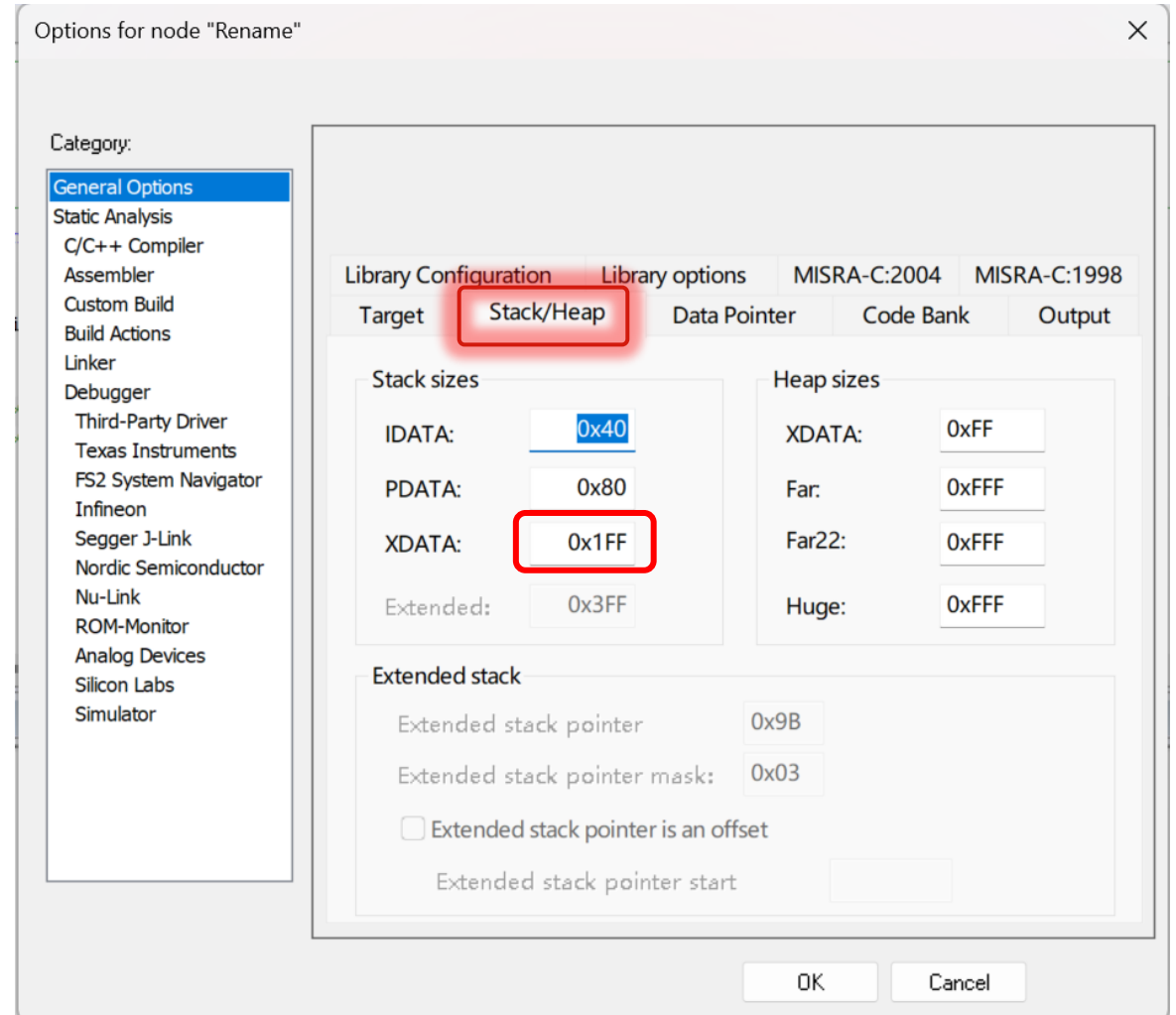 https://wwwfiles.iar.com/8051/webic/doc/EW8051_MigrationGuide_v7.pdf
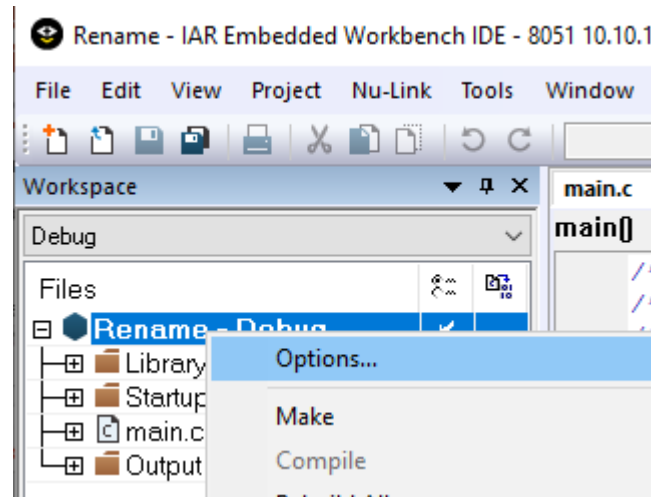
For IAR – General Options

- Check with the device.
- Data Model: Large for variable default using XDATA
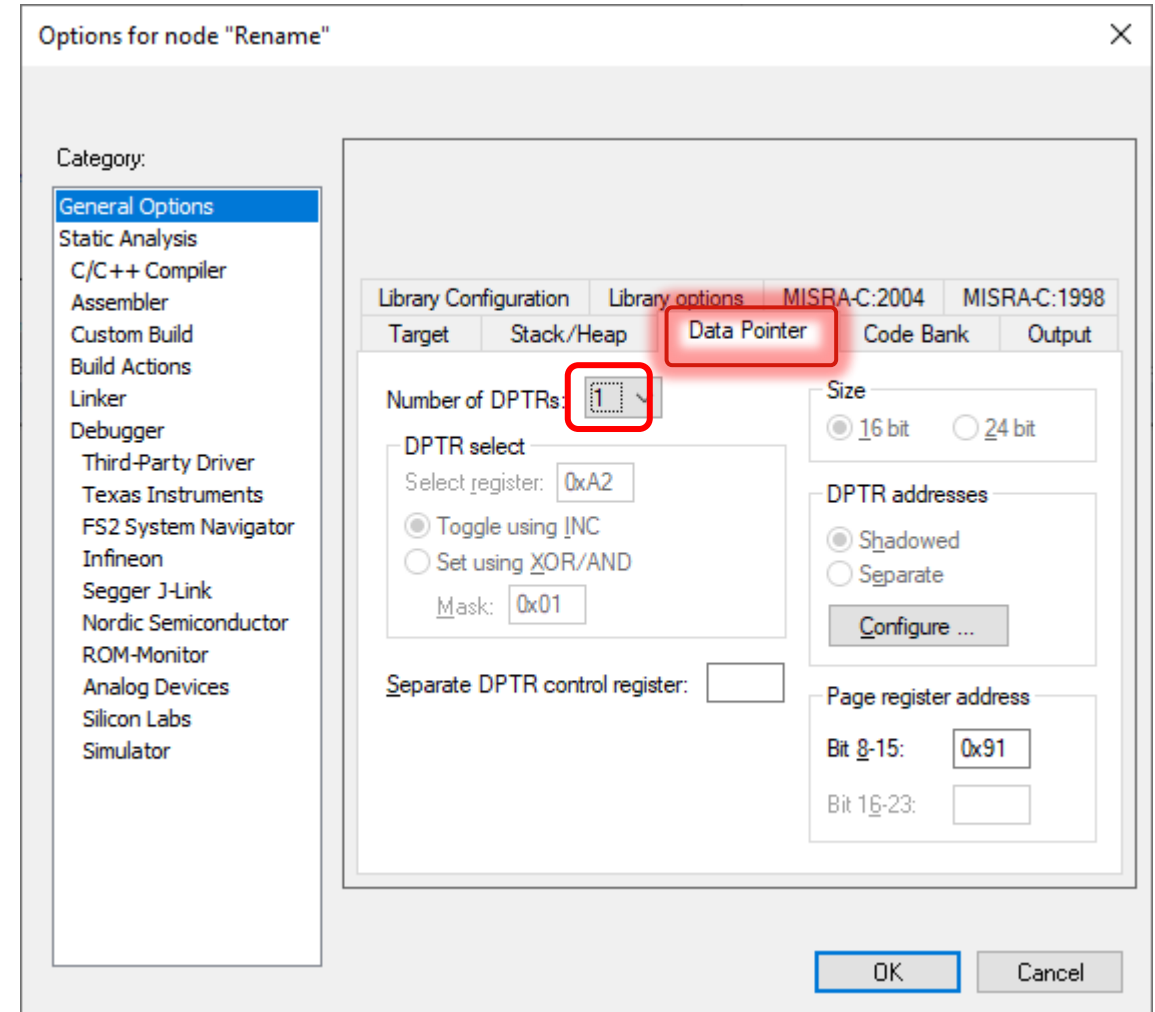
For IAR – General Options

- Stack / Heap
  - XDATA value is important to printf
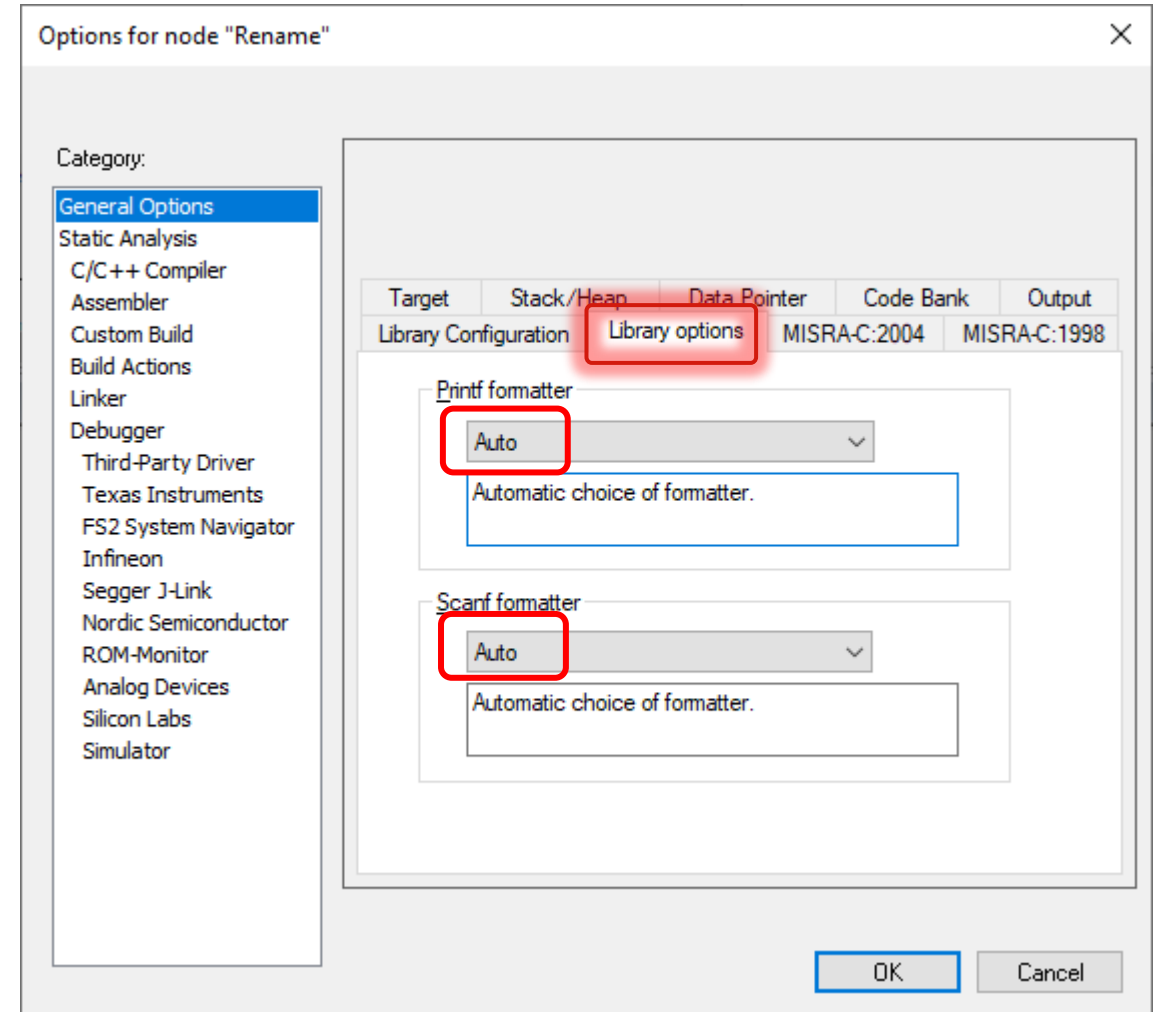

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For IAR – General Options

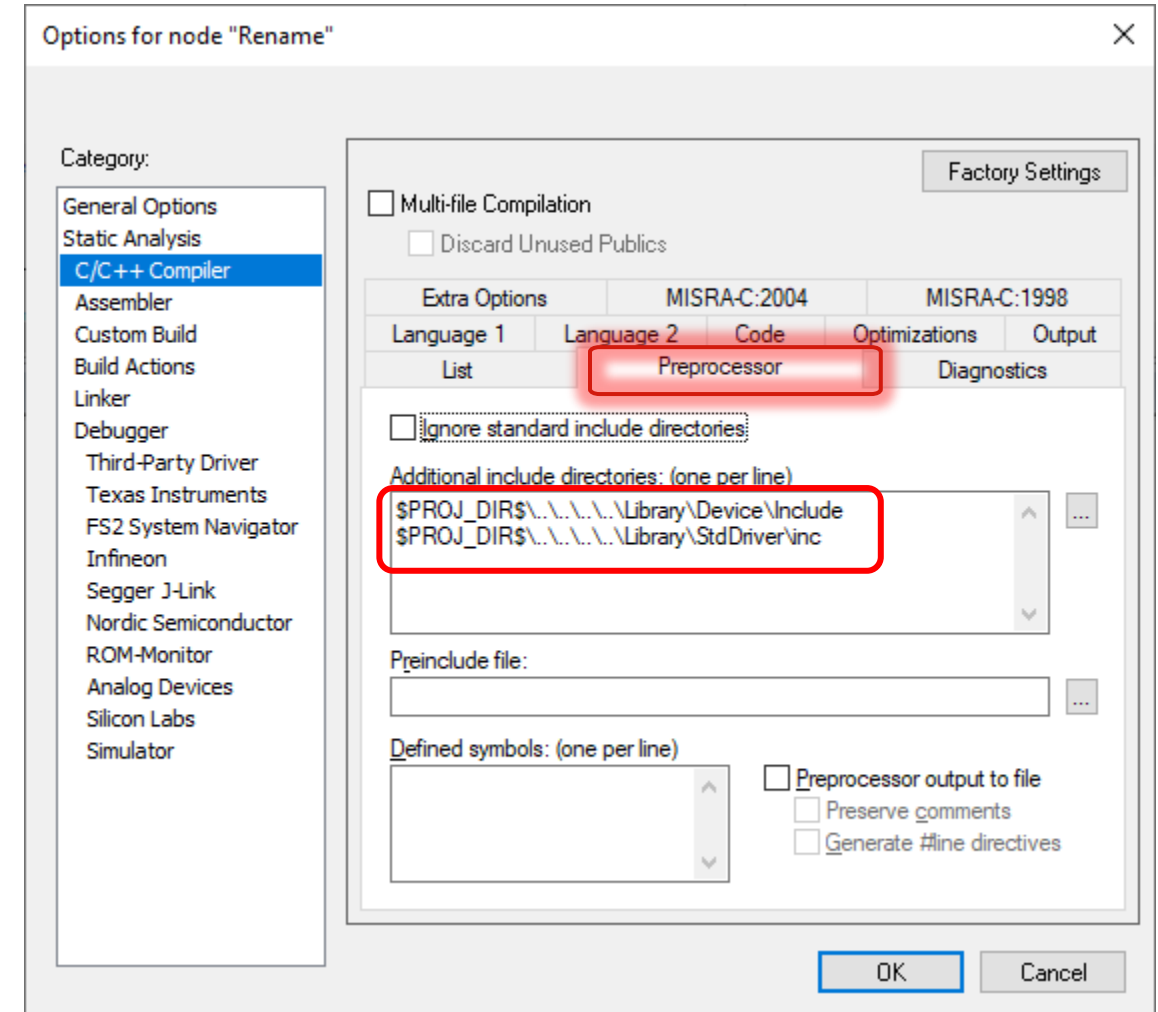- DPTRs
  - Always use 1 DPTR.

For IAR – General Options

- Auto for Printf formatter

For IAR – C/C++ Compiler

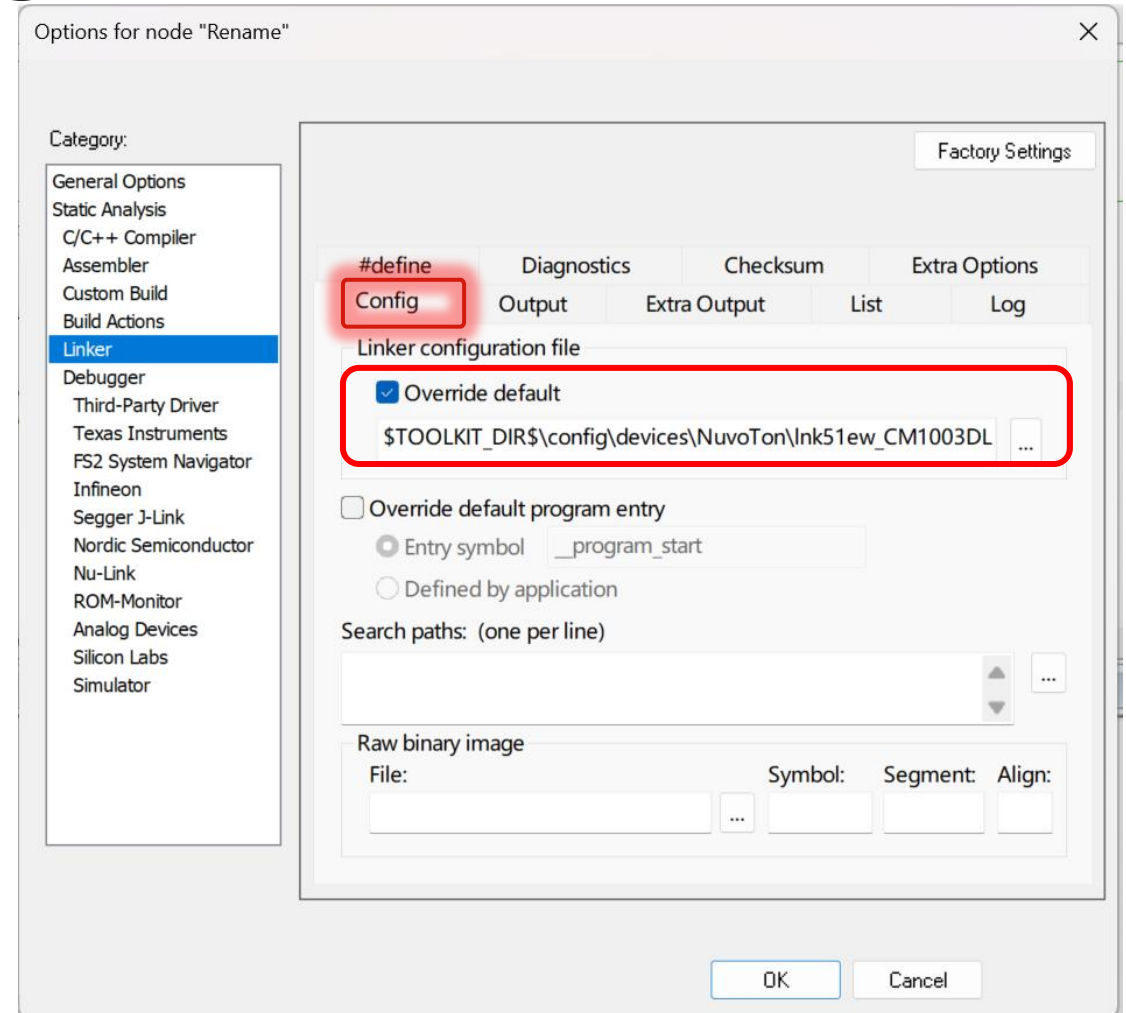- Include Paths

Defined the header file path of device and library.

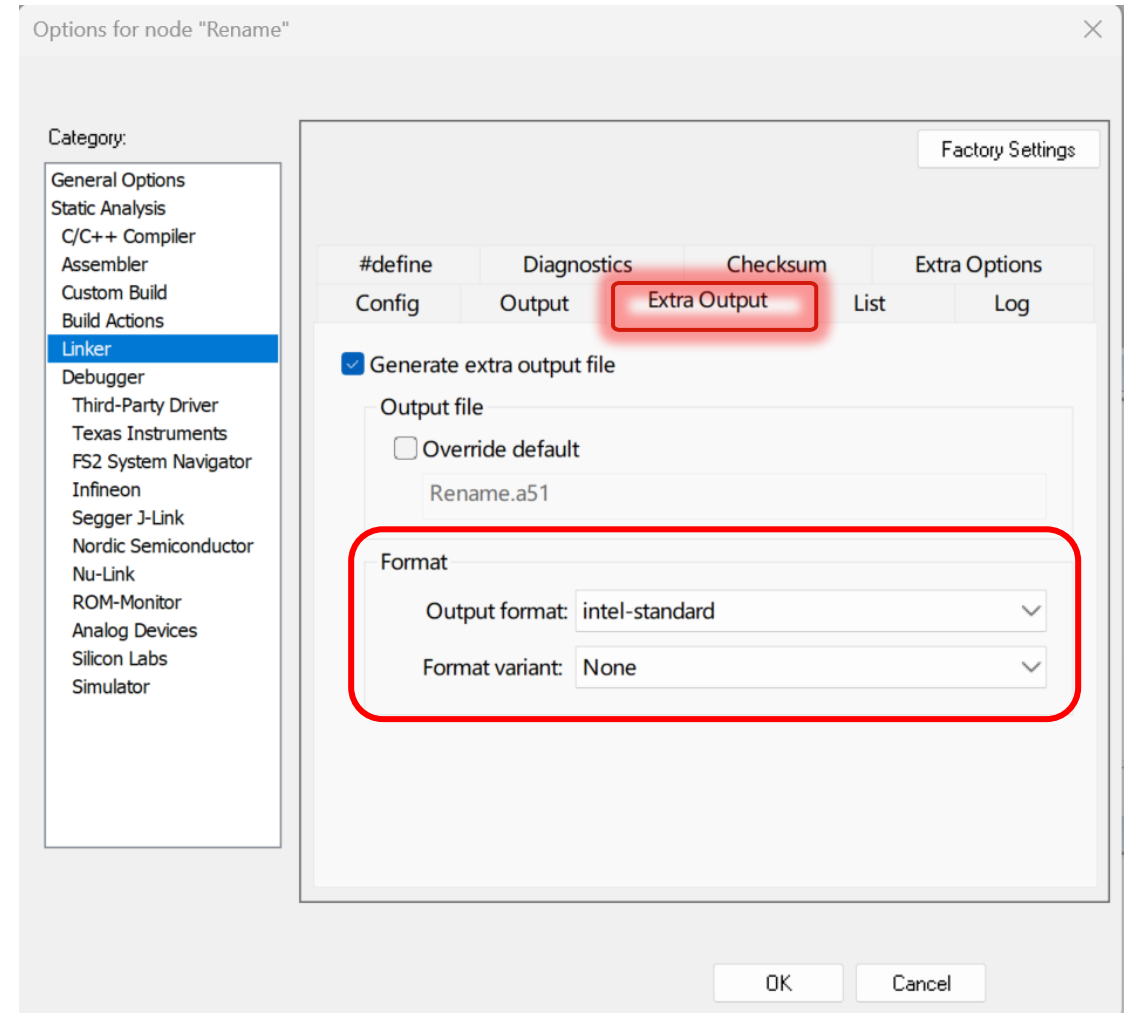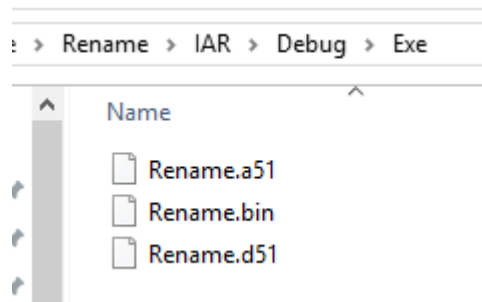# For IAR – Build Actions

- Linker configuration file

  - Derived from the device definition manually adjusted by Nuvoton (rather than automatically selected by the IAR tool).

  - **Do not modify the value in this area under any circumstances.**

For IAR – Build Actions

- Build with hex format output

- Bin format use nuvoton command line. Introduce in next page.

- After compiler with following
  - .a51 hex format
  - .bin bin format
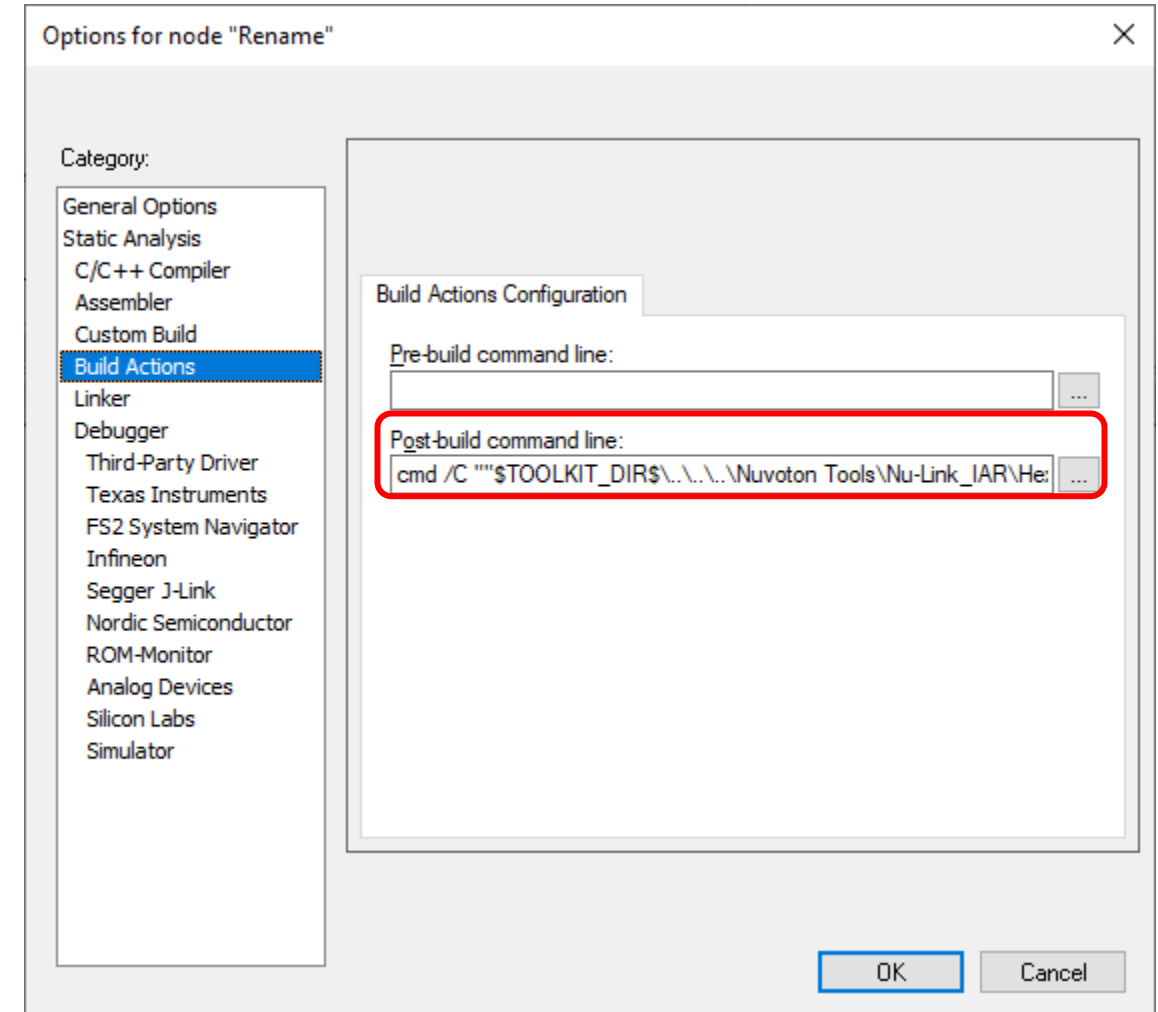 - .d51 debug file for IAR

For IAR – C/C++ Compiler

- Hex2bin

This file is located within the Nuvoton IAR driver folder.

. \Nuvoton Tools\Nu-Link_IAR\Hex2Bin.exe

  ◦ By default, unused locations will be filled with 0xFF.
  ◦ Users can also include the parameter –P 0x00 means unused locations are filled with zeros.
  ◦ Parameter <start address> <data length>

For IAR – Debugger

- Third-Party Driver

  - Manually adjusted by Nuvoton (rather than automatically selected by the IAR tool).

  - **Do not modify the value in this area under any circumstances.**
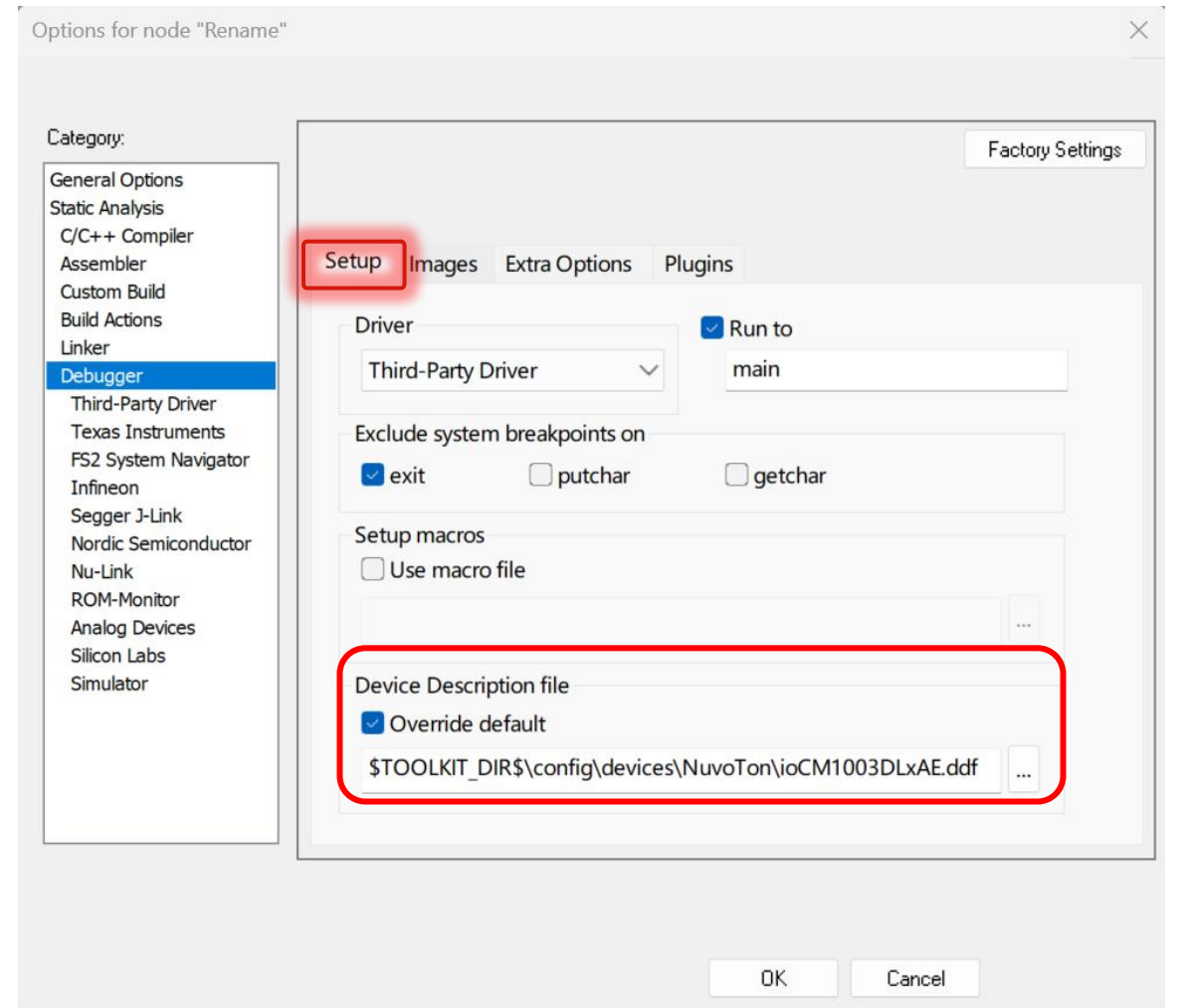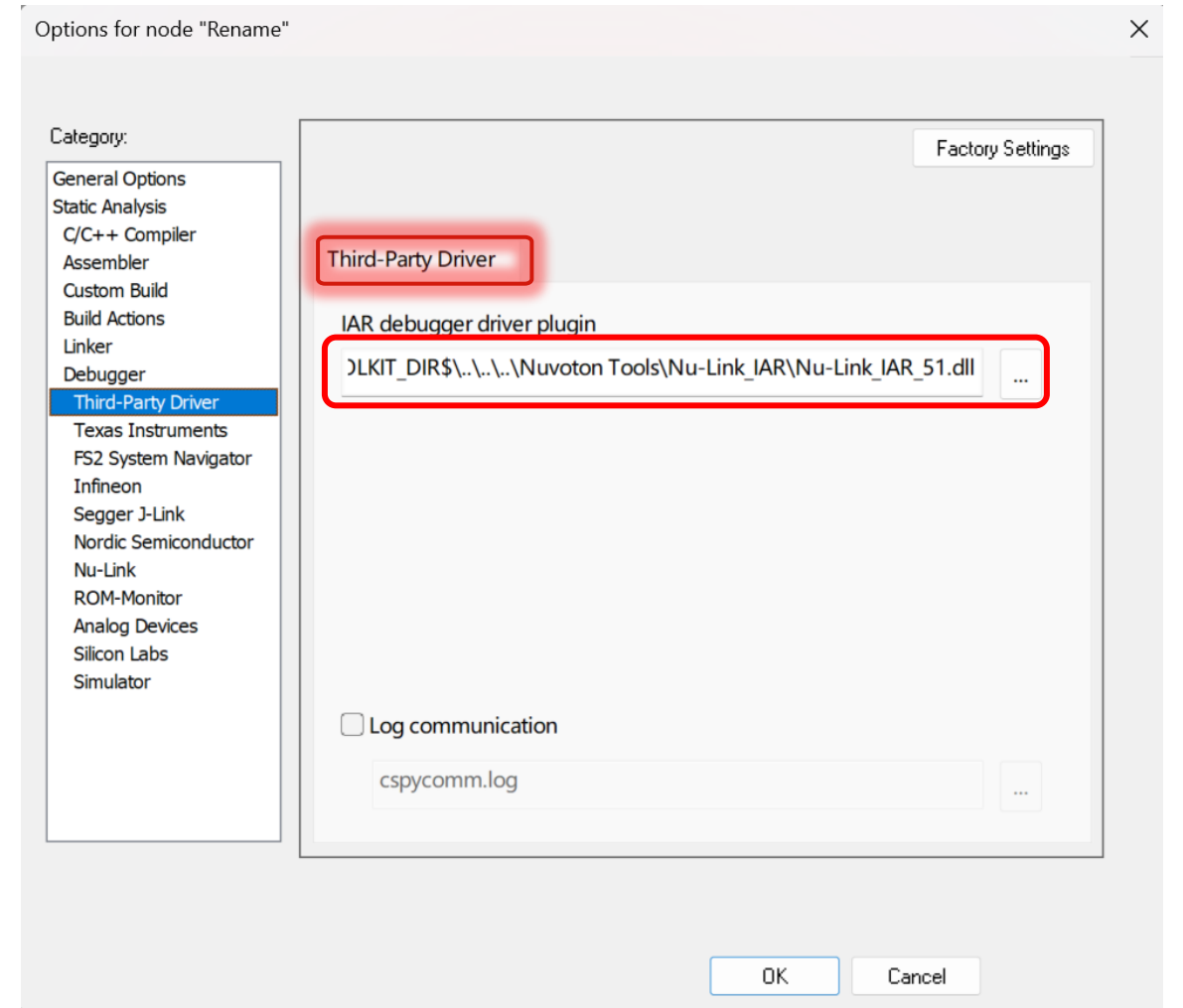
For IAR – Third Party Driver

- Third-Party Driver

  - Manually adjusted by Nuvoton (rather than automatically selected by the IAR tool).

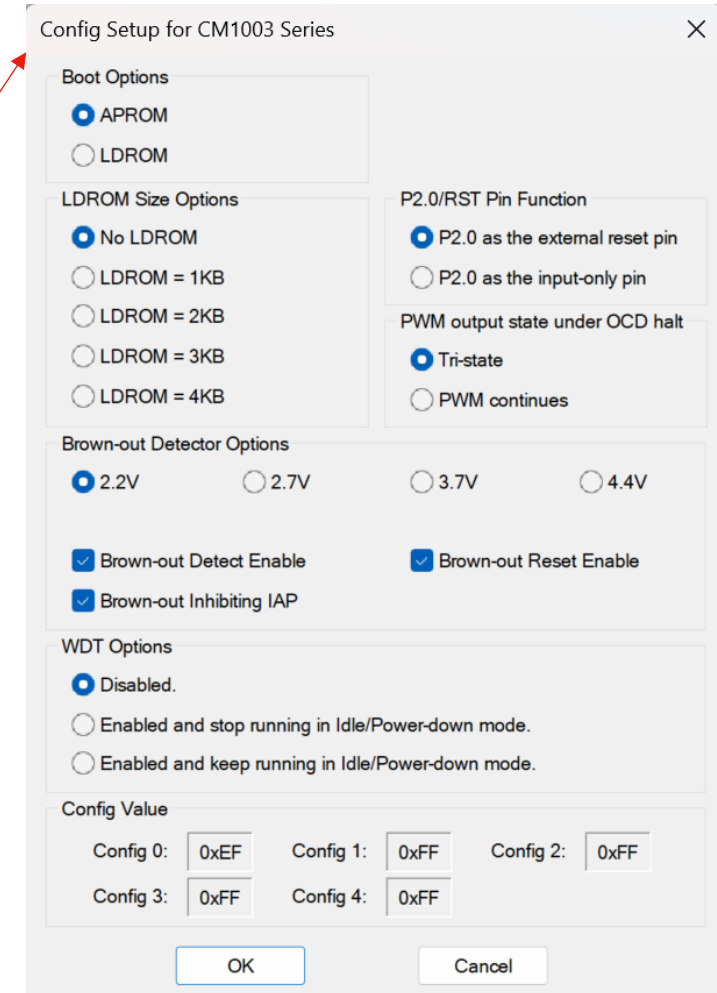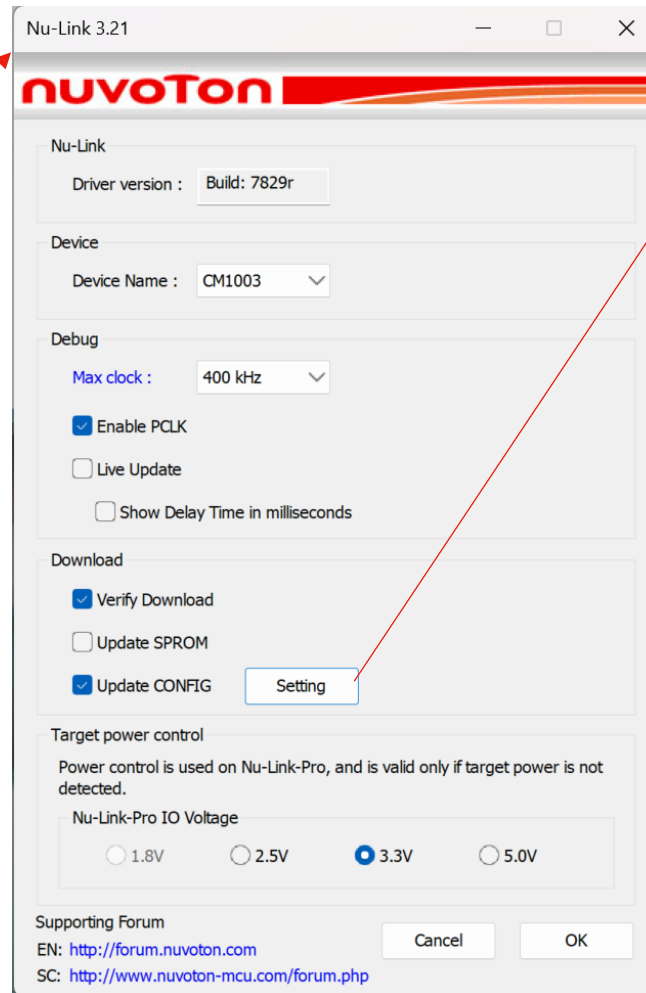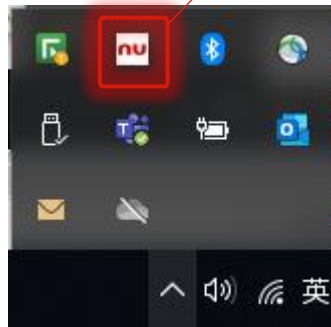 - **Do not modify the value in this area under any circumstances.**

For IAR – Nu-Link Setup & CONFIG define

- Third-Party Driver

Build Your Project Utilizing BSP - KEIL

Copying from the existing project is often more advantageous than creating a new one

For NuEclispe SDCC

- Refer to the "Nu Eclipse SDCC Quick Start_EN.pdf" for guidance.

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Thank You

Danke

Merci

ありがとう

Gracias

Kiitos

감사합니다

धन्यबाद

شكرا لك

תודה