ĐẠI HỌC QUỐC GIA TP.HỒ CHÍ MINH
TRƯỜNG ĐẠI HỌC BÁCH KHOA
KHOA ĐIỆN-ĐIỆN TỬ
BỘ MÔN KỸ THUẬT ĐIỆN TỬ

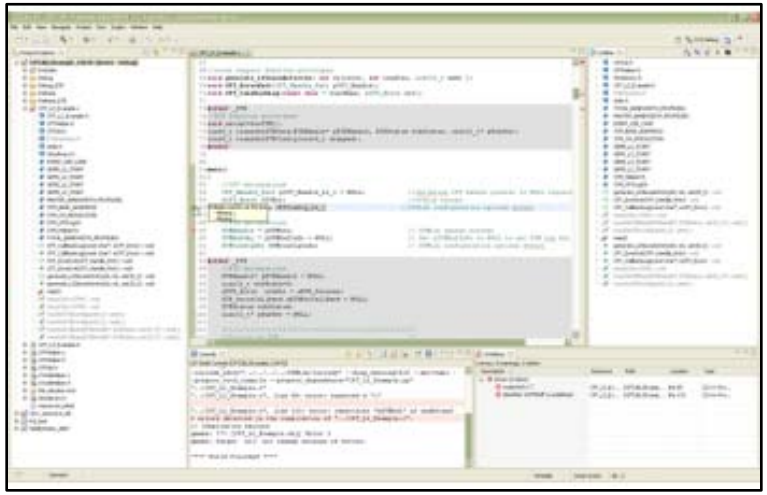
Embedded System Design

Chapter 4: Development Tools

1. Code Composer Studio
2. Keil Tools by ARM

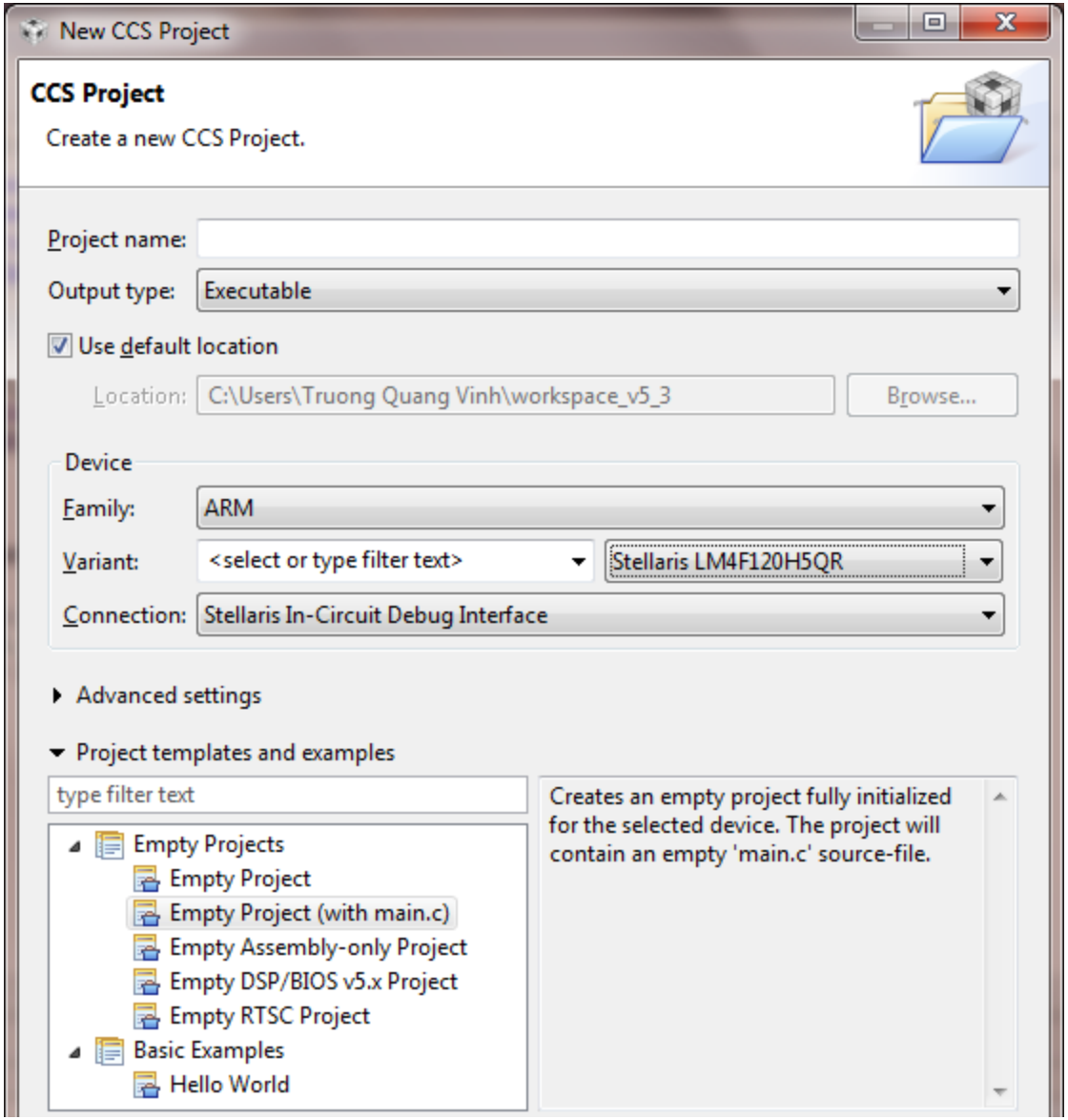
1. Code Composer Studio - Overview

- Code Composer Studio™ (CCStudio) is an integrated development environment (IDE) for Texas Instruments (TI) **embedded processor families**.
- CCStudio comprises a suite of tools used to develop and debug **embedded applications**



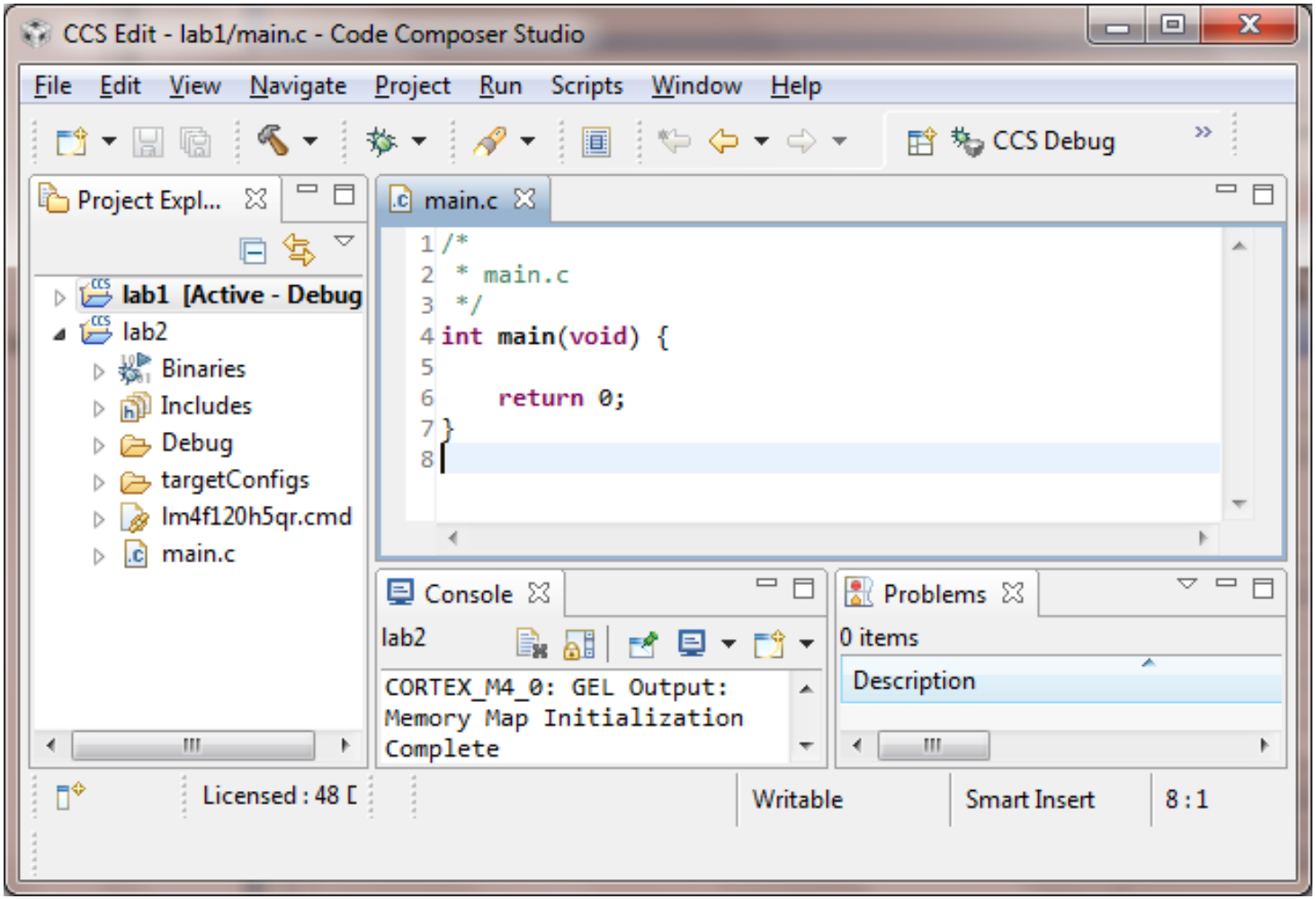
1. Code Composer Studio – Create a project

- Create new project
  - Family: ARM
  - Variant: LM4F120H5QR
  - Connection: ICDI
  - Project templates: Empty project



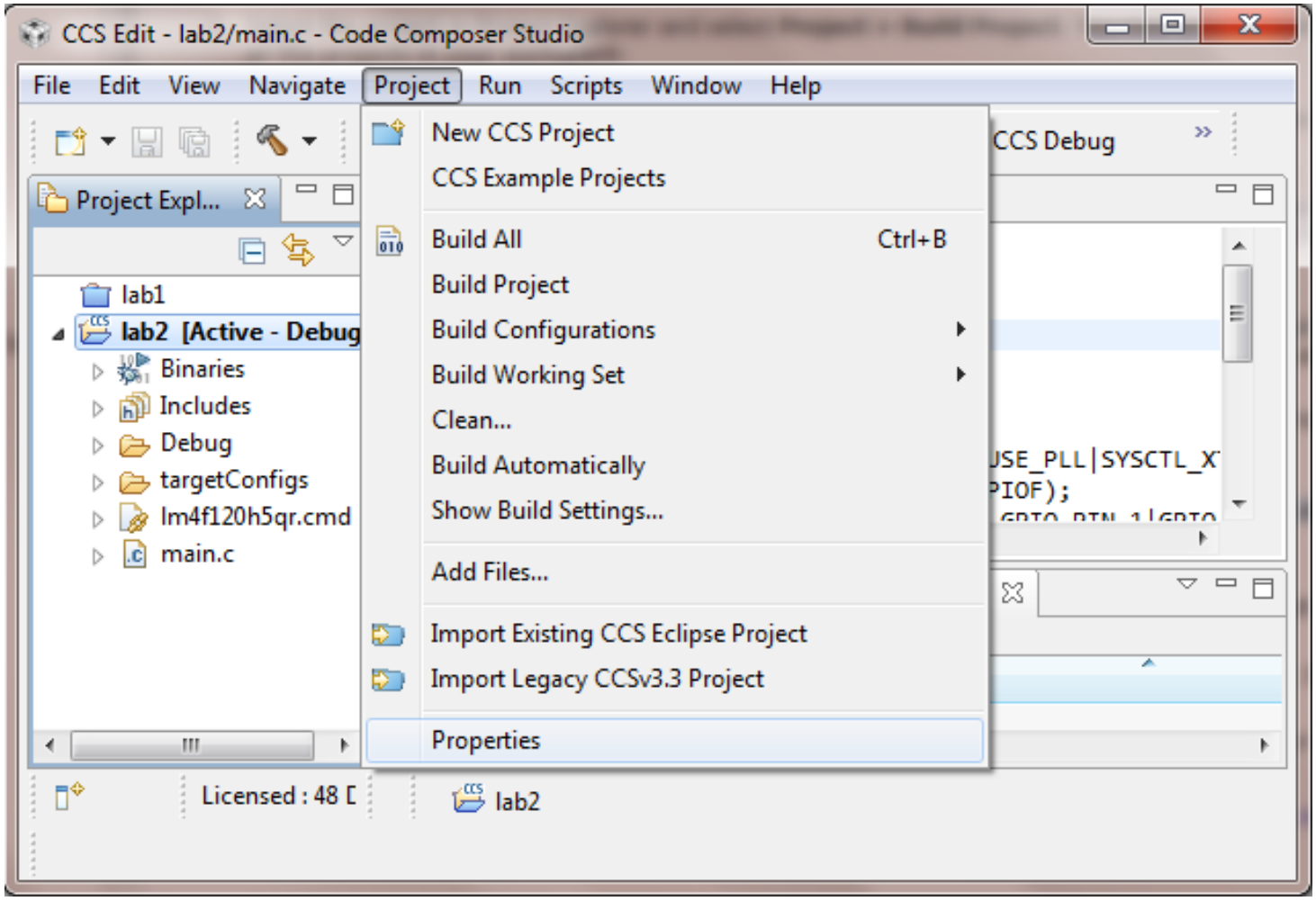
1. Code Composer Studio – Project view

- C/C++ Projects view



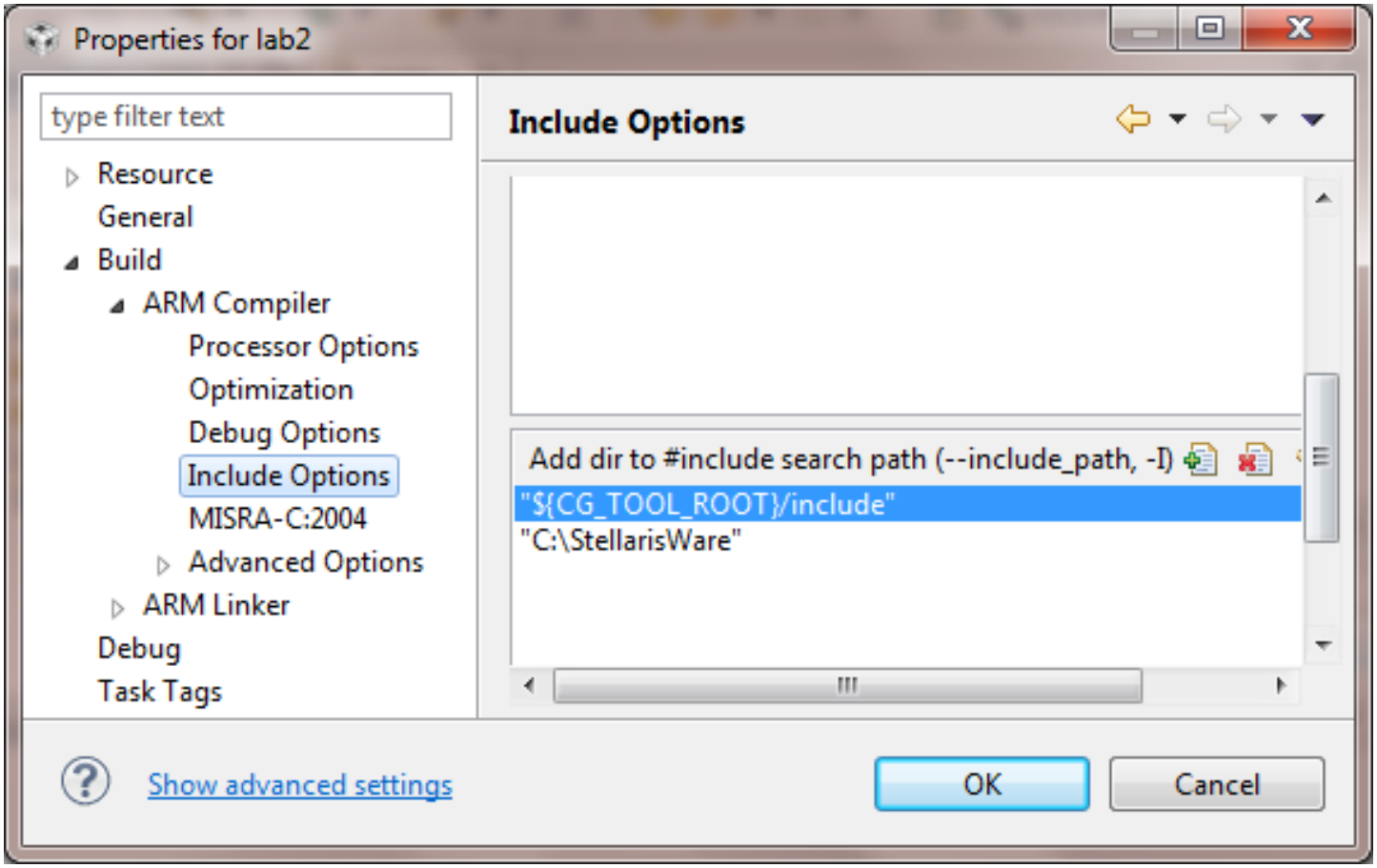
1. Code Composer Studio – Properties

- Setup properties…



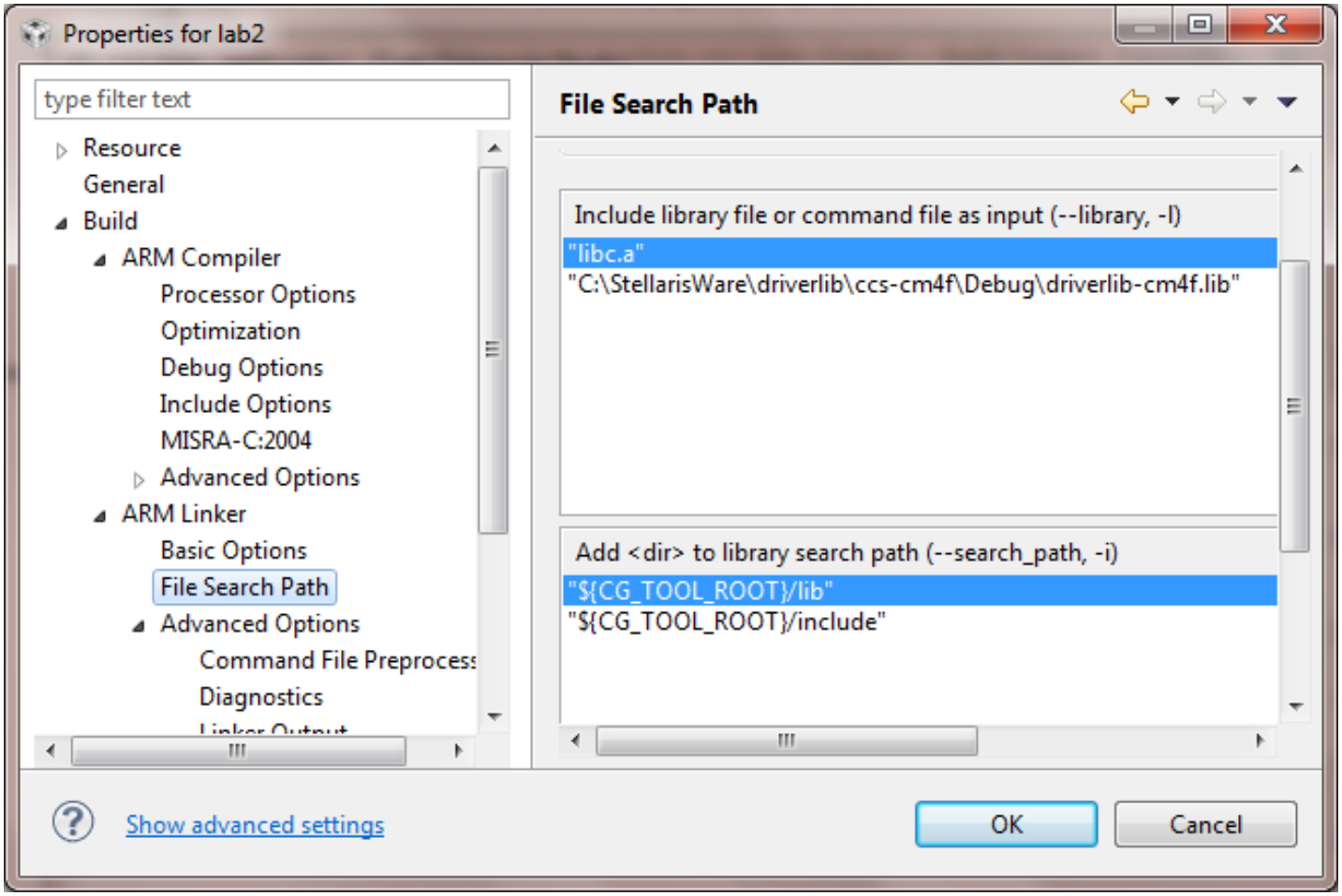
1. Code Composer Studio – Properties

- Include options:
  - C:\StellarisWare



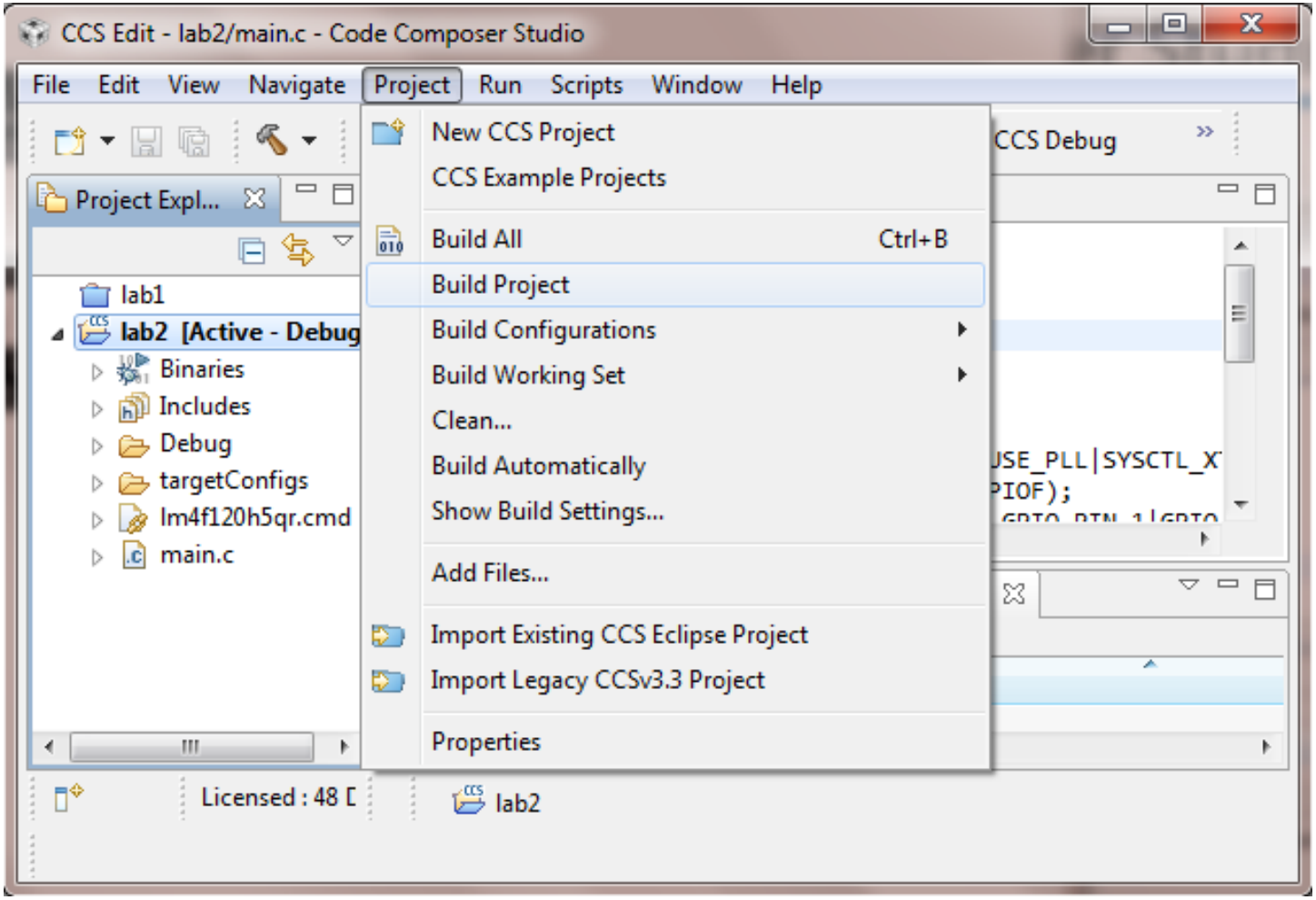
1. Code Composer Studio – Properties

- File Search Path
  - Driverlib-cm4f.lib



1. Code Composer Studio – Build a project

- Build your project



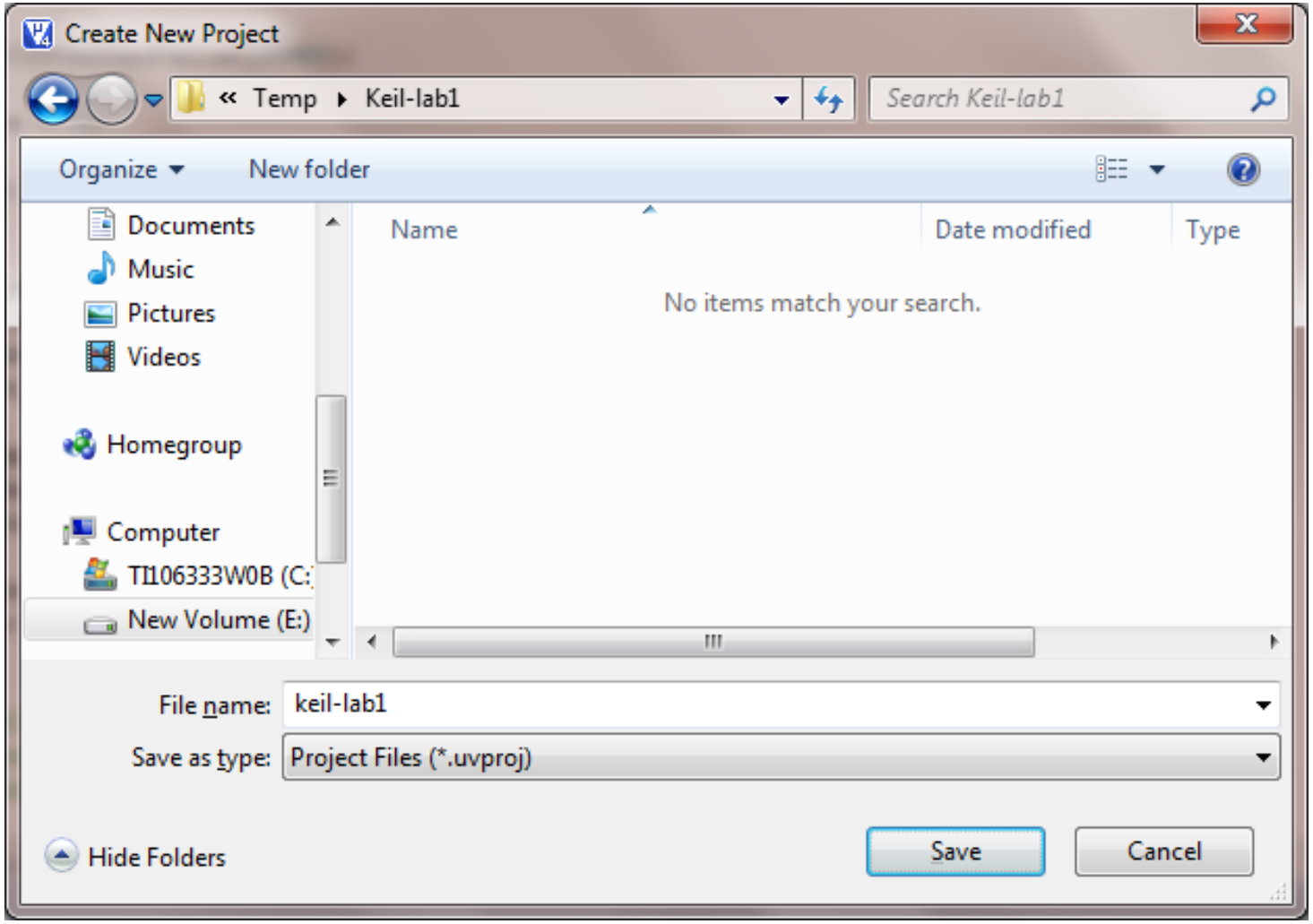
1. Code Composer Studio – Debug

Image	Name	Description	Availability
	New Target Configuration	Creates a new target configartion file.	File New Menu Target Menu
	Debug	Opens a dialog to modify existing debug configurations. Its drop down can be used to access other launching options.	Debug Toolbar Target Menu
	Connect Target	Connect to hardware targets.	TI Debug Toolbar Target Menu Debug View Context Menu
	Terminate All	Terminates all active debug sessions.	Target Menu Debug View Toolbar

2. Keil Tools by ARM

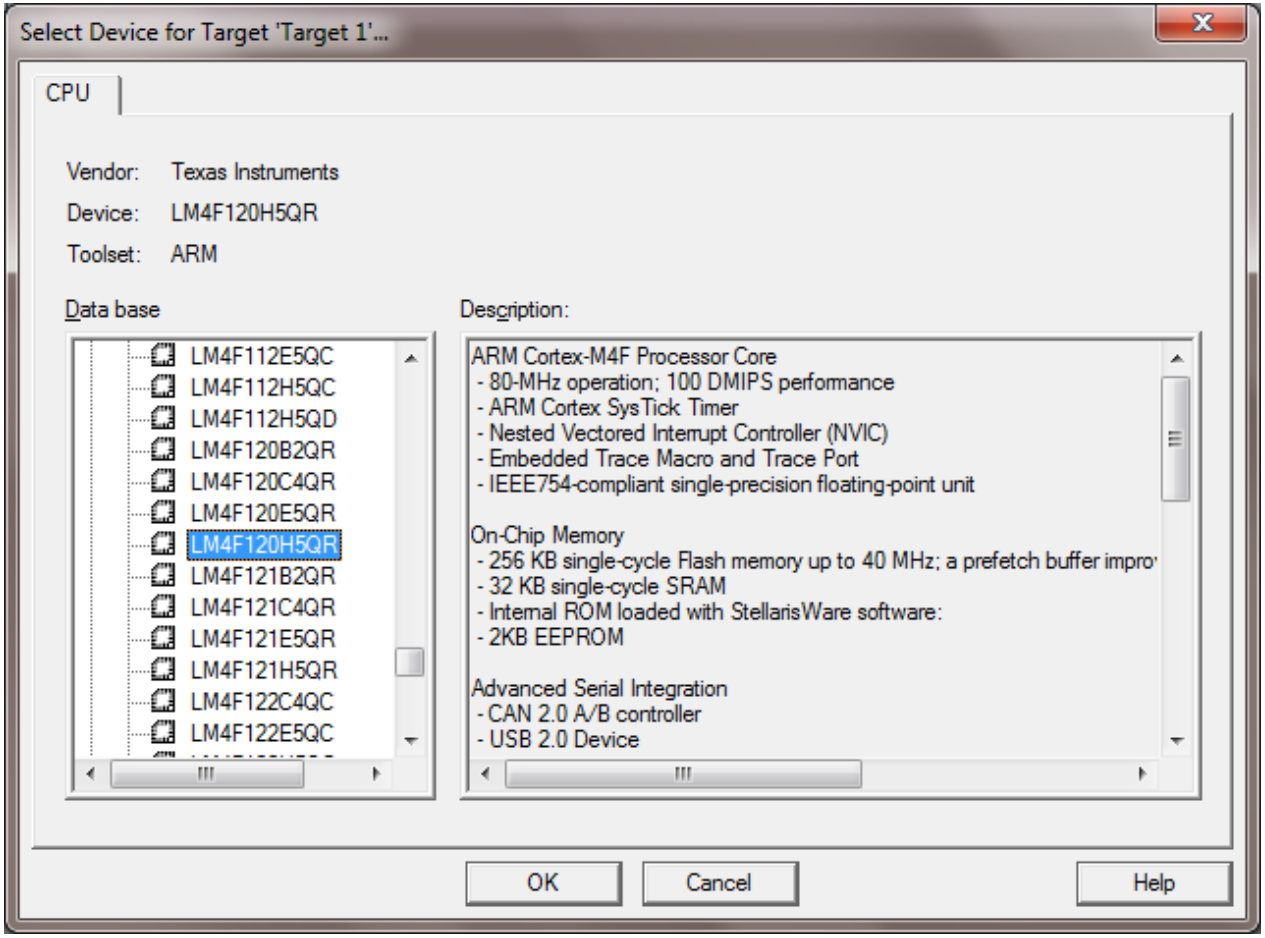
- The Keil products from ARM support over 700 of the most popular ARM microcontrollers.
  - Includes RealView® Compilation Tools including C/C++ Compiler, Macro Assembler, and Linker
  - Includes Debuggers, Real-time Kernels, Single-board Computers, and Emulators
  - All tools are integrated into µVision which provides interfaces to ULINK and other third-party debug adapters.

2. Keil Tools by ARM – Create a project



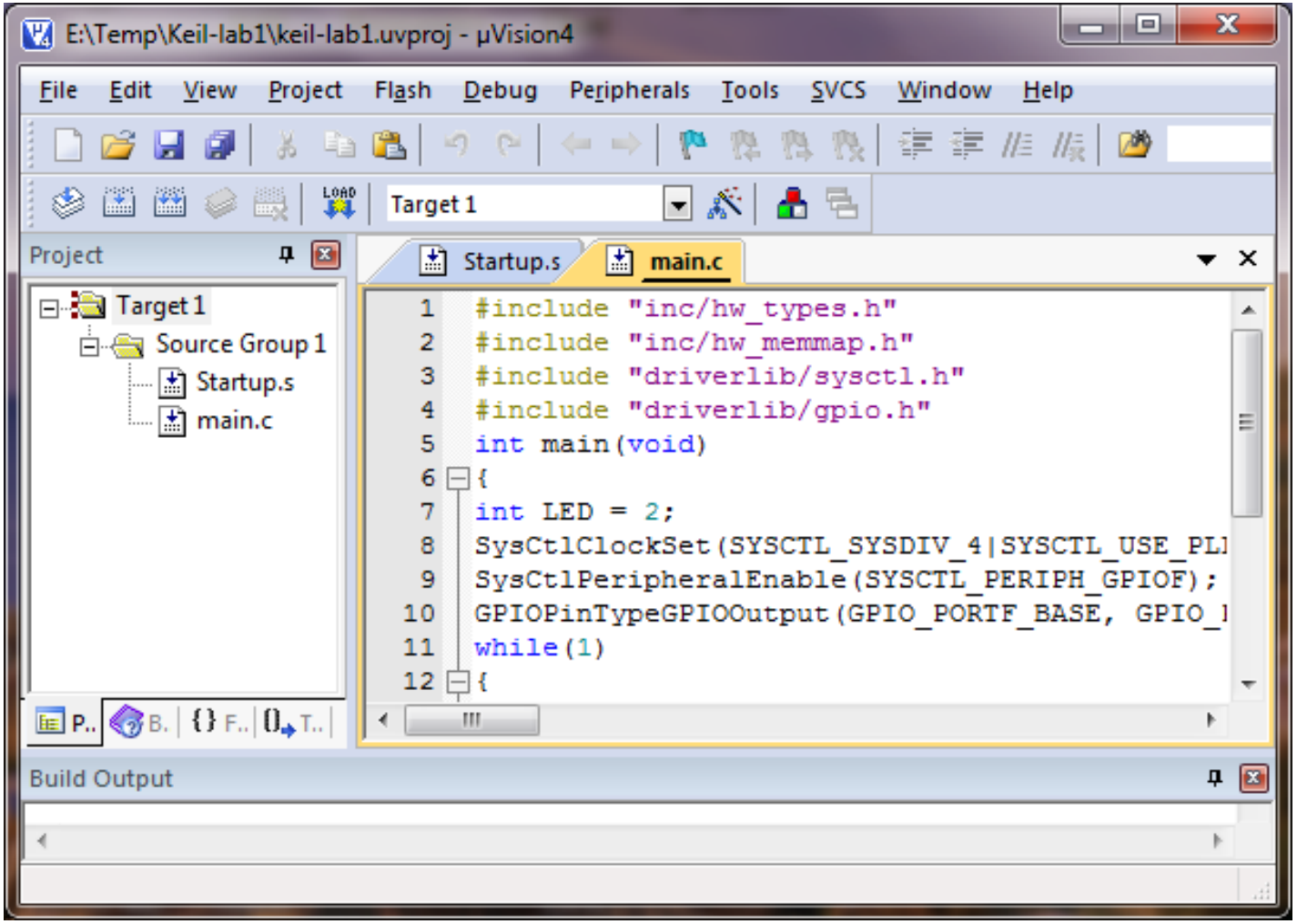
2. Keil Tools by ARM – Select device

- Vendor: Texas Instruments
- Device: LM4F120H5QR



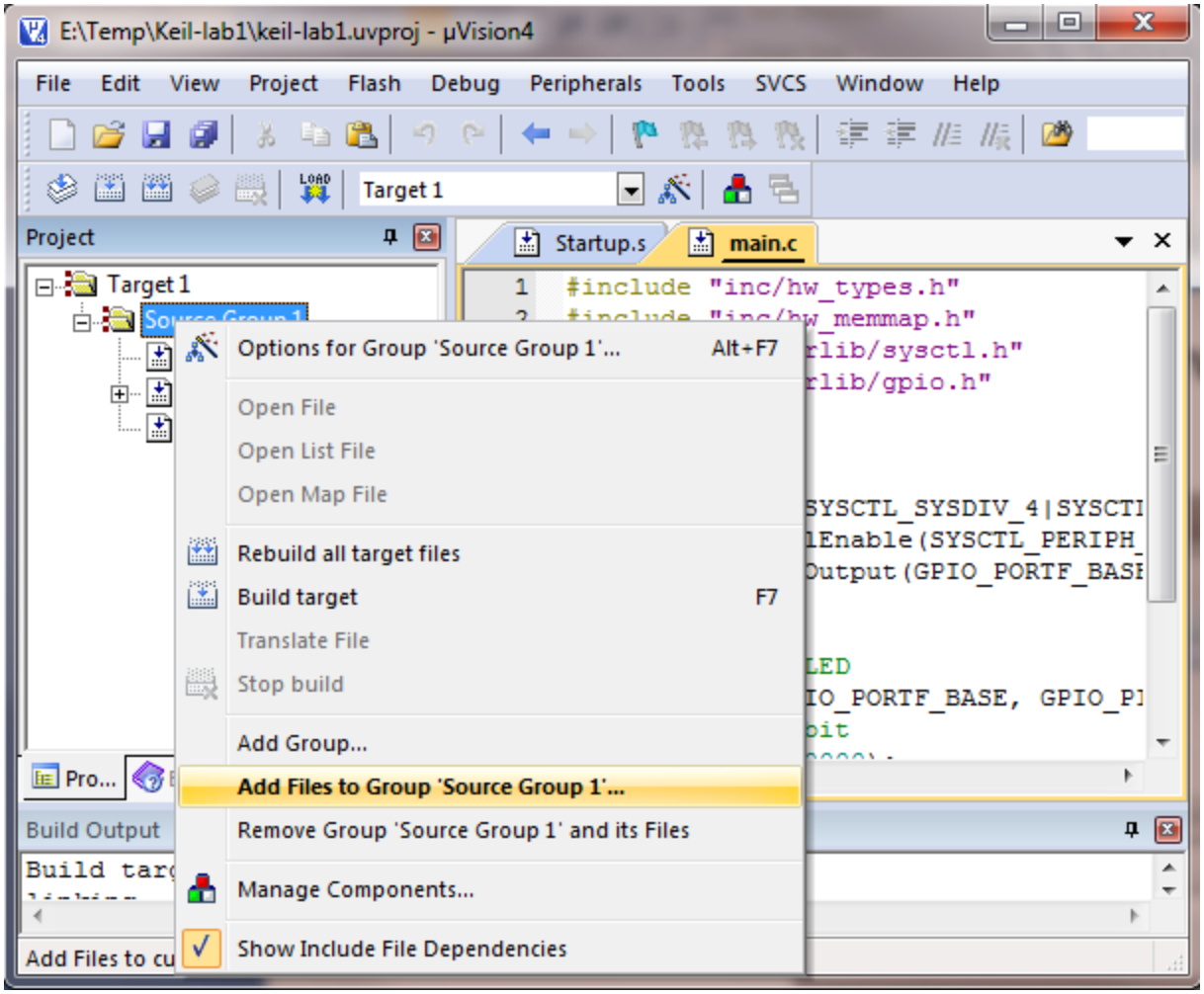
2. Keil Tools by ARM – Add files

- Add **main.c**



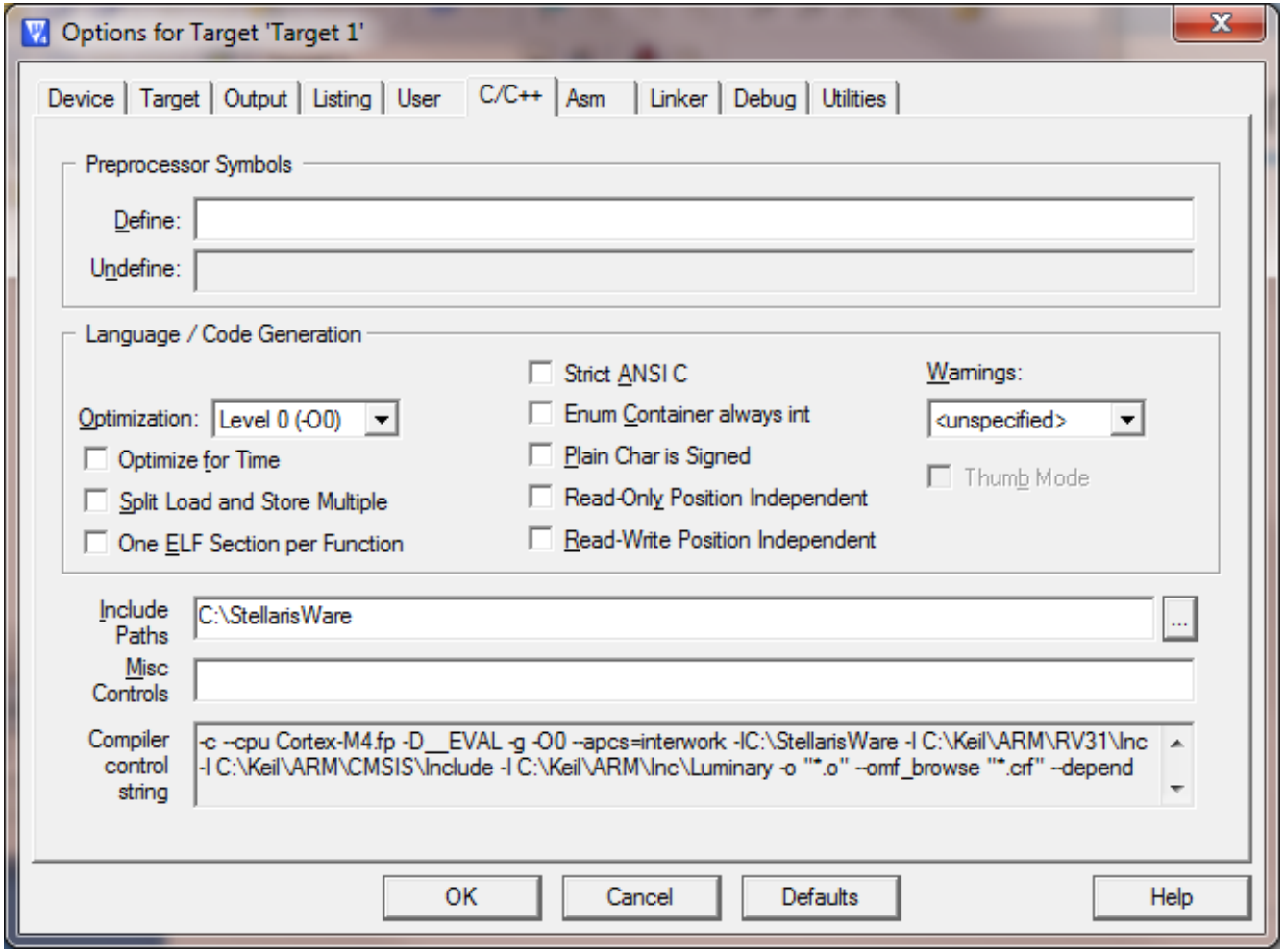
2. Keil Tools by ARM – Add files

- Add **C:\StellarisWare\driverlib\rvmdk-cm4\driverlib-cm4f.lib**

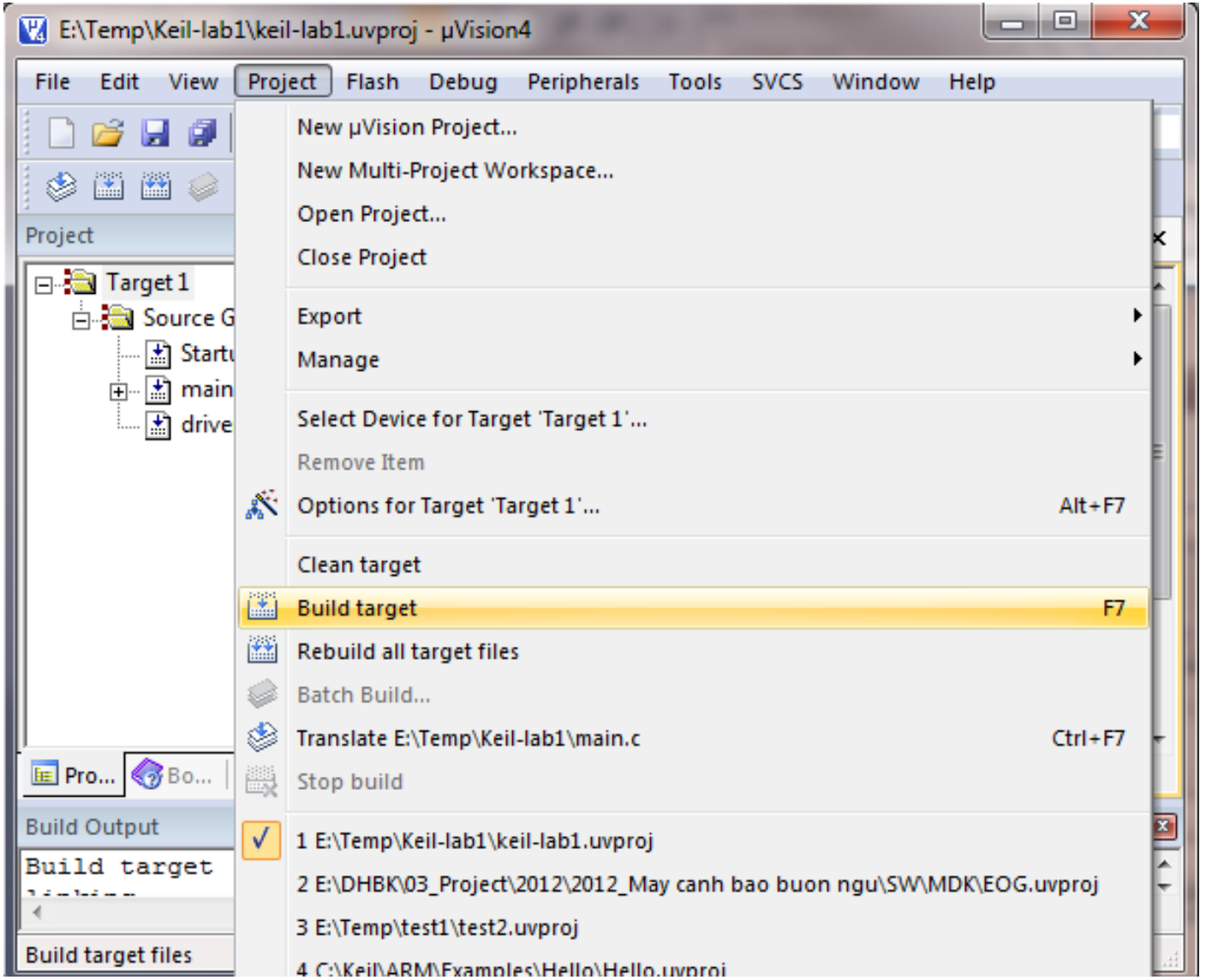


2. Keil Tools by ARM – Options

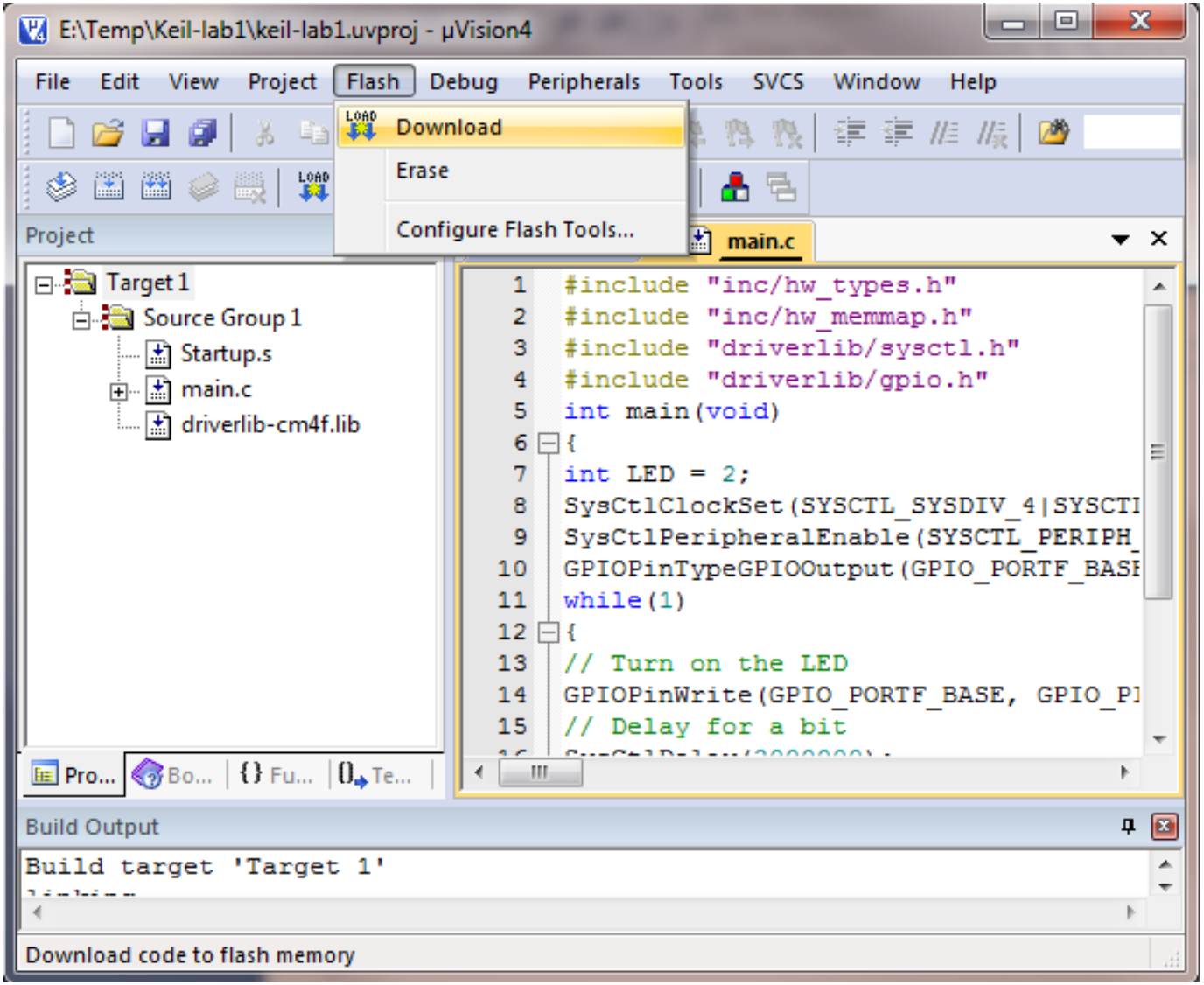
- Include Paths: C:\StellarisWare



2. Keil Tools by ARM – Build target

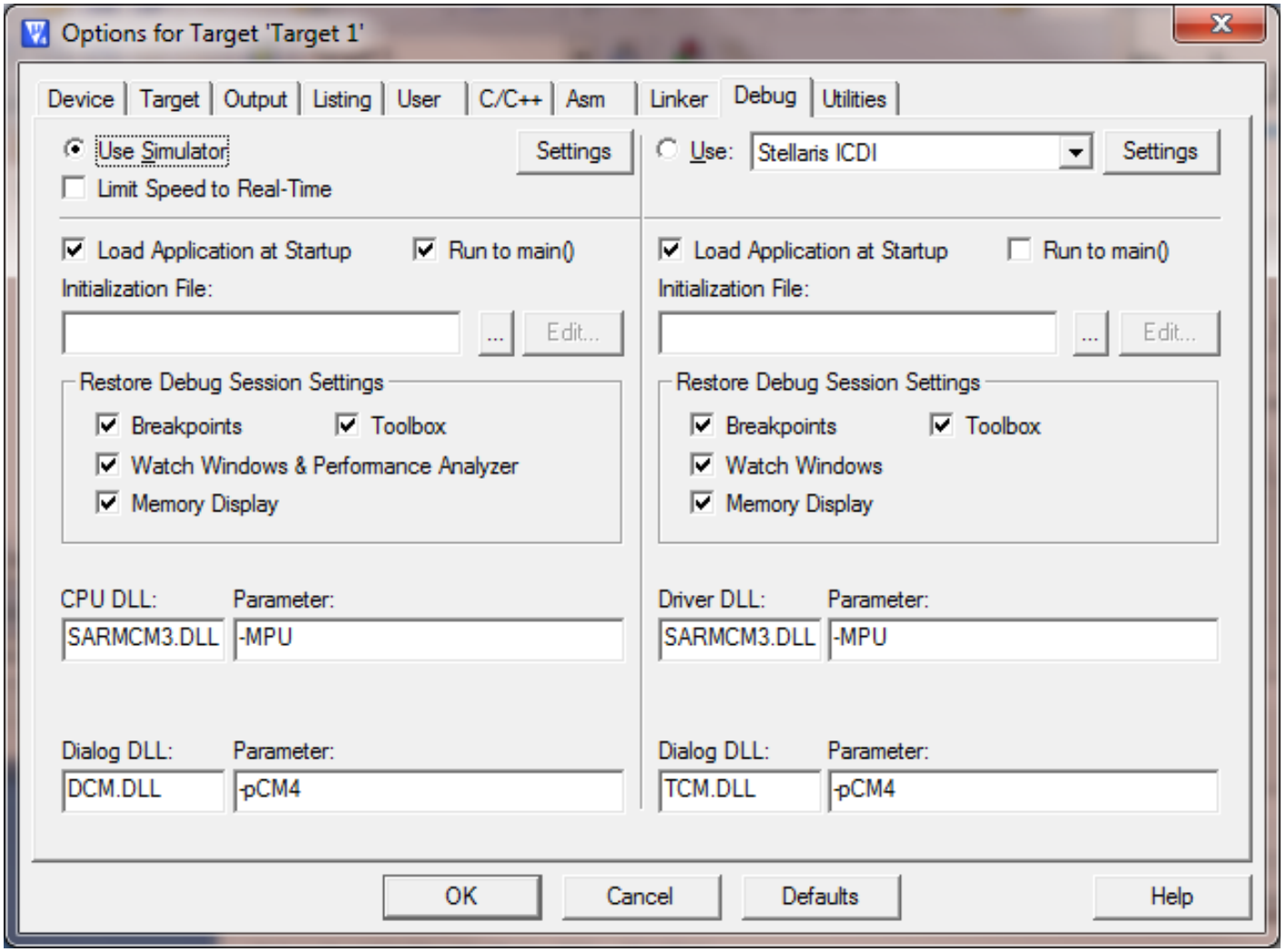


2. Keil Tools by ARM – Run on Kit

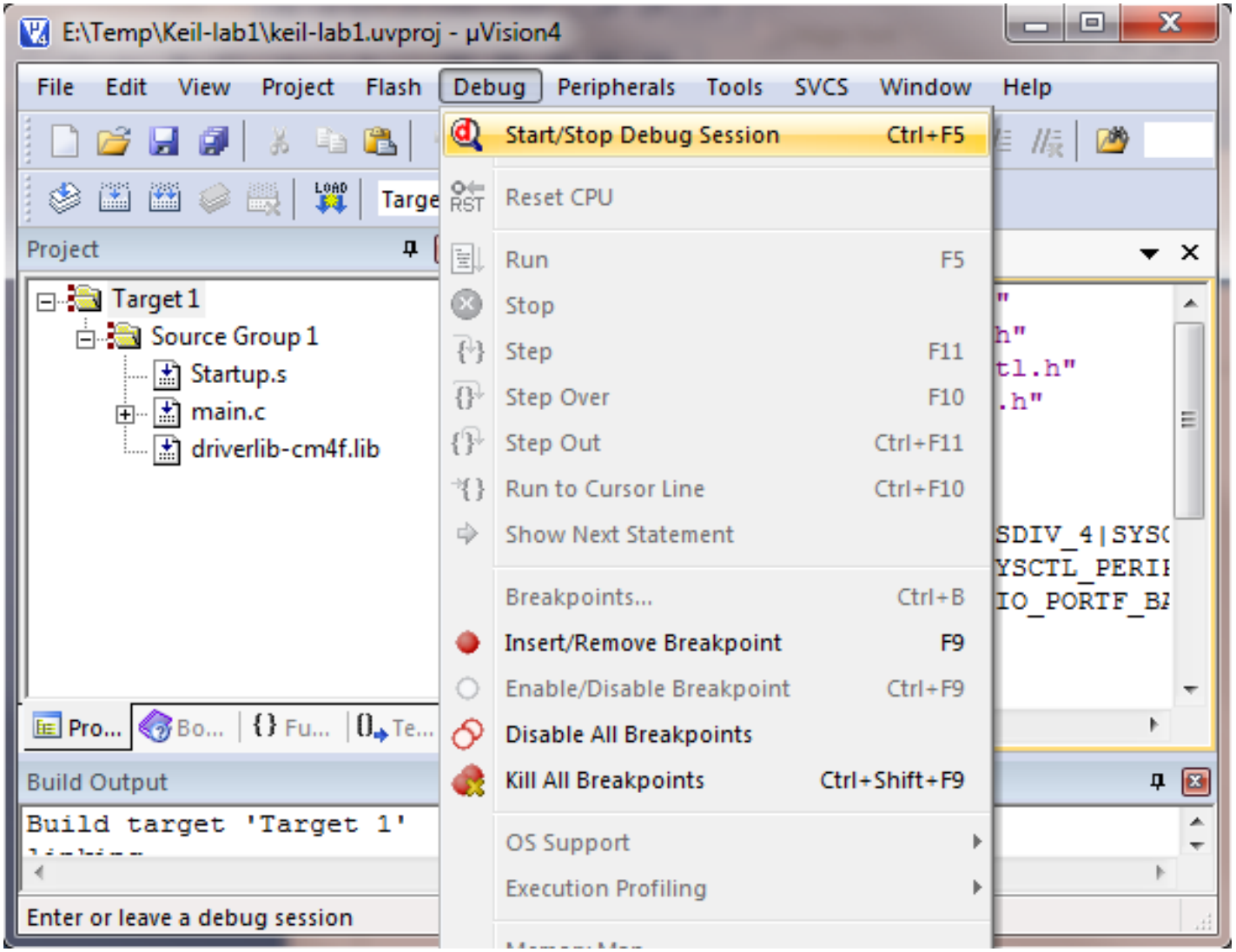


2. Keil Tools by ARM – Debug

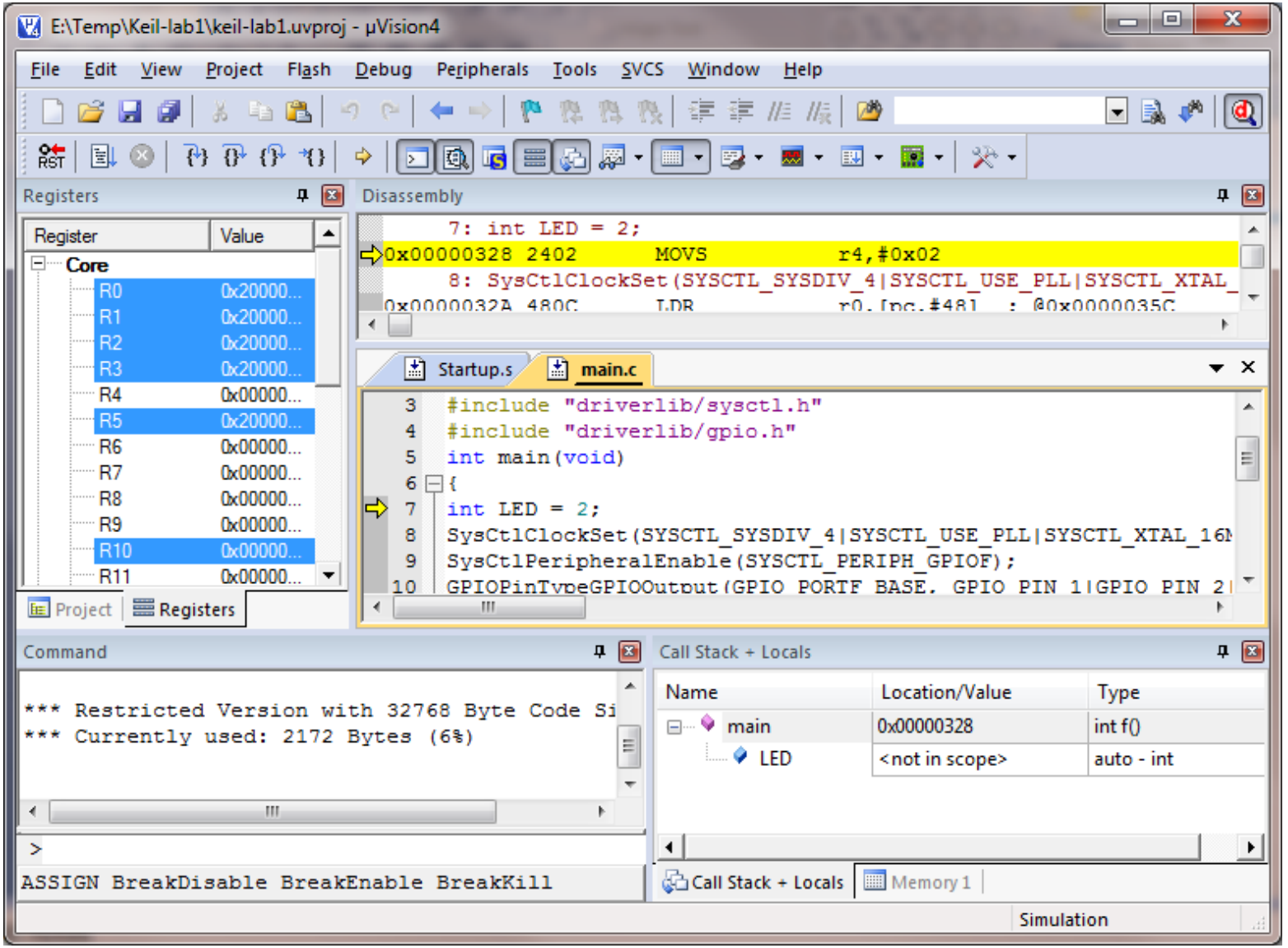
- Use Simulator or Use Stellaris ICDI



2. Keil Tools by ARM – Debug



2. Keil Tools by ARM – Simulation



Sample Codes

```
#include "inc/hw_memmap.h“
#include "inc/hw_types.h“
#include "driverlib/gpio.c“
#include "driverlib/sysctl.h“
unsigned int i;
int main()
{
    //Enable GPIO Port F
    SysCtlPeripheralEnable(SYSCTL_ PERIPH_GPIOF);
     // Set pins PF3 as output.
    GPIOPinTypeGPIOOutput(GPIO_PORTF_BASE,GPIO_PIN_3);
    while(1)
    {
        GPIOPinWrite(GPIO_PORTF_BASE,GPIO_PIN_3,GPIO_PIN_3 ); //SET PF3
        for(i=0;i<1000000;i++){}; //Delay
        GPIOPinWrite(GPIO_PORTF_BASE,GPIO_PIN_3,0); //Clear PF3
        for(i=0;i<1000000;i++){}; //Delay
    }
}
```