

NuEclipse SDCC 快速入门 V1.02

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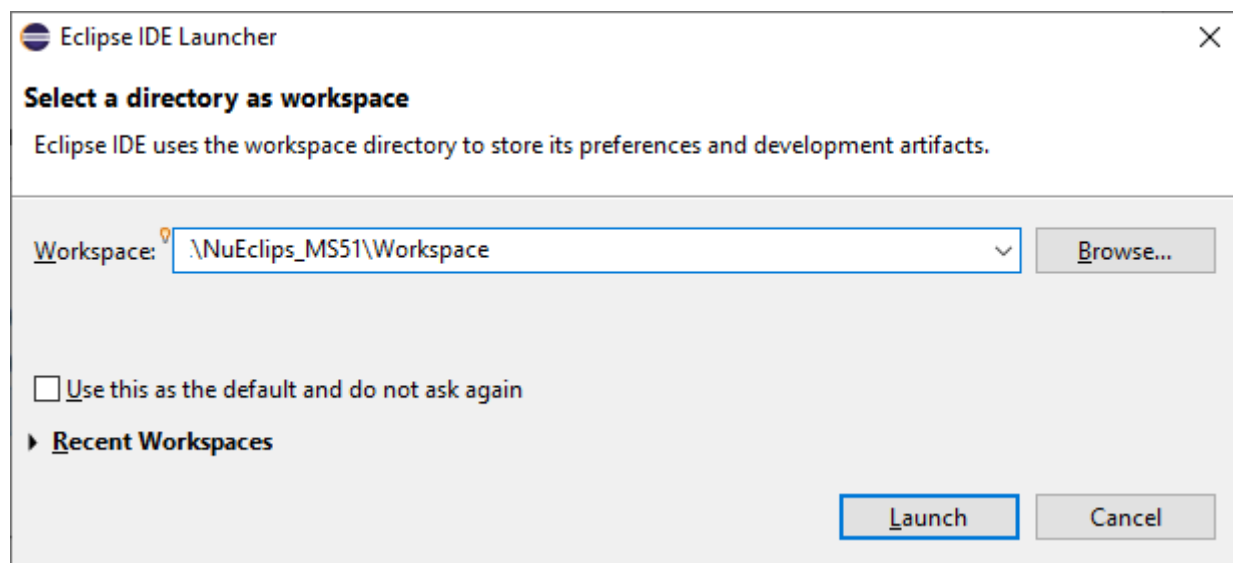
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1 建立NuEclipse项目

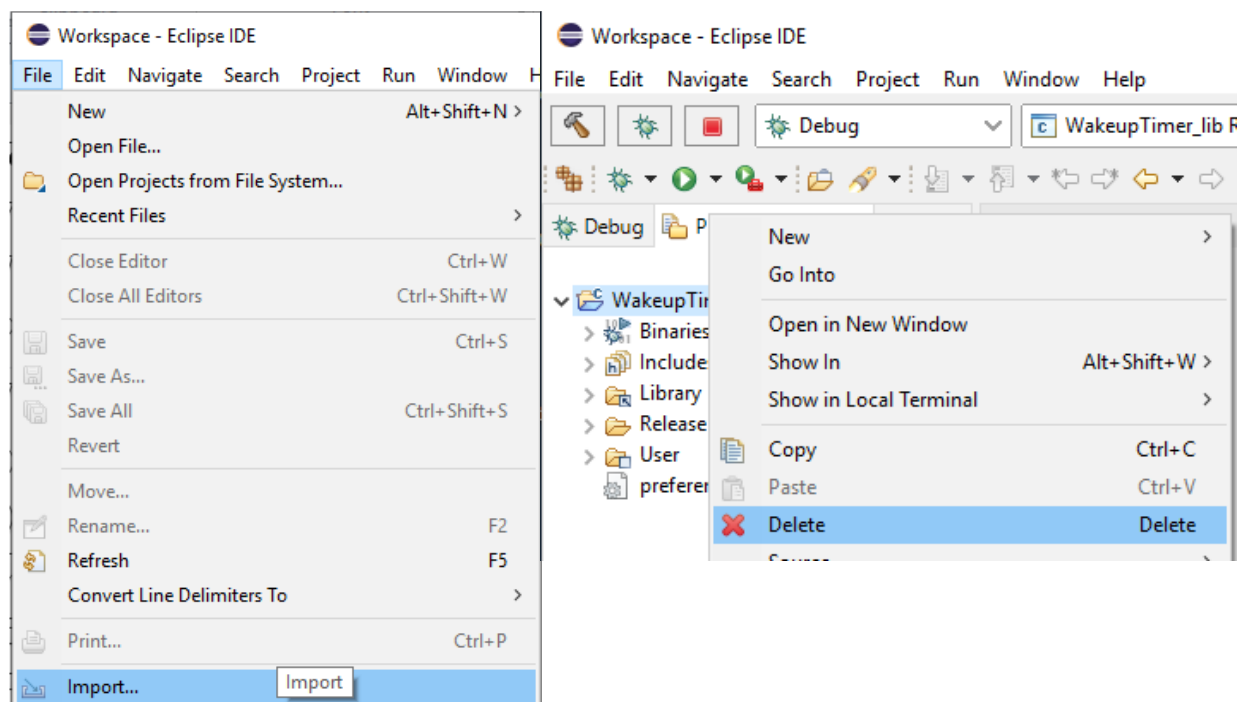
1.1 开启现有BSP project

1.1.1 NuEclipse采用workspace import project的方式，

BSP 有建立一个workspace folder可直接开启。直接在launcher 的workspace内点选对应路径

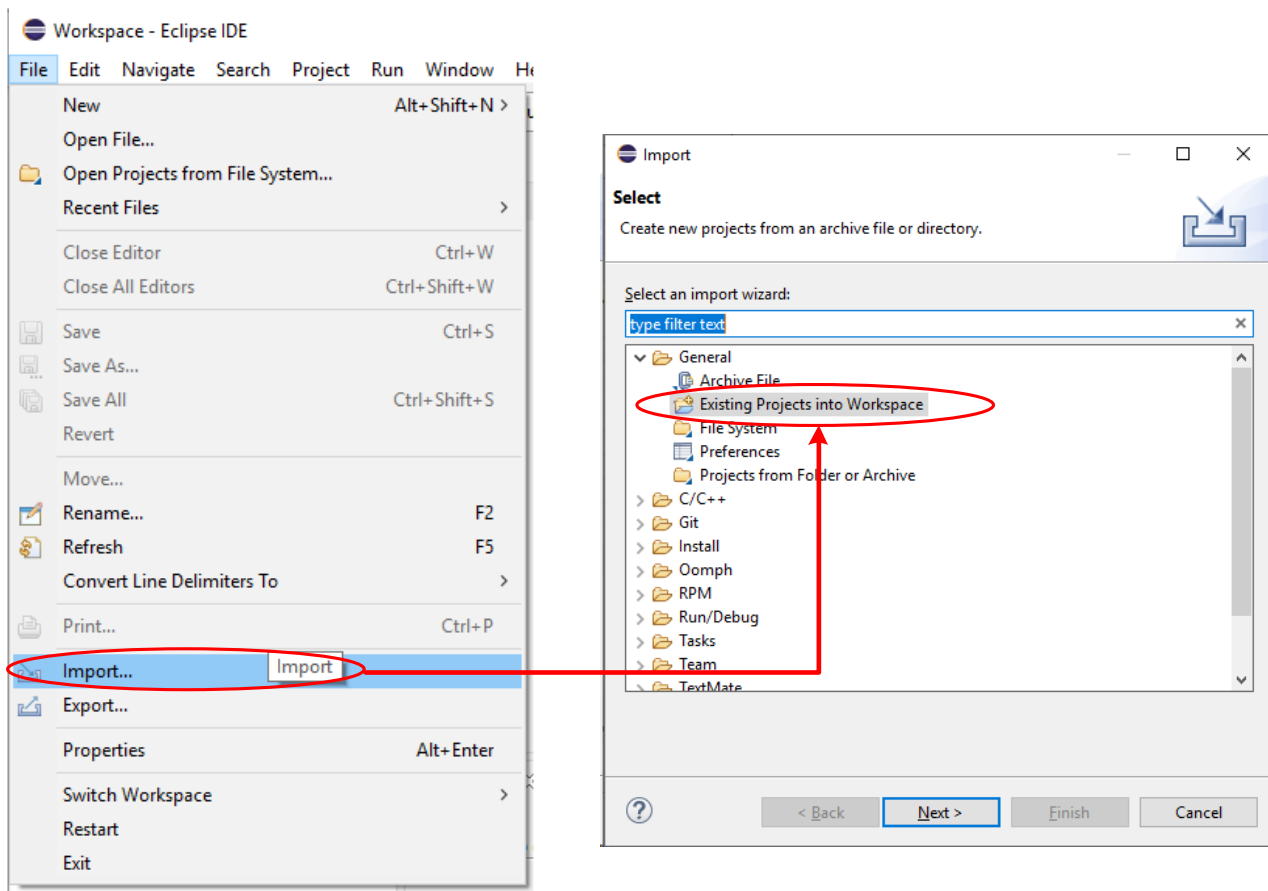


当开启一个project 采用import ， 关闭采用 workspace 内delete project

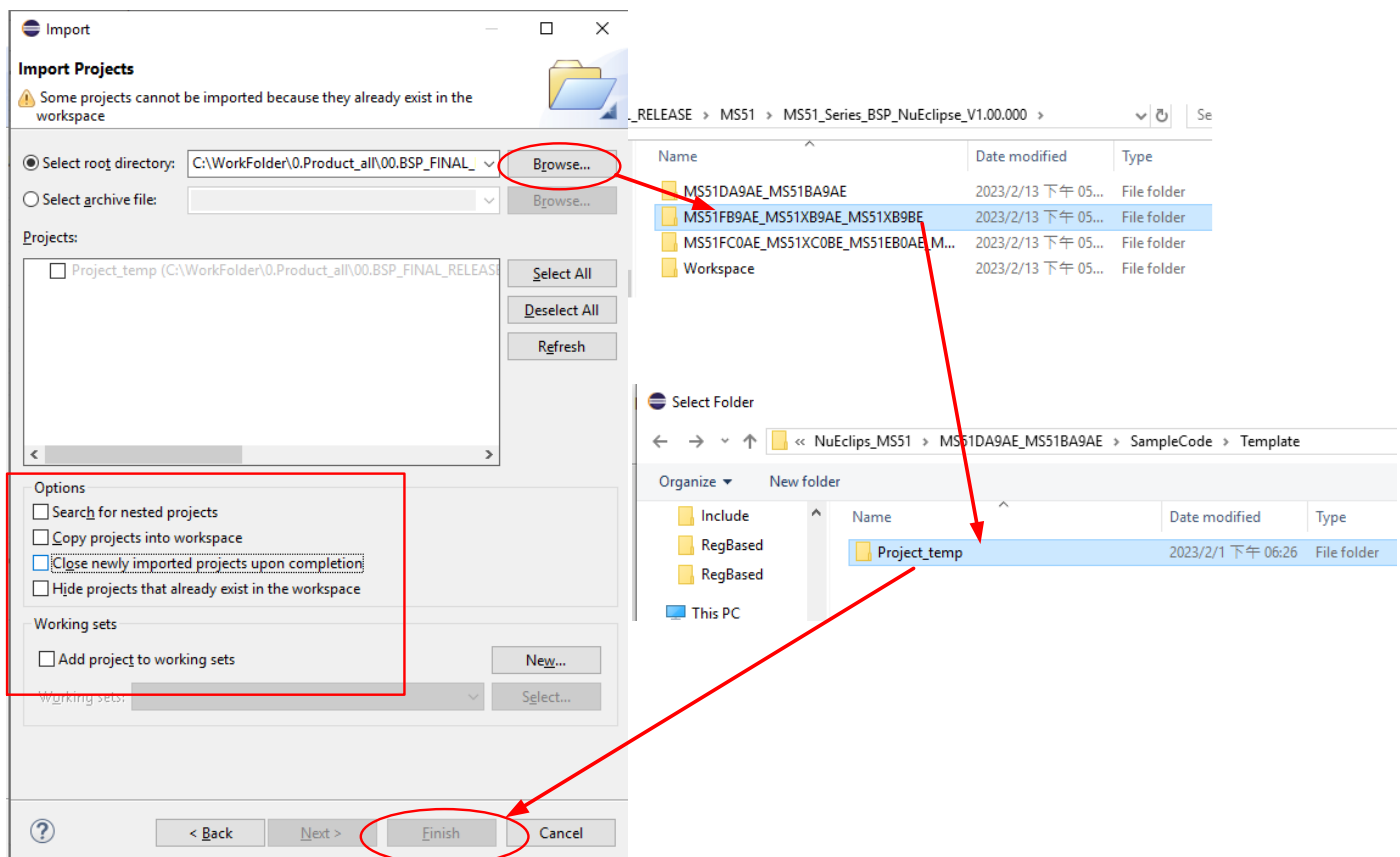


1.1.2 开启project

点选file / Import “Existing Projects into Workspace.”



启在import Projects 中点选BSP 对应project folder ，并点选Finish.



1.1.3 Compiler / Build

右键点击Project名称并选择"Build Project"，正常完成后，会显示0 error，0 warning以及checksum相关信息。

The screenshot illustrates the Eclipse IDE interface during a build process. The top-left pane shows the 'Project Explorer' with 'Project_temp (in SDCC)' selected. A red arrow points from this project to a context menu that appears upon right-clicking. The menu includes options like 'New', 'Go Into', 'Open in New Window', 'Show In', 'Show in Local Terminal', 'Copy', 'Paste', 'Delete', 'Source', 'Move...', 'Rename...', 'Import...', 'Export...', 'Build Project', and 'Clean Project'. The 'Build Project' option is highlighted, and a tooltip indicates 'Incremental Build of Selected Project'.

The bottom-left pane shows the 'Project Explorer' again, but now with additional folders like 'Binaries', 'Release', and 'User' visible under 'Project_temp (in SDCC)'. A red box highlights this section.

The bottom-right pane shows the 'main.c' source file with the following code:

```
7
8
9 /* File Function: MS51 DEMO project
10
11
12 #include "MS51_8K_SDCC.h"
13
14
15 void main (void)
16 {
17 /* UART0 initial setting
18  * include sys.c in Library for modify HIRC value to 24MHz
19  * include uart.c in Library for UART initial setting
20 */
21     MODIFY_HIRC(HIRC_24);
22     Enable_UART0_VCOM_printf_24M_115200();
23
24     printf("\n Hello world!");
25     while(1);
26
27
28 }
```

The bottom-most pane shows the 'Console' output, which displays the build results for 'Project_temp'. The output is circled in red:

```
CDT Build Console [Project_temp]
Finished building target: Project_temp.elf

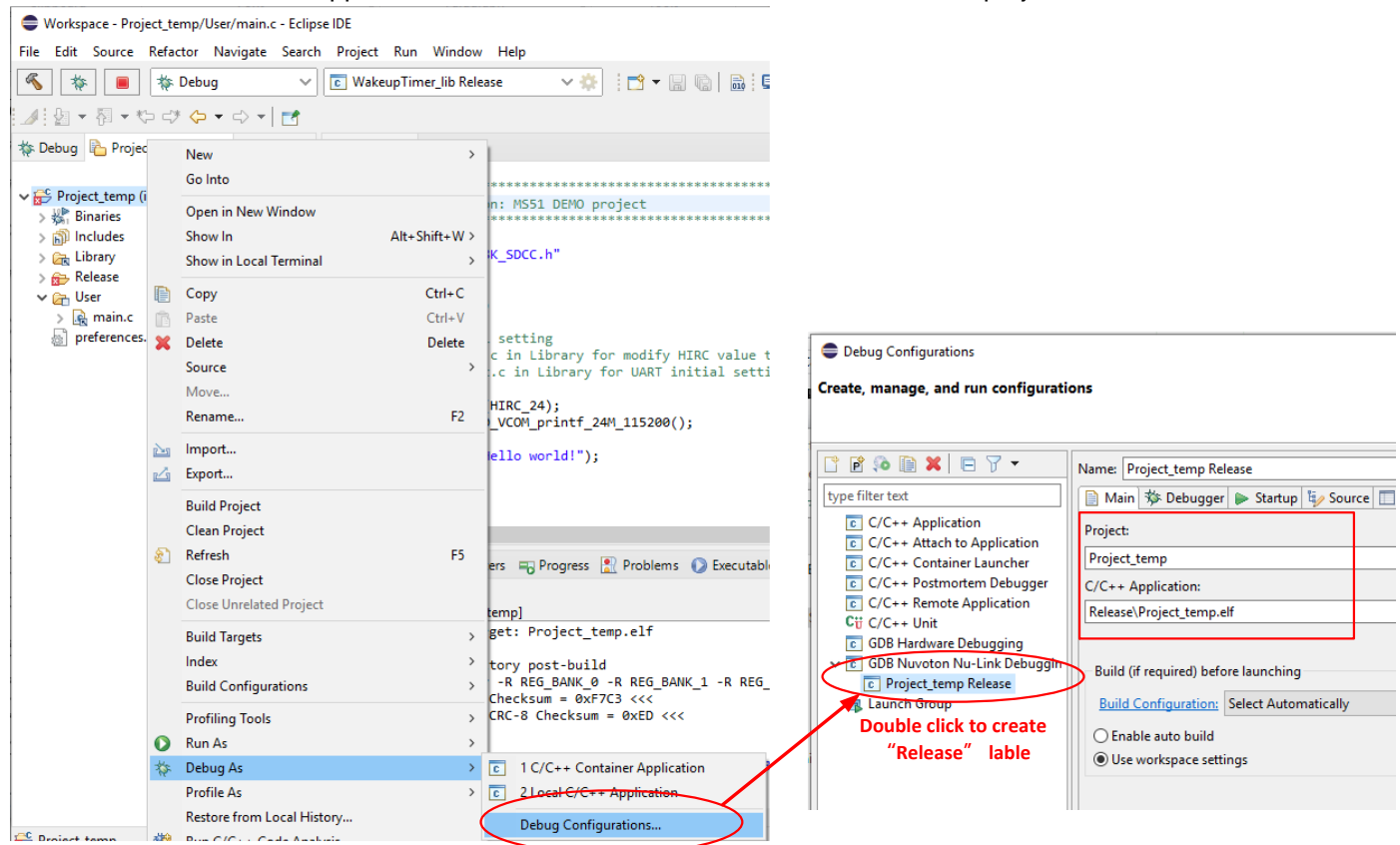
make --no-print-directory post-build
arm-none-eabi-objcopy -R REG_BANK_0 -R REG_BANK_1 -R REG_BANK_2 -R
>>> Project_temp.bin Checksum = 0xF7C3 <<<
>>> Project_temp.bin CRC-8 Checksum = 0xED <<<

19:02:05 Build Finished. 0 errors, 0 warnings. (took 3s.845ms)
```

1.1.4 Debug

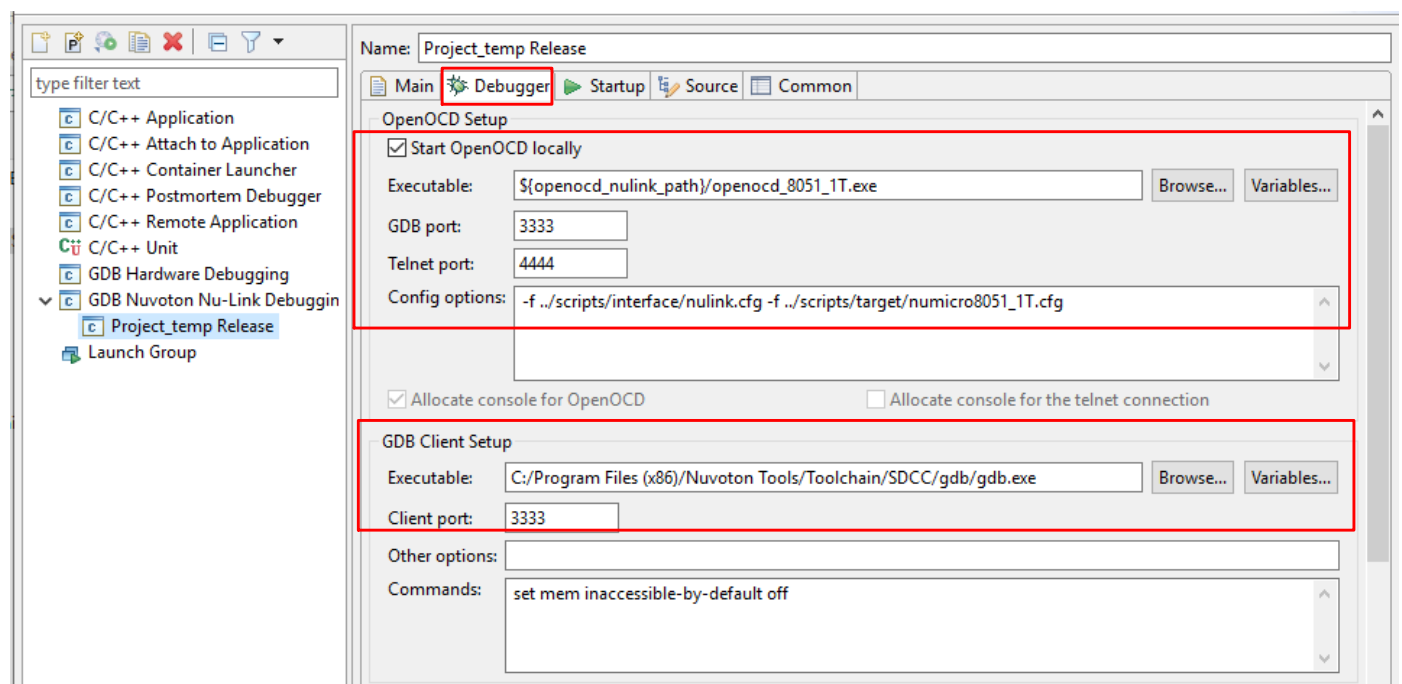
右键点击Project名称并选择"Debug As" Debug Configurations.

在 Debug Configurations 页面内, 双击GDB Nuvoton Nulink Debugging. 系统会自动产生Project Release卷标。检查 标签 内 C/C++ Application 是否自动出现 Release project 的 .elf 内容。



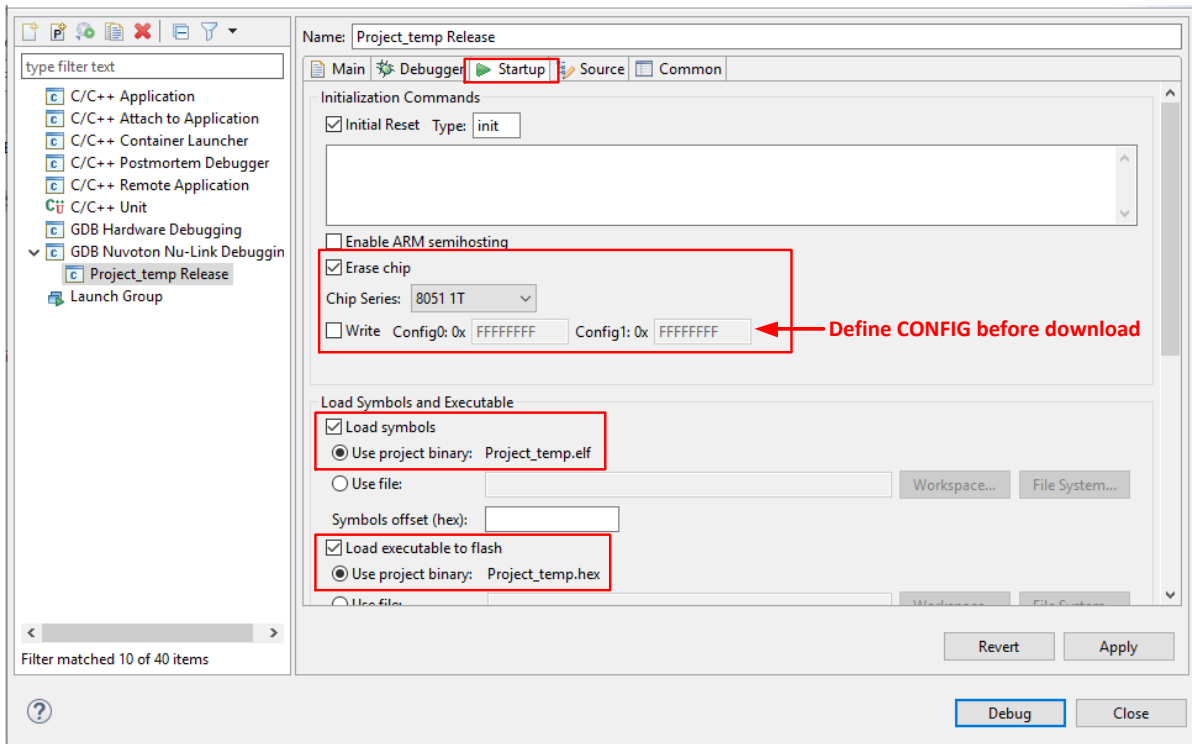
确认Debugger 页面内参数

GDB Client Setup 第一次可能需要手动填入参数, 找到对应Toolchain下gdb.exe安装路径, 初始值为 **C:/Program Files (x86)/Nuvoton Tools/Toolchain/SDCC/gdb/gdb.exe**

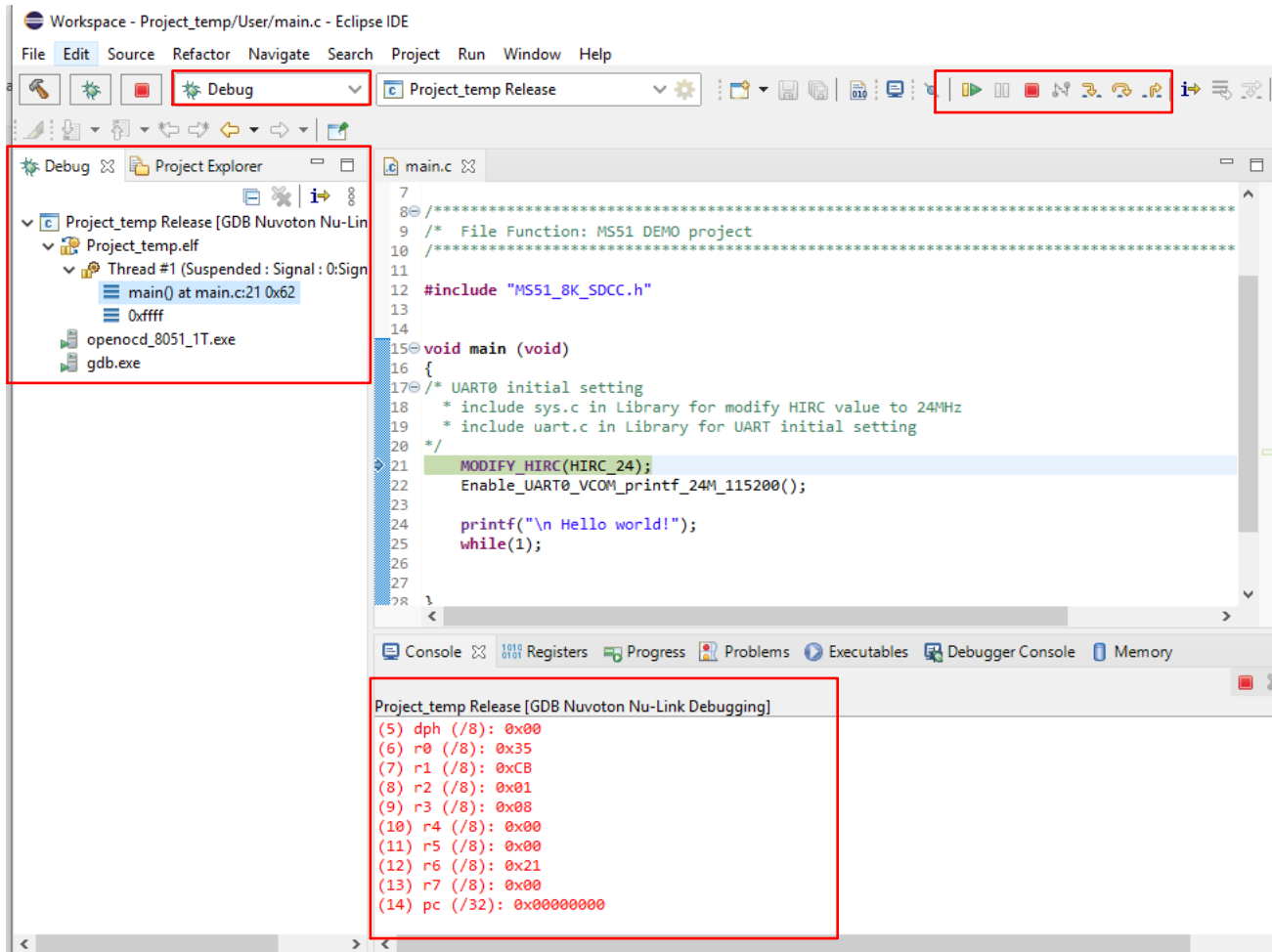


确认Startup页面内参数, CONFIG如需更改, 手动填入。

确认load .elf / .hex 名称与Project一致, 然后点击Debug

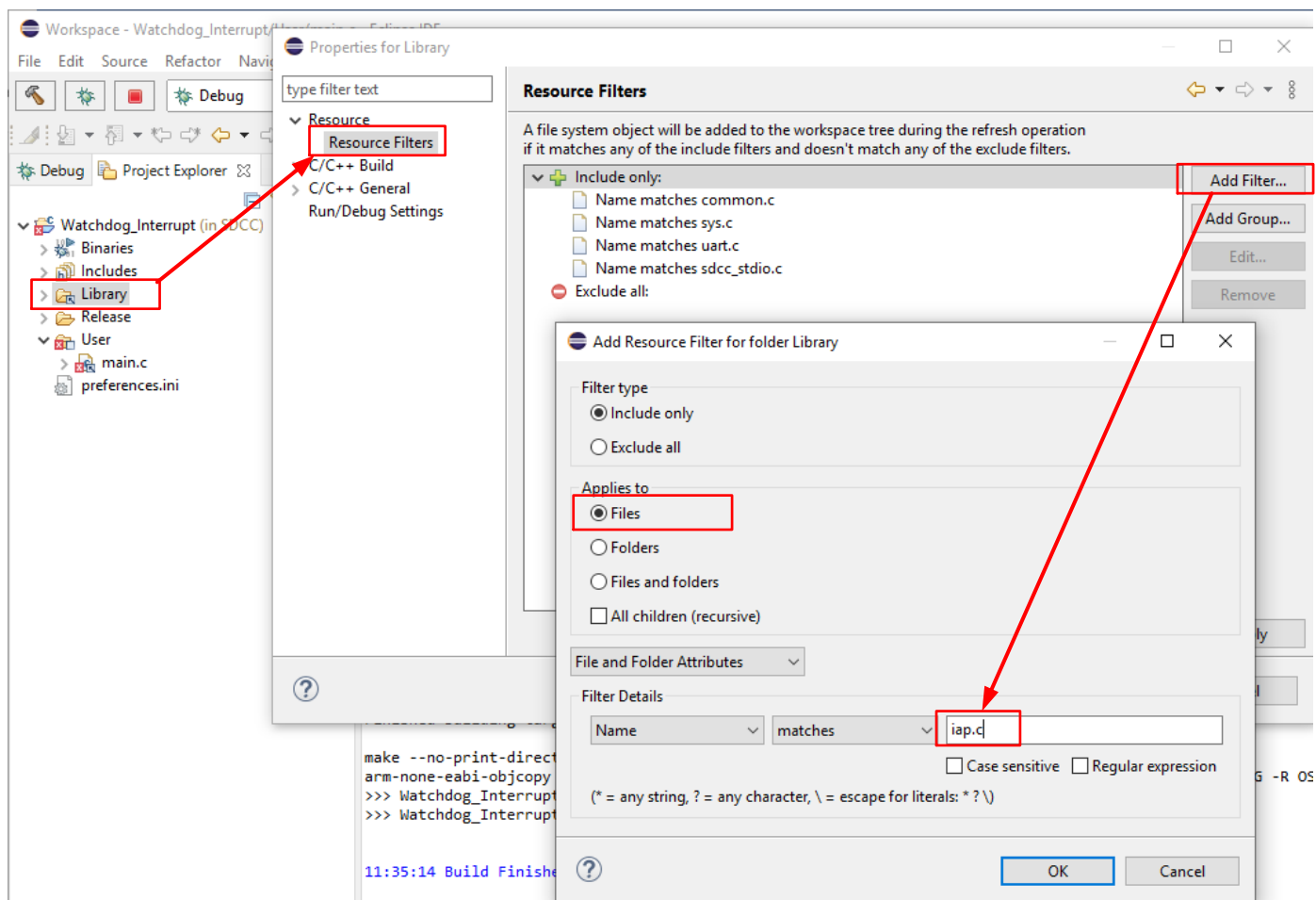


显示如下窗口及说明进入debug mode

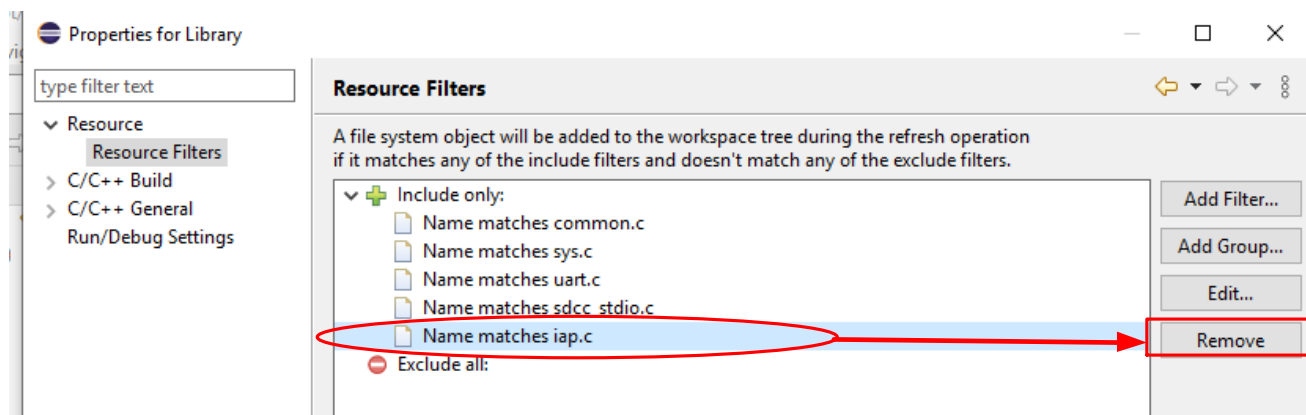


1.1.5 增减Library .c 文件

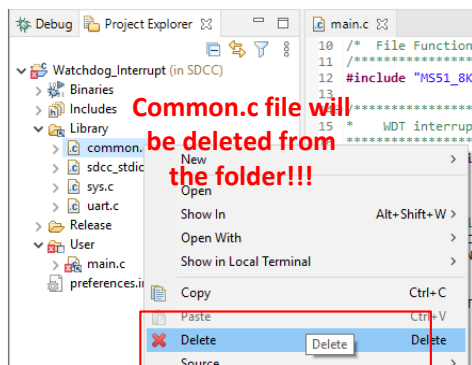
Project 内加入lib .c file进行build ， 是采用Add Filter 来增加



移除lib，是Remove Filter



移除动作不能Library 内选择delete，会直接在文件夹内删除source .c file

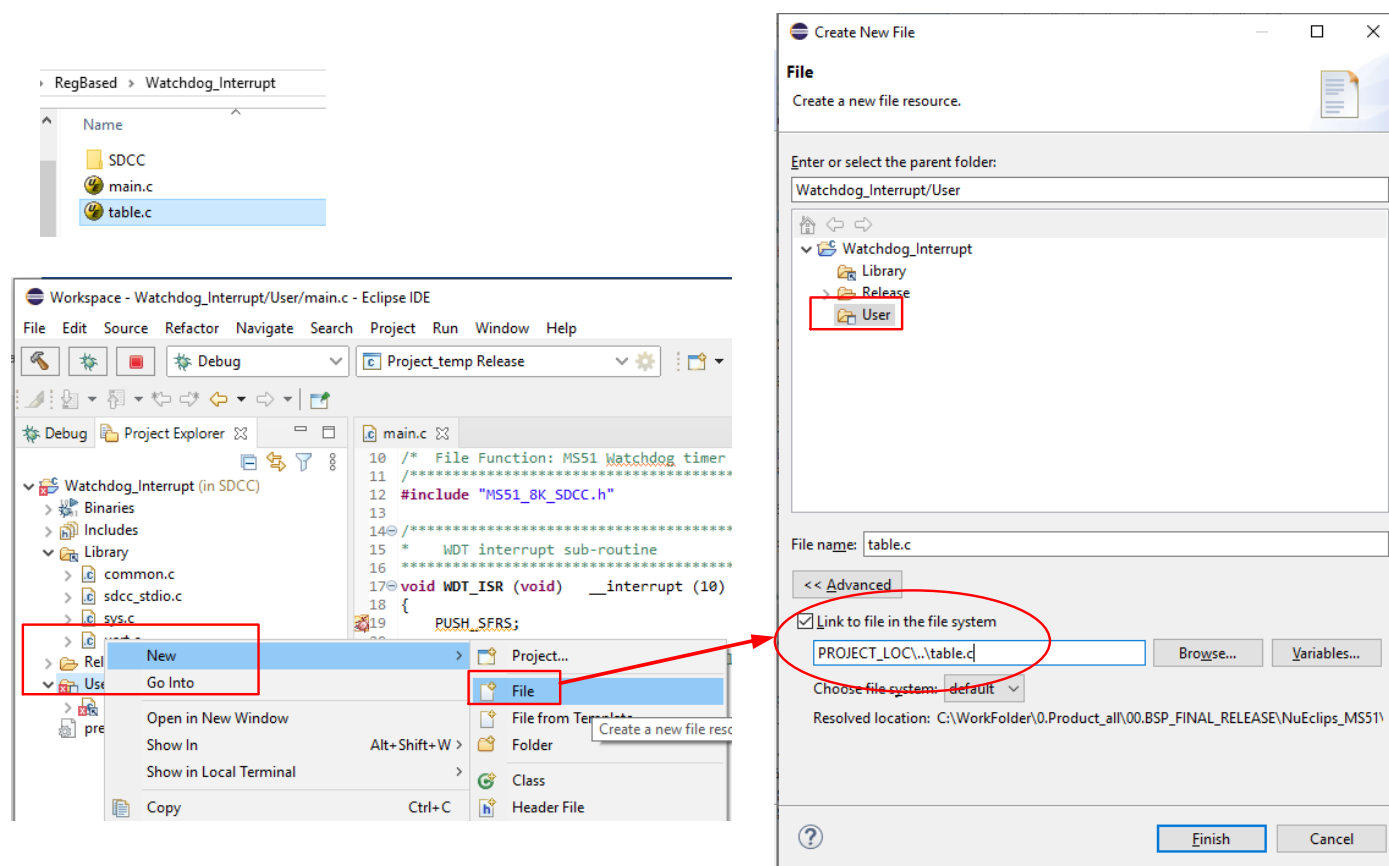


1.1.6 增减user code

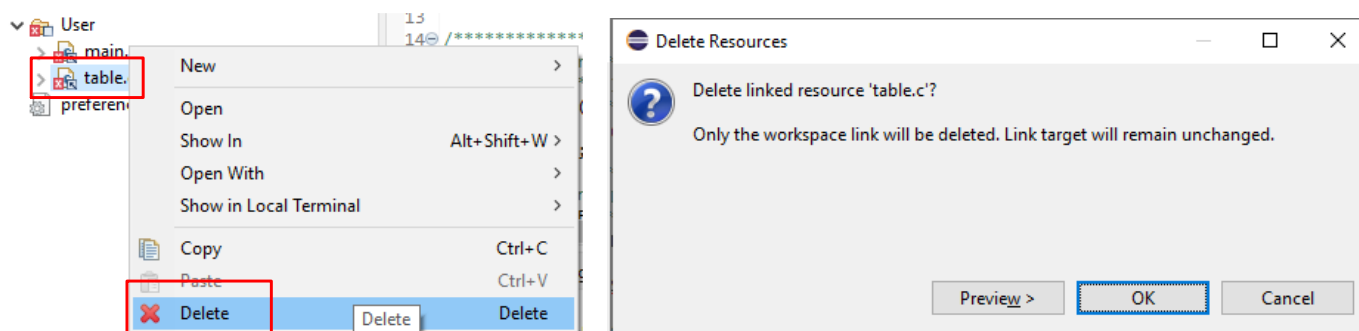
新增一个table.c，右键点选user / New / File 在Create New File 页面内点选Link to file in the file system.建议填入

相对路径方式，绝对路径会造成Project 位置移动无法找到对应file 问题。

PROJECT_LOC\.\<file name>

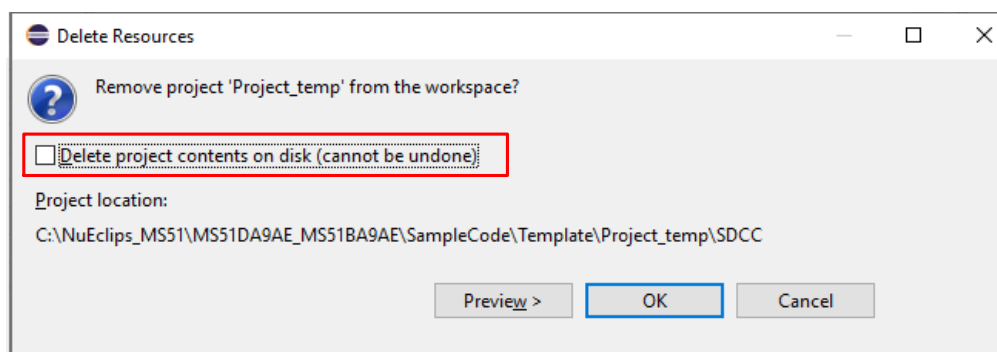


移除 user .c file



1.1.7 关闭Project

请不要勾选delete project contents on disk, SDCC project folder会被删除。



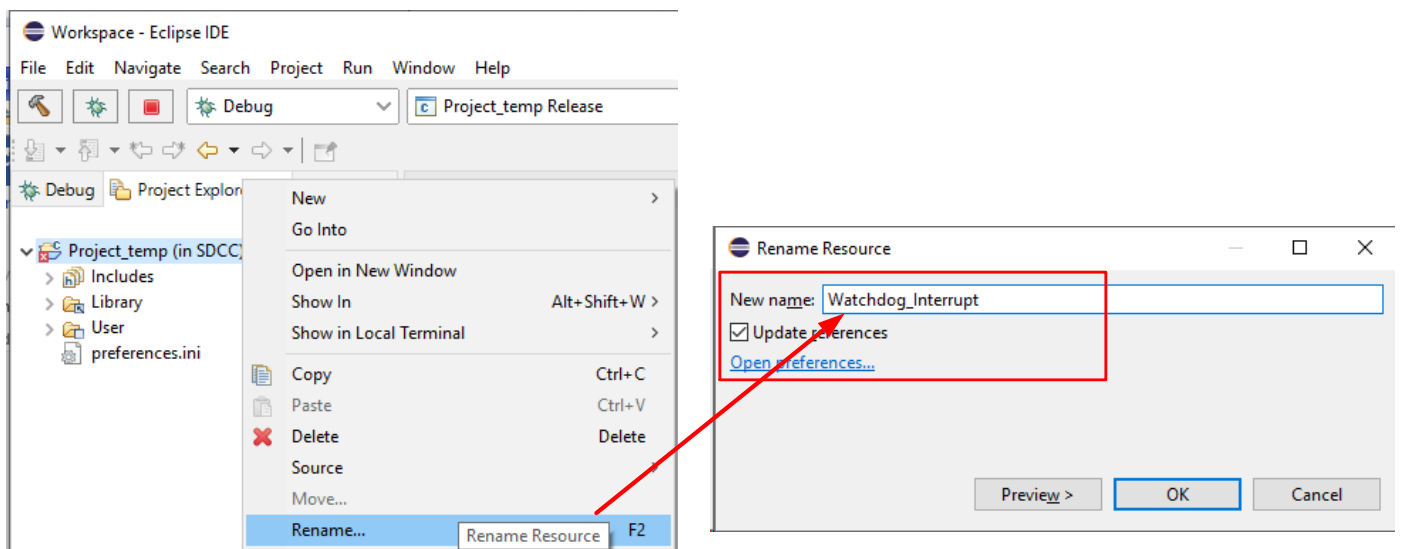
1.2 由现有BSP project 创建新的Project

1.2.1 复制现有的SDCC project folder 到新的Project folder 中

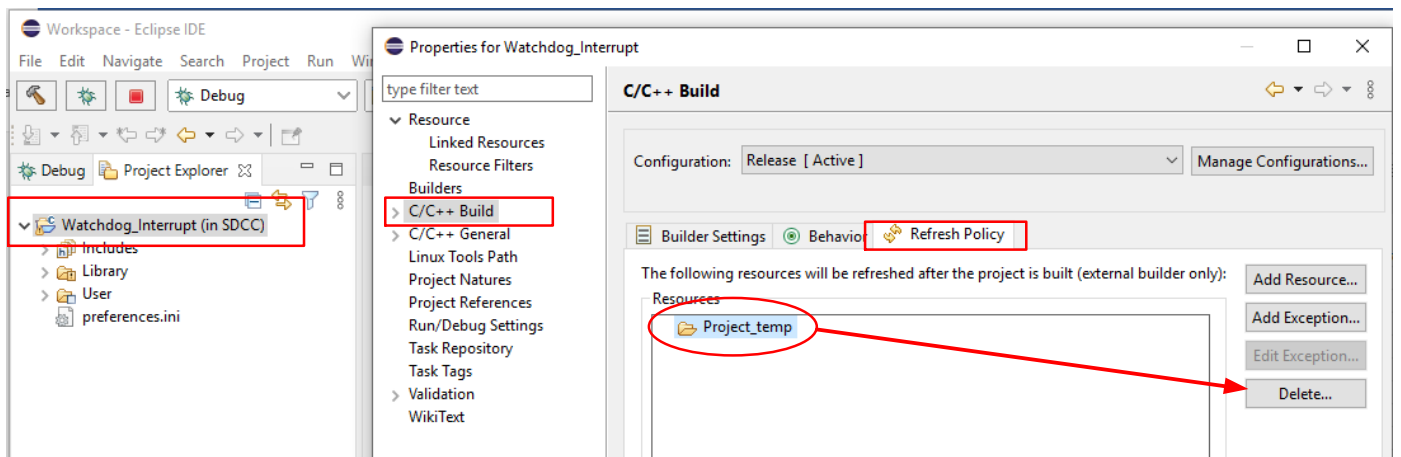
NuEclips_MS51 > MS51DA9AE_MS51BA9AE > SampleCode > RegBased > Watchdog_Interrupt			
Name	Date modified	Type	Size
SDCC	2023/2/1 下午 06:04	File folder	
main.c	2023/2/1 下午 06:06	C File	3 KB

1.2.2 在Workspace 中import 这个project

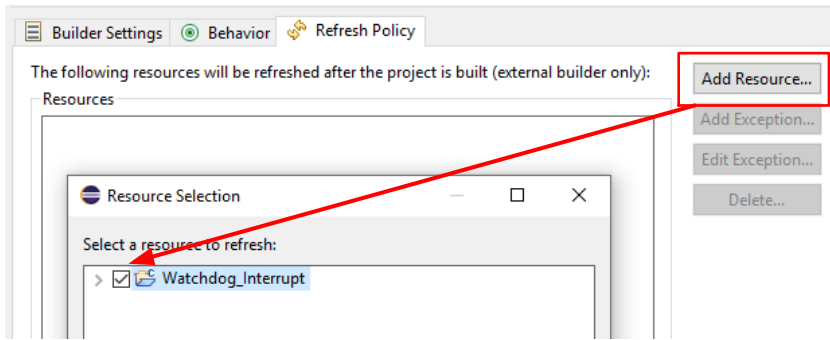
1.2.3 Rename Project



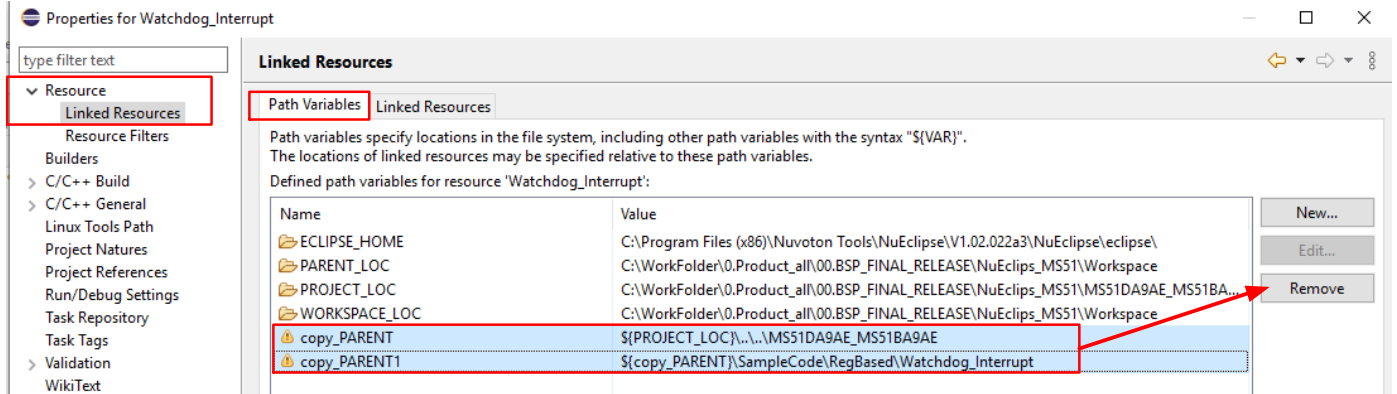
确认Project名称已更改后，右键点选Properties，修改Refresh Policy，删除旧Resource



删除后新增，系统会自动带入Rename后的Project Resource，手动勾选。



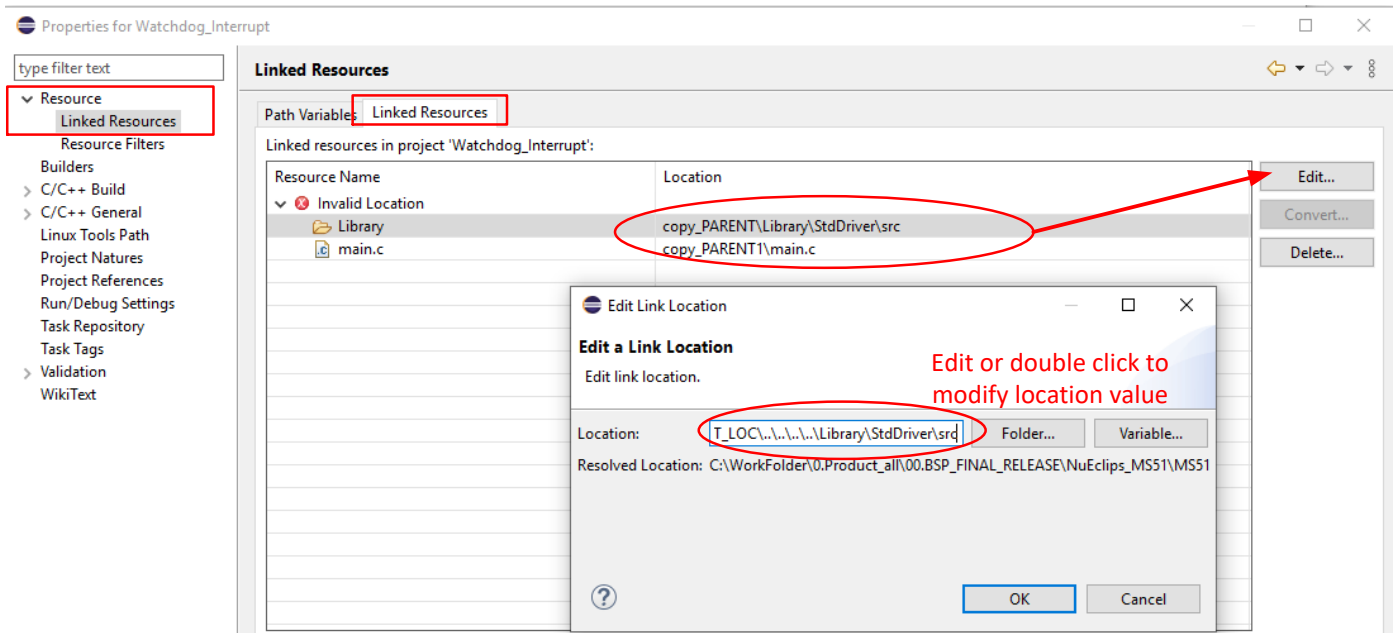
移除因Rename产生的错误Resource



更正Resource linker 设置，直接贴下列内容

PROJECT_LOC\..\..\..\Library\StdDriver\src

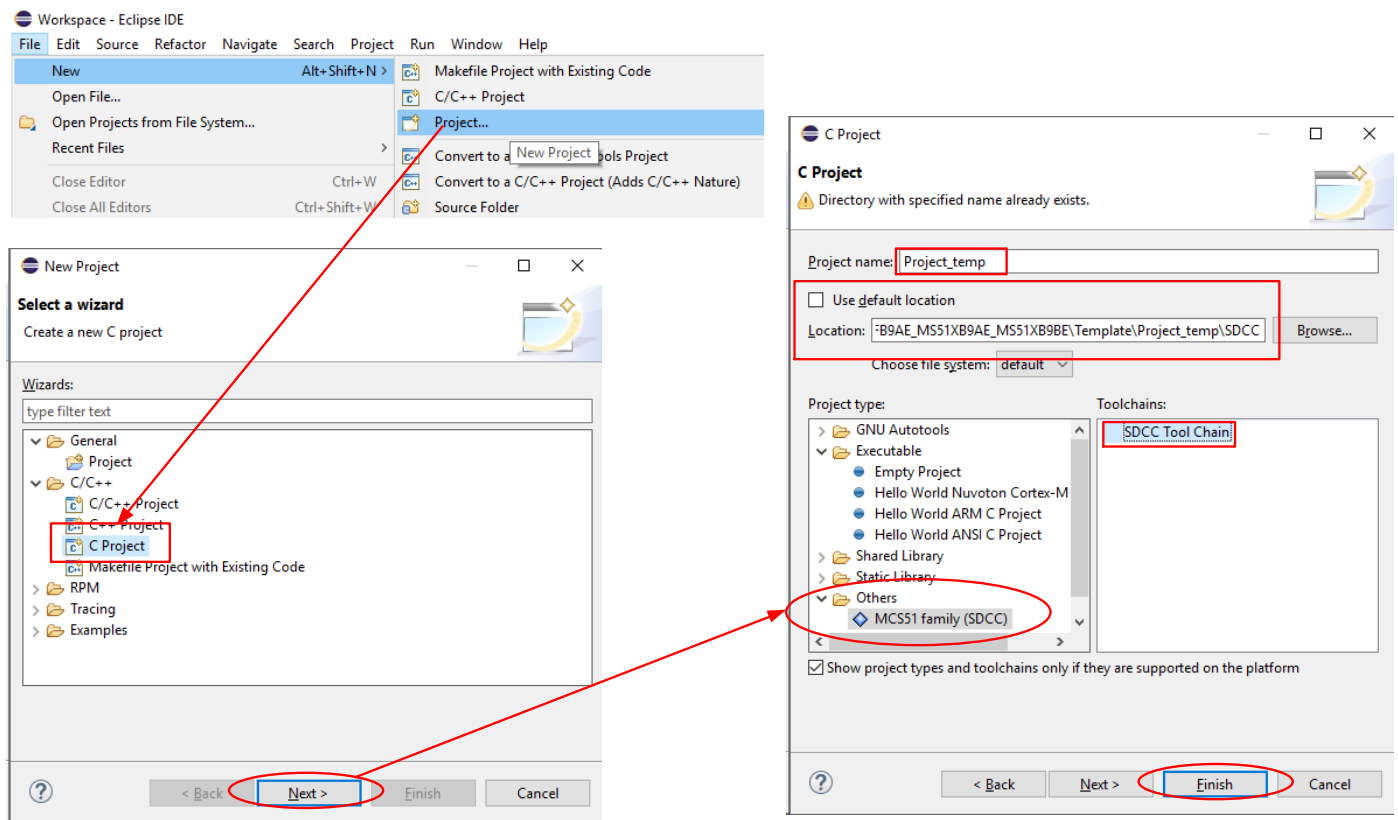
PROJECT_LOC\..\main.c



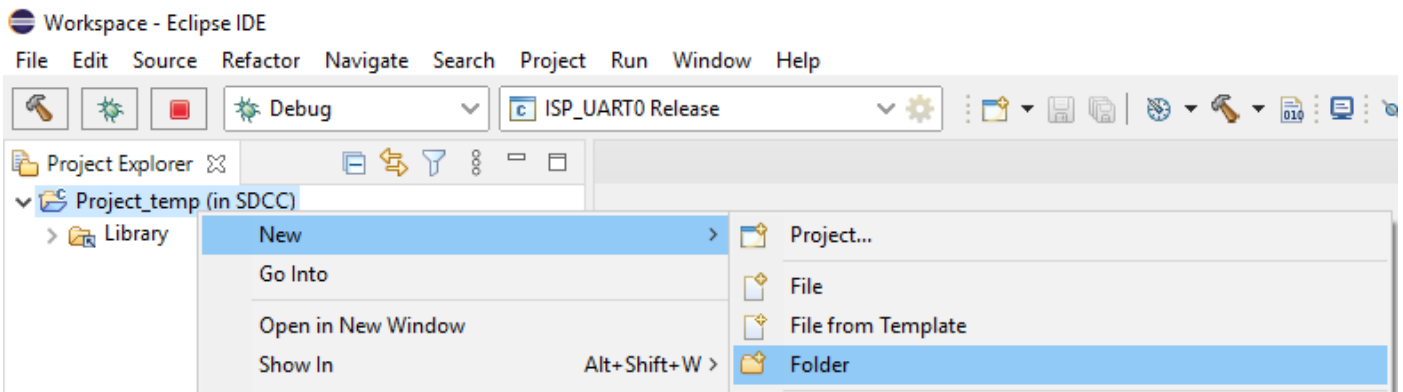
1. Build 更改后的Project
2. Debug

1.3 新建Project （不建议）

1.3.1 选择Others SDCC Tool Chain, 选择正确的Location.

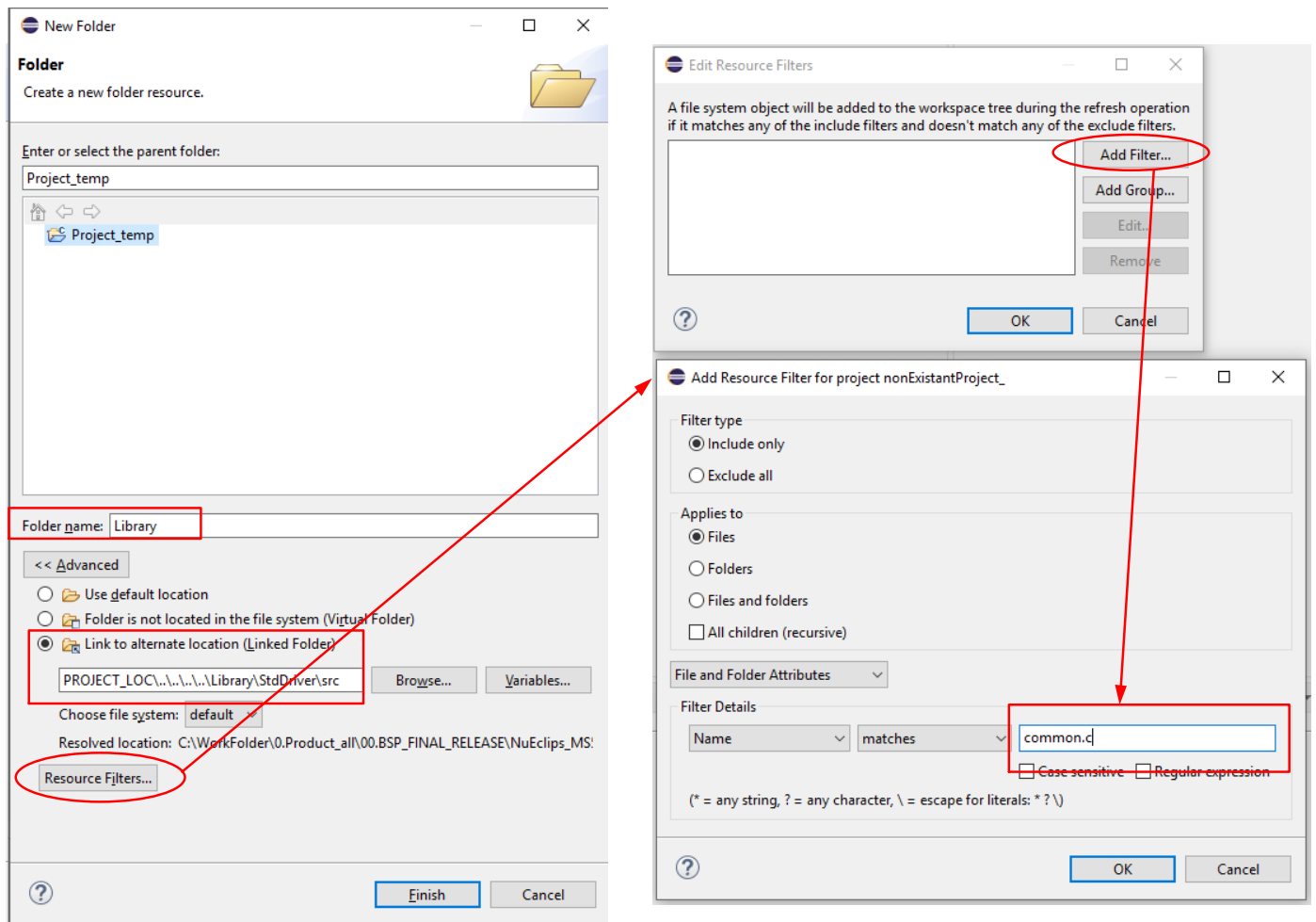


1.3.2 新增library 及用户代码

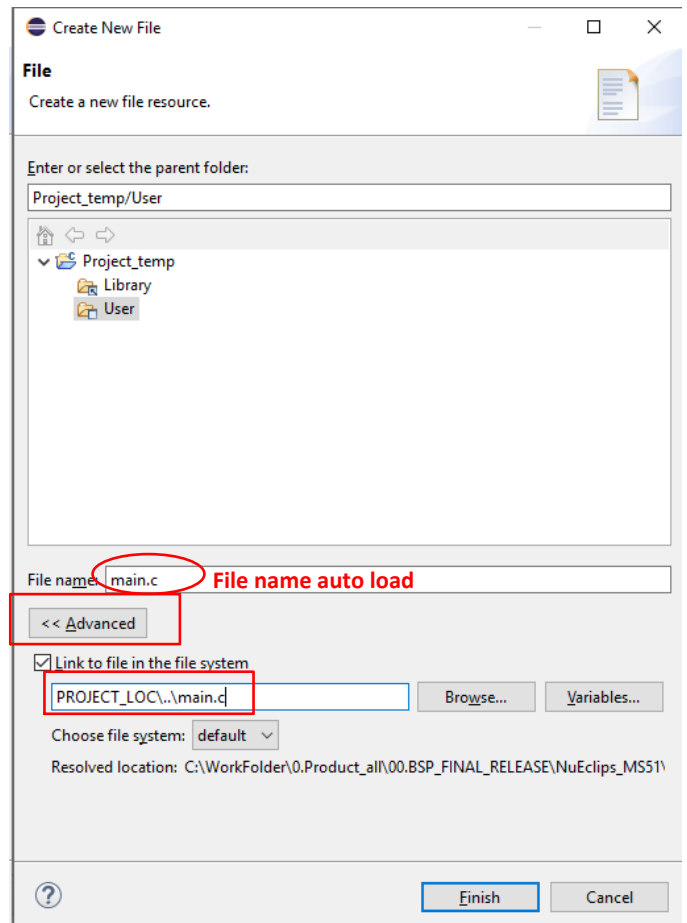
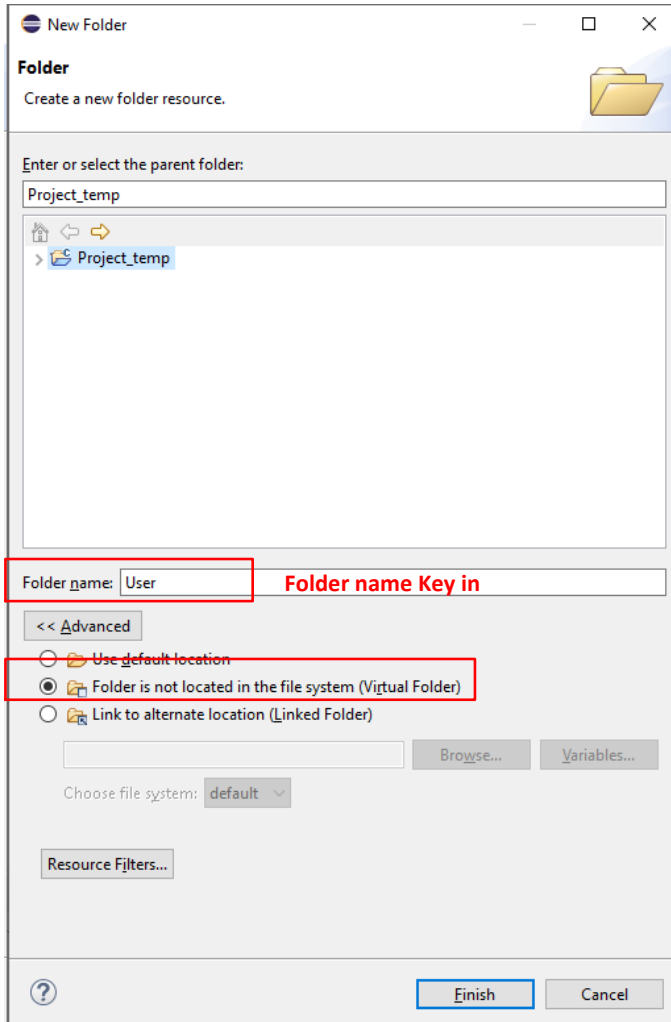
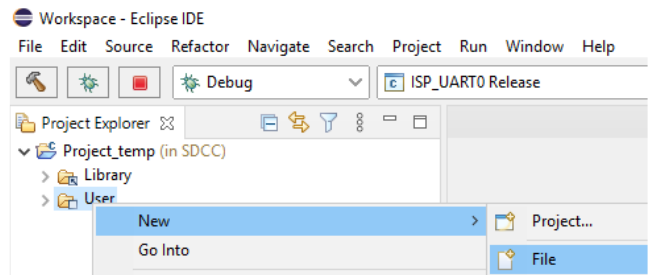
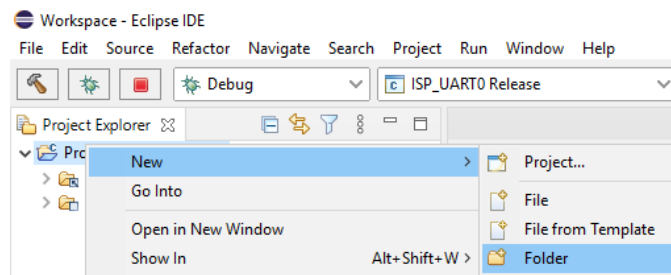


Link folder 方式. 可直接link 已有的整个folder路径, 不加入filter 就自动加入folder内所有文件。

新增或减少文件都是用Filter 方式, 不能采用delete。



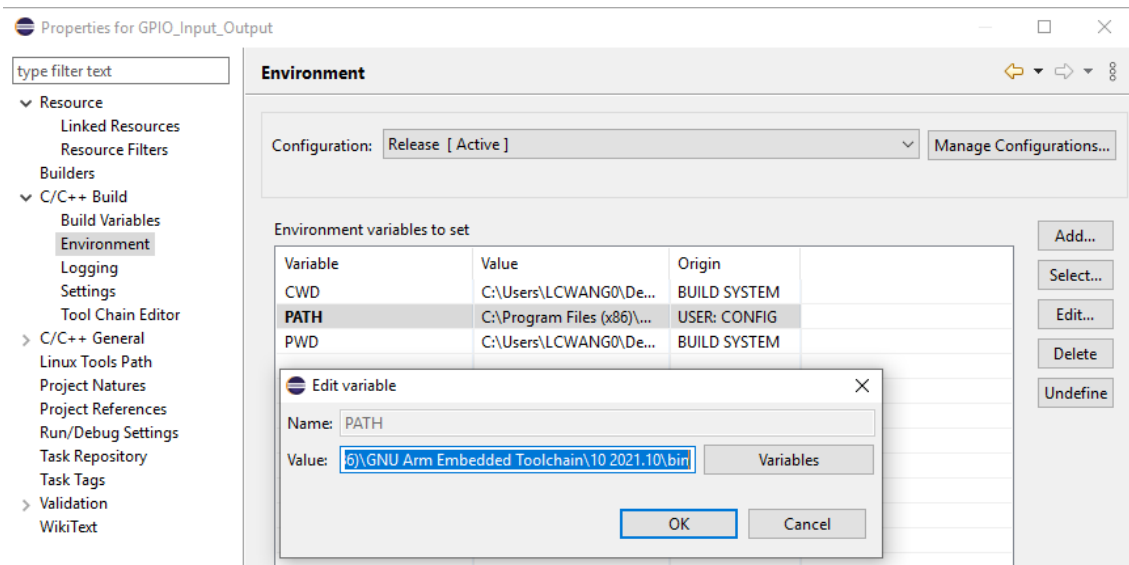
Link file 方式，先创建Virtual Folder ，再加入文件link ，每个文件为单一link，可用delete删除link



2 设定PROJECT PROPERTIES

a. Build / Environment / PATH

C:\Program Files (x86)\Nuvoton Tools\Toolchain\SDCC\bin;C:\Program Files (x86)\GNU ARM Eclipse\Build Tools\2.8-201611221915\bin;C:\Program Files (x86)\GNU Arm Embedded Toolchain\10 2021.10\bin

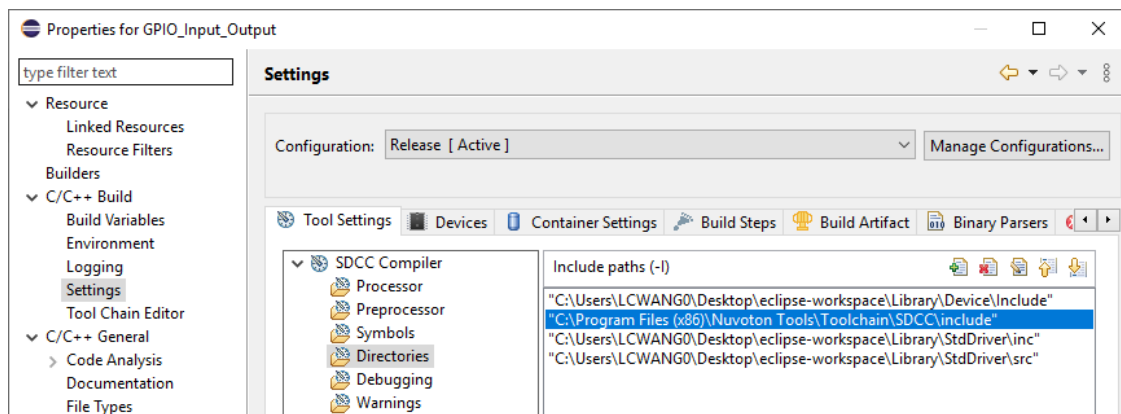


b. Build setting

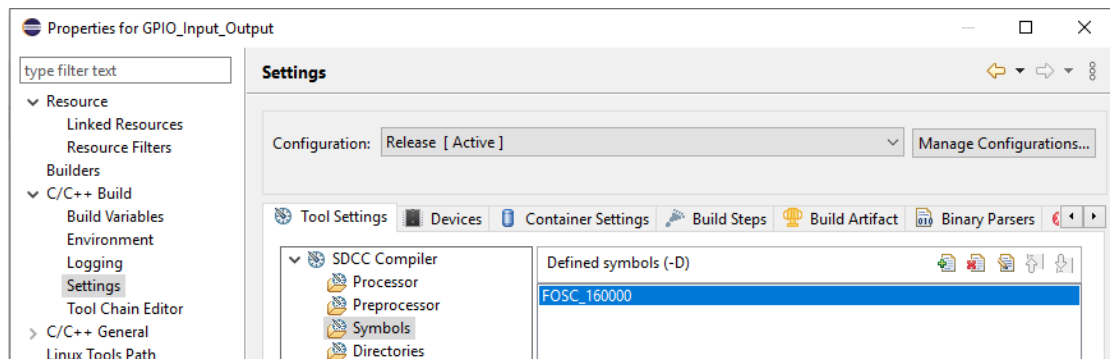
Symbols请依sample code需要自行增加

Settings / Tool Settings / SDCC Compiler /Directories要加入SDCC include路径

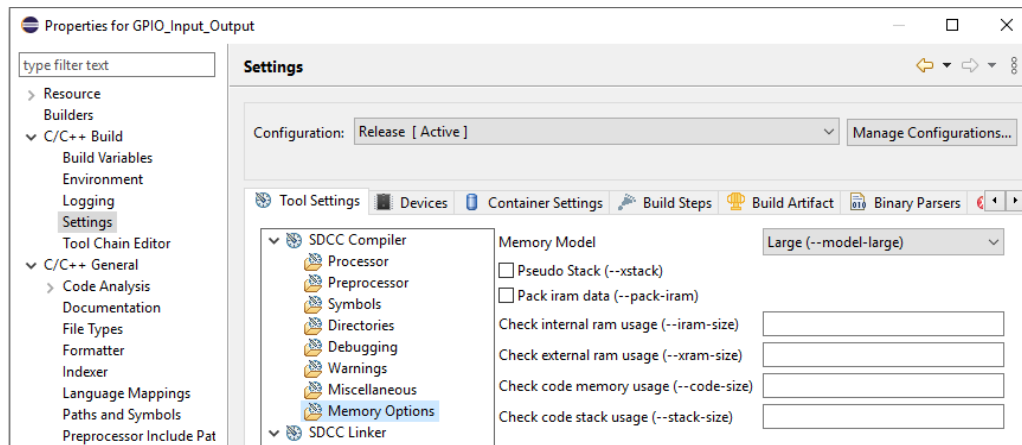
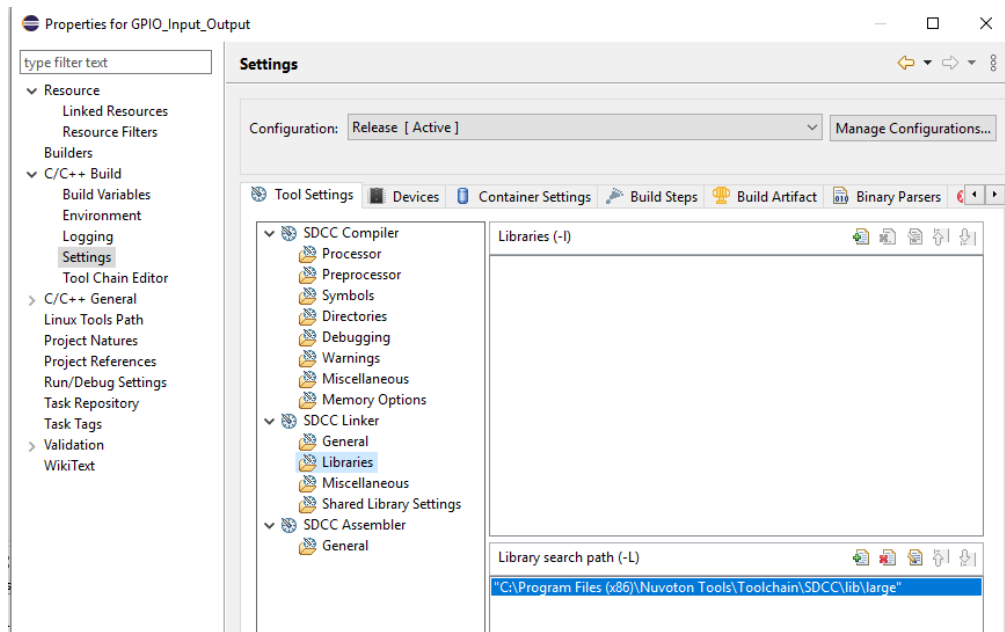
C:\Program Files (x86)\Nuvoton Tools\Toolchain\SDCC\include



c. Directories/ Tool Settings / SDCC Compiler / Symbols 写Define

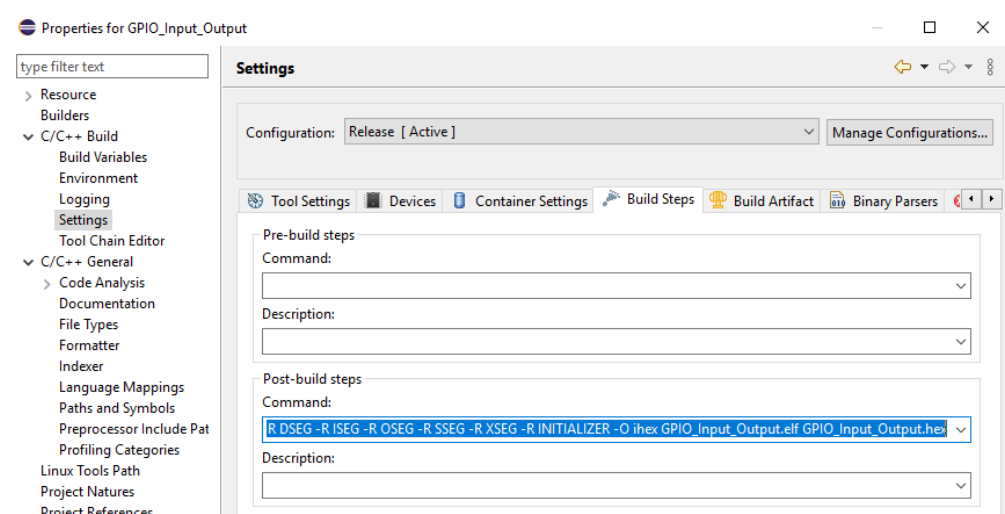


d. Directories/ Tool Settings / SDCC Linker / Library 需要依照Directories/ Tool Settings / SDCC Compiler / Memory Options 设置 SMALL OR LARGE



e. Build Steps要加入产生hex檔的command，elf和hex檔名请依自己的project名更改

arm-none-eabi-objcopy -R REG_BANK_0 -R REG_BANK_1 -R REG_BANK_2 -R REG_BANK_3 -R BSEG -R DSEG -R ISEG -R OSEG -R SSEG -R XSEG -R XISEG -R INITIALIZER -O ihex \${ProjName}.elf \${ProjName}.hex;Hex2bin \${ProjName}.hex



f. Code Analysis取消红框的两个选项

type filter text

- > Resource
- Builders
- ▼ C/C++ Build
 - Build Variables
 - Environment
 - Logging
 - Settings
 - Tool Chain Editor
- ▼ C/C++ General
 - > **Code Analysis**
 - Documentation
 - File Types
 - Formatter
 - Indexer
 - Language Mapping
 - Paths and Symbols
 - Preprocessor Inclusion
 - Profiling Categories
- Linux Tools Path
- Project Natures
- Project References
- Run/Debug Settings
- Task Repository
- Task Tags
- > Validation
- WikiText

Code Analysis

☐ Use workspace settings ☒ Use project settings [Configure Workspace Settings...](#)

Problems

type filter text

Name	Severity
<input checked="" type="checkbox"/> Suspicious semicolon	Warning
<input type="checkbox"/> Symbol shadowing	Warning
<input checked="" type="checkbox"/> Unused function declaration	Warning
<input checked="" type="checkbox"/> Unused return value	Error
<input checked="" type="checkbox"/> Unused static function	Warning
<input checked="" type="checkbox"/> Unused variable declaration in file	Warning
<input type="checkbox"/> Virtual method call in constructor/c	Error
▼ <input type="checkbox"/> Security Vulnerabilities	
<input type="checkbox"/> Format String Vulnerability	Warning
▼ <input checked="" type="checkbox"/> Syntax and Semantic Errors	
<input checked="" type="checkbox"/> Abstract class cannot be instantiated	Error
<input checked="" type="checkbox"/> Ambiguous problem	Error
<input checked="" type="checkbox"/> Circular inheritance	Error
<input checked="" type="checkbox"/> Field cannot be resolved	Error
<input checked="" type="checkbox"/> Function cannot be resolved	Error
<input checked="" type="checkbox"/> Invalid arguments	Error
<input checked="" type="checkbox"/> Invalid overload	Error
<input checked="" type="checkbox"/> Invalid redeclaration	Error
<input checked="" type="checkbox"/> Invalid redefinition	Error
<input checked="" type="checkbox"/> Invalid template argument	Error
<input checked="" type="checkbox"/> Label statement not found	Error
<input checked="" type="checkbox"/> Member declaration not found	Error
<input checked="" type="checkbox"/> Method cannot be resolved	Error
<input type="checkbox"/> Symbol is not resolved	Error
<input type="checkbox"/> Type cannot be resolved	Error

3 DEBUG 模式设置

3.1 进入Debug 模式

3.1.1 必须使用 GDB Nuvoton Nu-link Debugging 选项

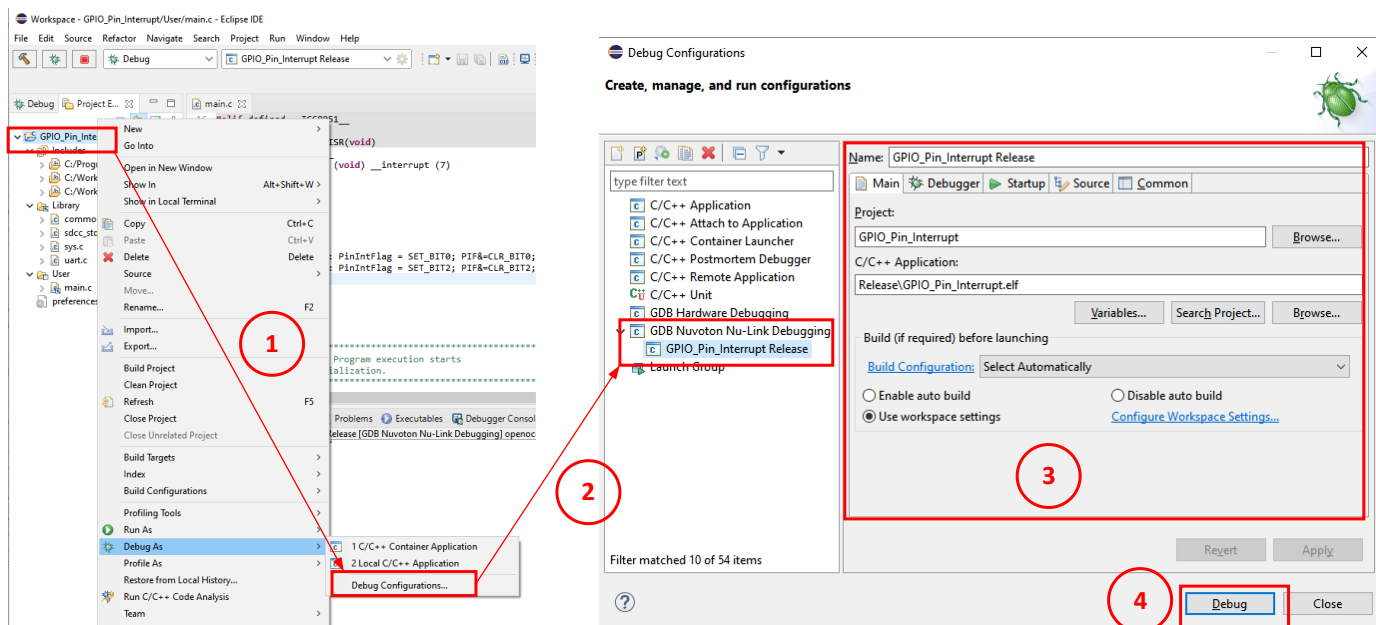
第一次开启debug 模式，不得直接debug 按钮

我们建议始终使用“调试配置 > GDB Nuvoton Nu-link 调试”选项来启用调试模式。



进入debug环境步骤:

1. 右键点选project名，显示下拉菜单。
2. 选择“Debug As” 开启“Debug Configurations” 对话框。
3. 双击“GDB Nuvoton Nu-link Debugging” 项目，产生“Project_name Release” 页面
4. 检查debug 对应所需内容正确后，点选 “Debug” 按钮，开启debug模式。



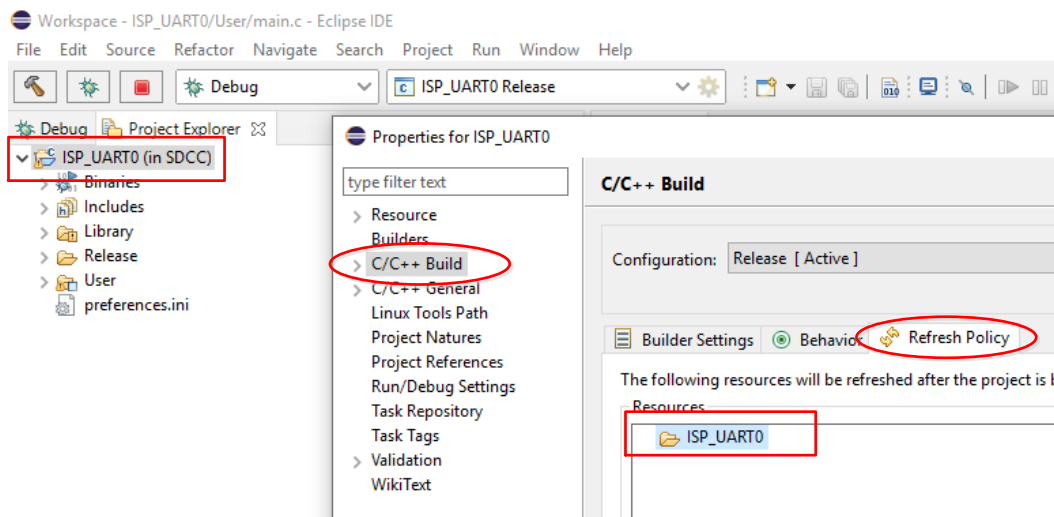
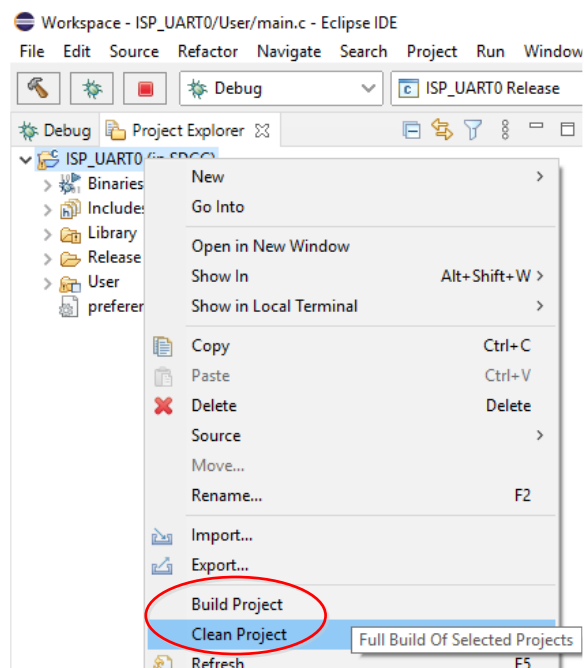
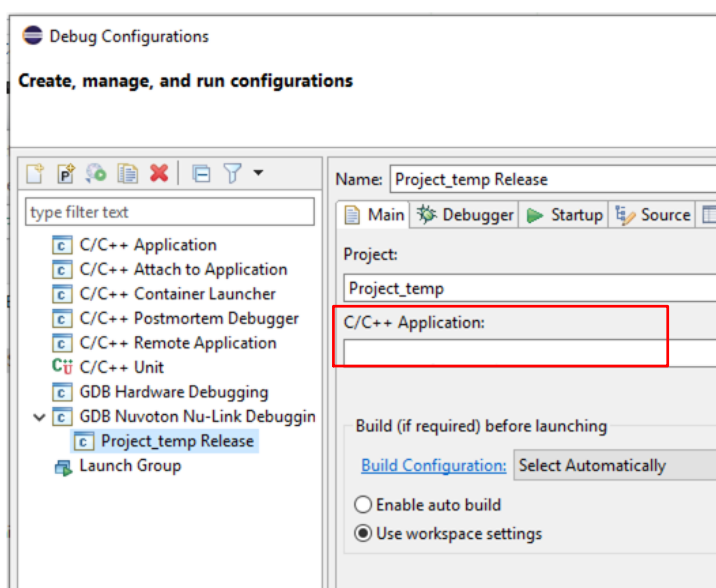
3.2 需要确认的Debug选项

3.2.1 Debug mode 未显示正确的.elf

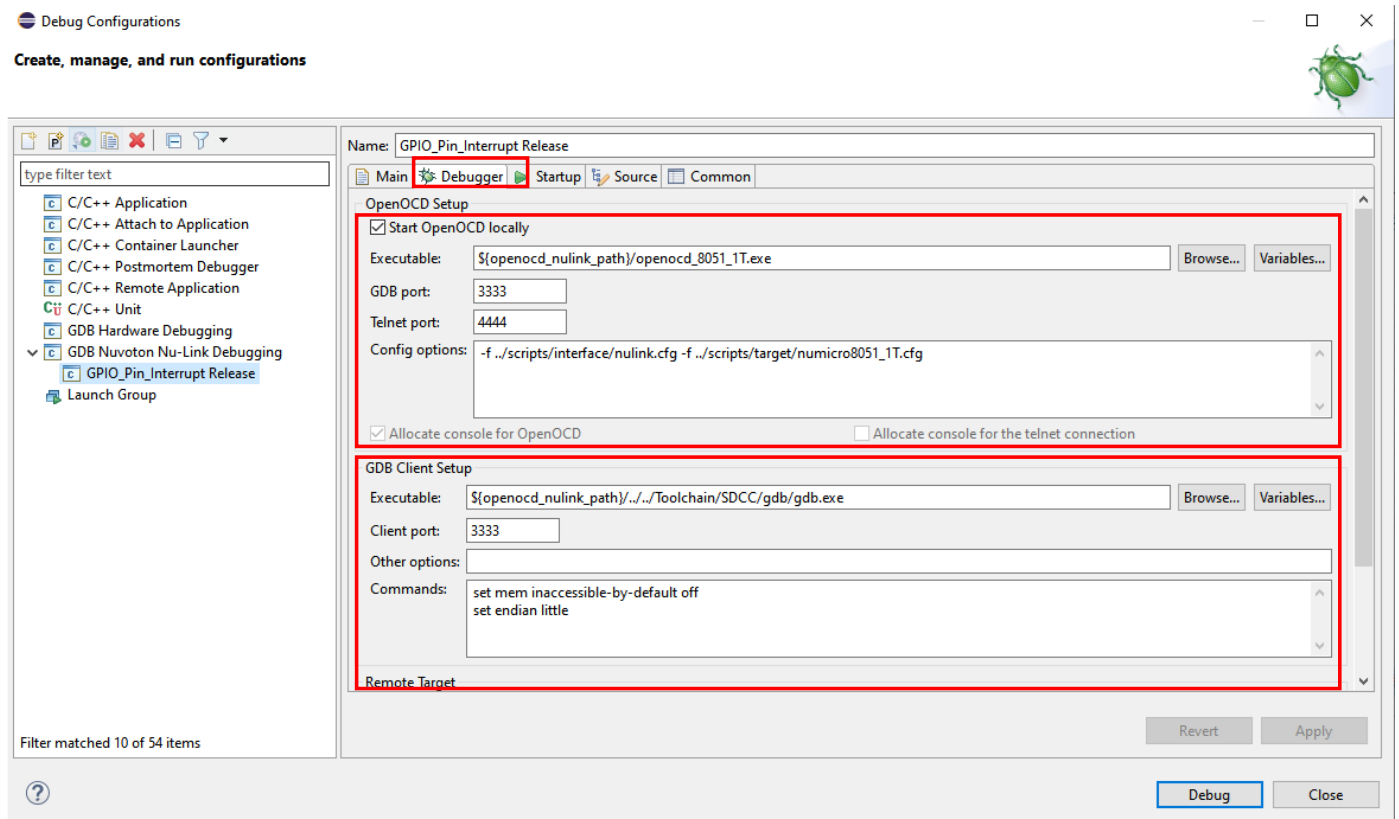
确保在每次进入调试模式之前，确认“C/C++ Application”配置框中“<project_name>.elf”文件名正确显示。

如果没有这个文件，则需要执行以下步骤。

- 删除“Project_name Release” 标签，双击“GDB Nuvoton Nu-Link Debugging” 标签，重新产生“Project_name Release”标签页
- 如果始终无法显示正确的.elf 文件名，点选“Clean Project” 并再次 Build Project直至没有error。若始终build有错误，建议参考[章节4.4Build](#) 需要确认的内容。
- 确认project “Refresh Policy” 建立正确，名字与Project一致。



3.2.2 检查 Debugger Commands 页面内容



3.2.3 完整下载代码

进入debug 模式展示的消息窗口，需要确认下载完整。当出现如下错误讯息，请检查如下几点

- 电脑仅连接一支NuLink装置，并确认目标芯片正确连接。
- 没有打开其他的NuLink连接软体。例如ICP-programmer，KeillAR 等debug环境，或是Pin View。

```
Info : IDCODE: 0x00FF0000
Warn : NuMicro flash driver: Failed to detect a known part
undefined debug reason 7 - target needs reset
NuMicro.cpu: target state: halted
target halted due to debug-request, pc: 0x000fffff
numicro chip_erase complete
NuMicro.cpu: target state: halted
target halted due to debug-request, pc: 0x000fffff
```

3.3 显示变量

3.3.1 设定不同RAM区域变量内容。

注意:

NuEclipse V1.02.028 之后版本，显示不同区域参数格式有所调整。请优先确认安装版本

Version V1.02.028 及之后版本:

RAM变数位置及SFR页位置	地址调整参数
__code	(CODE address) + 0x000000
__SFR page 0	(SFRs address) + 0x100000
__SFR page 1	(SFRs address) + 0x100100
__SFR page 2	(SFRs address) + 0x100200
__SFR page 3	(SFRs address) + 0x100300
__data	(DATA address) + 0x100000
__idata	(IDATA address) + 0x210000
__xdata	(XDATA address) + 0x310000

早期版本:

RAM变数位置及SFR页位置	地址调整参数
__code	(CODE address) + 0x000000
__data	(DATA address) + 0xF0000000
__idata	(IDATA address) + 0xF1000000
__xdata	(XDATA address) + 0xF2000000

3.3.2 使用Expression window 查看变量

注意:

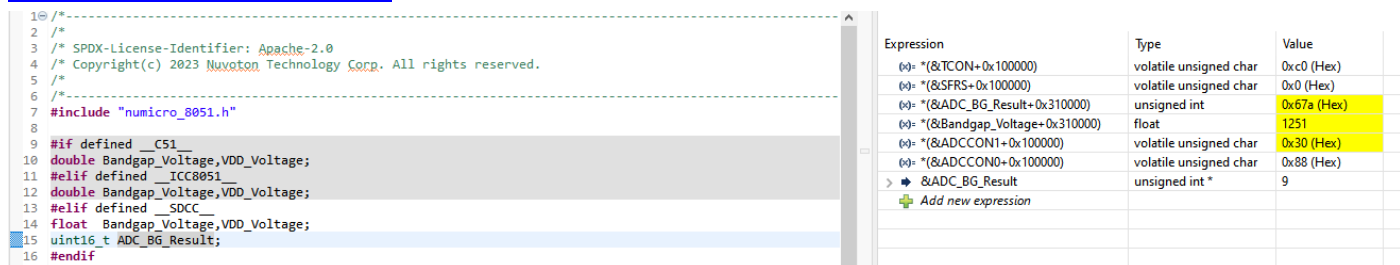
NuEclipse V1.02.028 之后版本, 需要通过窗口显示内容的变量, 必须定义为Global变量

3.3.2.1 Expression

显示变量内容: ***(&<变量名称/ 变量地址> + 地址调整参数)**

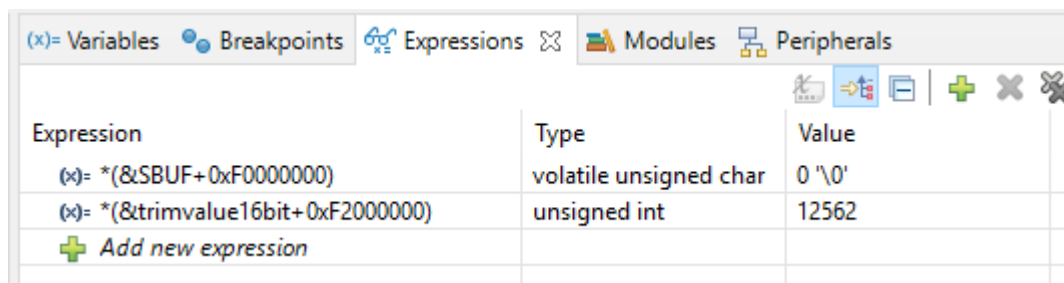
显示变量地址: **&<变量名称>**

Version V1.02.028 及之后版本:



Expression	Type	Value
(*)= *(&TC0N+0x100000)	volatile unsigned char	0xc0 (Hex)
(*)= *(&SFRS+0x100000)	volatile unsigned char	0x0 (Hex)
(*)= *(&ADC_BG_Result+0x310000)	unsigned int	0x67a (Hex)
(*)= *(&Bandgap_Voltage+0x310000)	float	1251
(*)= *(&ADCCON1+0x100000)	volatile unsigned char	0x30 (Hex)
(*)= *(&ADCCON0+0x100000)	volatile unsigned char	0x88 (Hex)
> &ADC_BG_Result	unsigned int *	9
+ Add new expression		

早期版本:

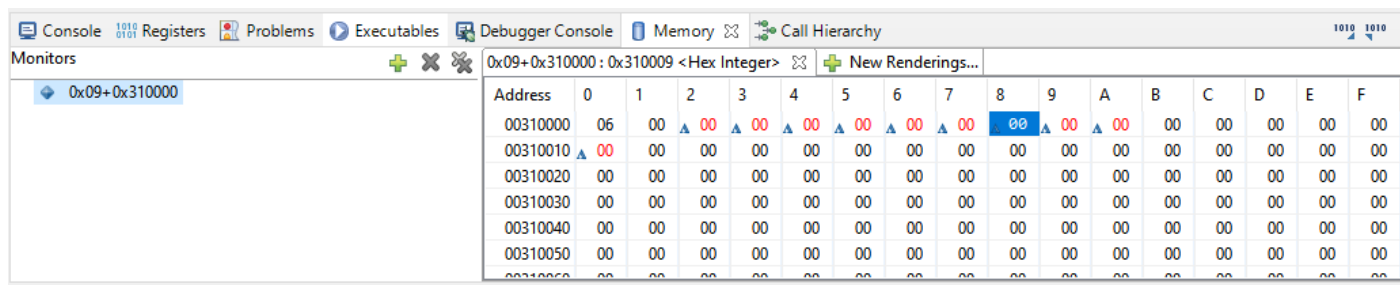


Expression	Type	Value
(*)= *(&SBUF+0xF0000000)	volatile unsigned char	0 '\0'
(*)= *(&trimvalue16bit+0xF2000000)	unsigned int	12562
+ Add new expression		

3.3.2.2 使用memory window 查看

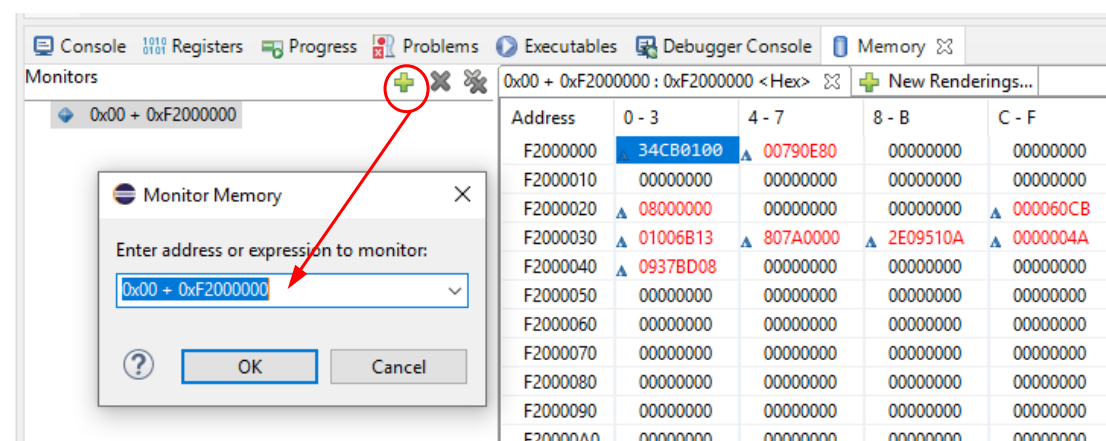
可以采用Memory 或 Memory Browse 窗口<地址> + < Data access offset define>

Version V1.02.028 及之后版本:



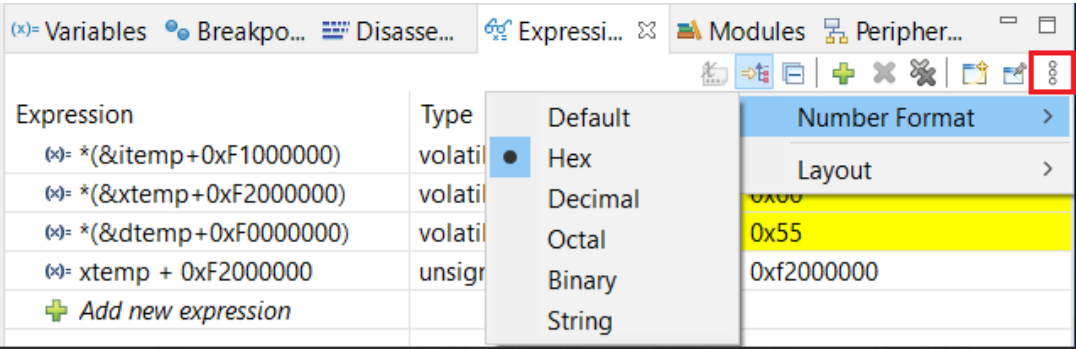
Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00310000	06	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00310010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00310020	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00310030	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00310040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00310050	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00310060	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

早期版本:



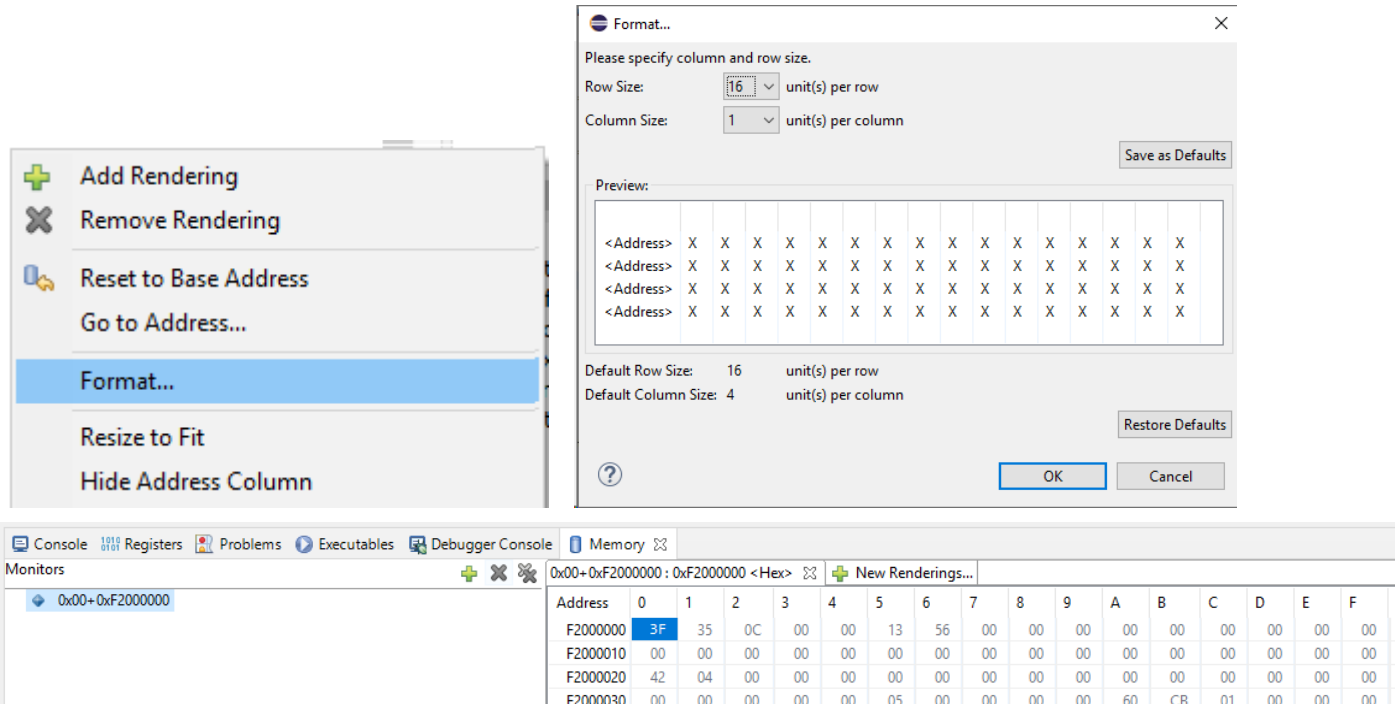
Address	0 - 3	4 - 7	8 - B	C - F
F2000000	34CB0100	00790E80	00000000	00000000
F2000010	00000000	00000000	00000000	00000000
F2000020	08000000	00000000	00000000	000060CB
F2000030	01006B13	807A0000	2E09510A	0000004A
F2000040	0937BD08	00000000	00000000	00000000
F2000050	00000000	00000000	00000000	00000000
F2000060	00000000	00000000	00000000	00000000
F2000070	00000000	00000000	00000000	00000000
F2000080	00000000	00000000	00000000	00000000
F2000090	00000000	00000000	00000000	00000000
F20000A0	00000000	00000000	00000000	00000000

3.3.2.3 变更显示格式



Memory窗口通过Format 选项更改显示方式。

右键点击Memory 窗口区域

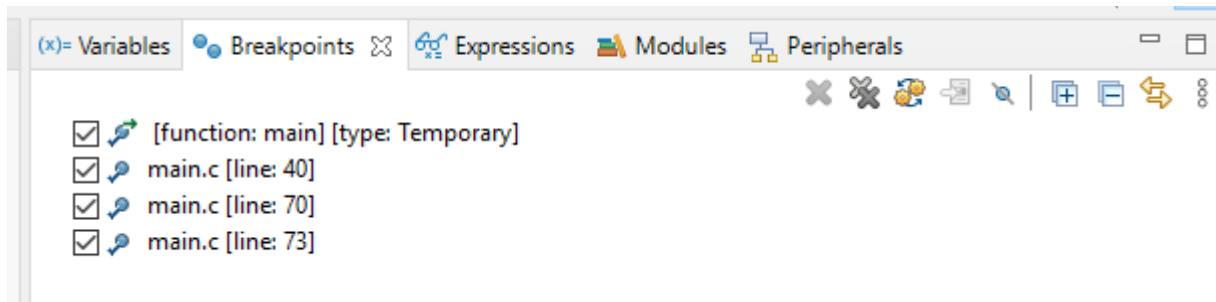


3.3.3 Break Point 设置

```
38     Bandgap_Value = (BandgapHigh<<4)+BandgapLow;  
39     Bandgap_Voltage= Bandgap_Value*3/4;  
40     clr_CHPCON_IAPEN;  
41 }  
42
```

BreakPoints 窗口列出所有已设置的列表，可通过XX删除所有breakpoint。

8051 MCU 最多设置8个break point！设置过多不会有警报，但会造成debug 环境错误。

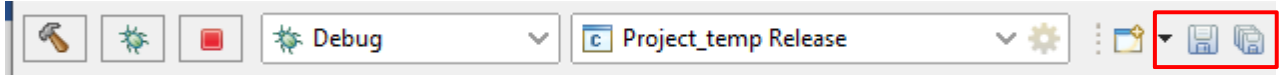


4 应用发现的问题处理方法

4.1 建议所有文件名都用小写。

4.2 Interrupt Vector 要放在main.c中，或者必须要在main.c中进行宣告。

4.3 更改过code 内容后，build 之前一定要重新存档。

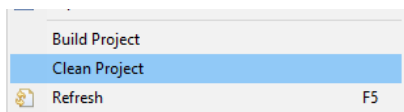


4.4 Build 需要确认的内容

若发现如下问题：例如刚导入工程后，点“Project->Build Project”没反应 / 多次点“Project->Build Project”才有反应的现象 / 首次点“Project->Build All”报错的工程，再重新点“Project->Build All”，不报错。

处理方法：任何build时发现没有完整的信息出现或无反应，點選Clear Project 清除project 记录

每次重新Build Project之前都要进行Clean Project 步骤



删除project 文件夹内 .setting / Release 文件夹，再重新Build Project直至 0 error 0 warning 字样出现，并检查 sdcc – debug out所有关联.c file都有 .rel 产生。

```
Building target: ADC_Bandgap_VDD.elf
Invoking: SDCC Linker
sdcc --debug --out-fmt-elf -L"C:\Program Files (x86)\Wuvoton Tools\Toolchain\SDCC\lib\large" -o "ADC_Bandgap_VDD.elf" ./User/main.rel ./Library/IAP.rel ./Library/bod.rel ./Library/common.rel ./Library/delay.rel
Finished building target: ADC_Bandgap_VDD.elf

make --no-print-directory post-build
arm-none-eabi-objcopy -R REG_BANK_0 -R REG_BANK_1 -R REG_BANK_2 -R REG_BANK_3 -R BSEG -R DSEG -R ISEG -R OSEG -R SSEG -R XSEG -R XISEG -R INITIALIZER -O ihex ADC_Bandgap_VDD.elf ADC_Bandgap_VDD.hex;Hex2bin ADC_Bandgap_VDD.hex
>>> ADC_Bandgap_VDD.bin Checksum = 0x9A29 <<<
>>> ADC_Bandgap_VDD.bin CRC-8 Checksum = 0xA6 <<<

10:46:23 Build Finished. 0 errors, 0 warnings. (took 11s.588ms)
```

当出现如下build 信息，也需要Clean 之后再Build

```
Console Registers Progress Problems Executables Memory Browser Debugger Console
CDT Build Console [ADC_Bandgap_VDD]
11:42:47 **** Incremental Build of configuration Release for project ADC_Bandgap_VDD ****
make -k all
make --no-print-directory pre-build
DUSE_FLOATS=1

make --no-print-directory main-build
make[1]: Nothing to be done for 'main-build'.

11:42:48 Build Finished. 0 errors, 0 warnings. (took 937ms)
```

Project pre build command “ make -k clean “ 协助进行clean的动作，同时也要请确认Settings页面都正常存在。

