Software Installation Guide for S32 Design Studio IDE (S32DS):

- **FRDM-KEAZ128**Q80
- **FRDM-KEAZ64**Q64
- **FRDM-KEAZN32**Q64

Ultra-Reliable MCUs for Industrial and Automotive

www.freescale.com/FRDM-KEA

Contents:

Install S32 Design Studio IDE
(step by step)

Download and Install S32 Design Studio Software

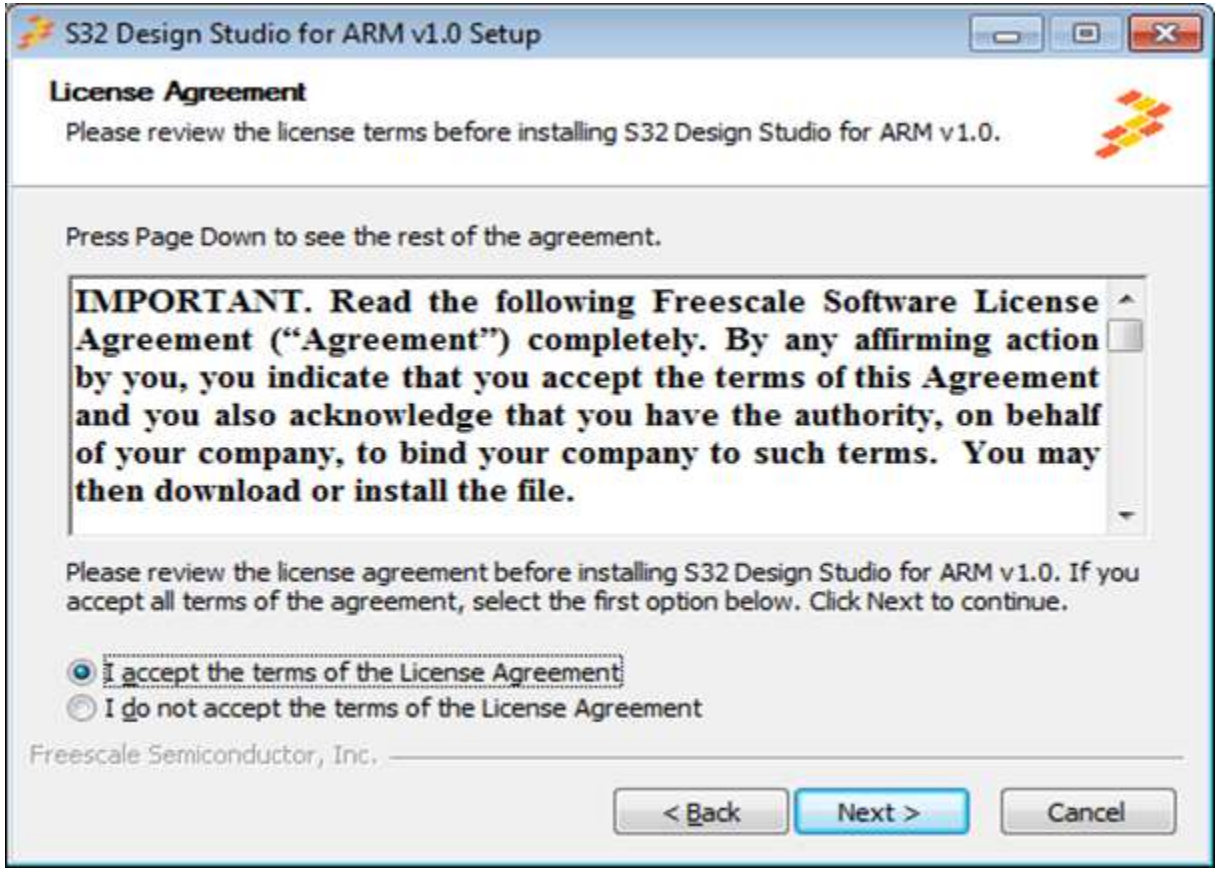
- From Downloads folder, double-click on **S32_ARM_Win32_v1.0_b150626.exe** to start installation
- Click through any administrative privilege issues resulting from unknown software publisher.

Download and Install S32 Design Studio Software

- An Installer welcome window will be displayed, click Next to continue

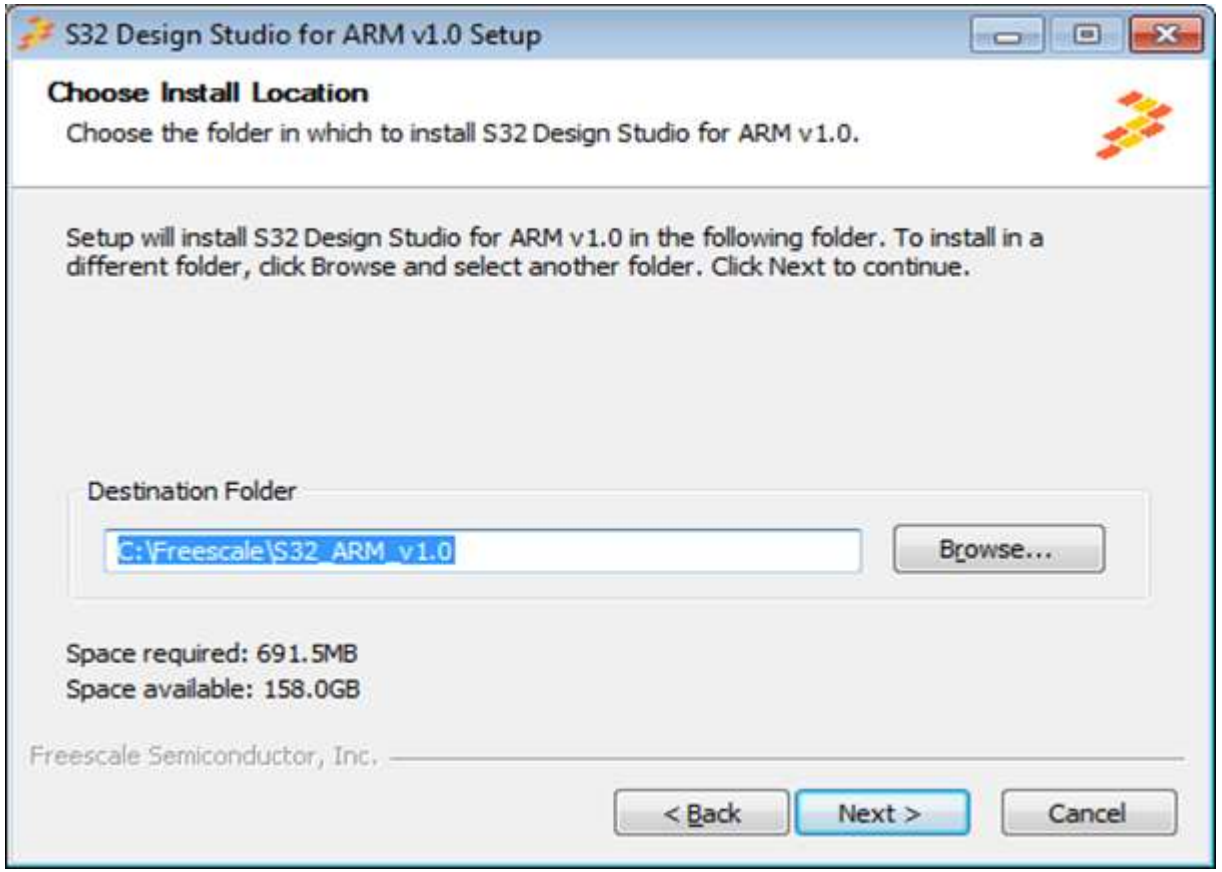
Download and Install S32 Design Studio Software

- Read license agreement, then select the radio button acknowledging the license agreement terms and click **Next** to continue.



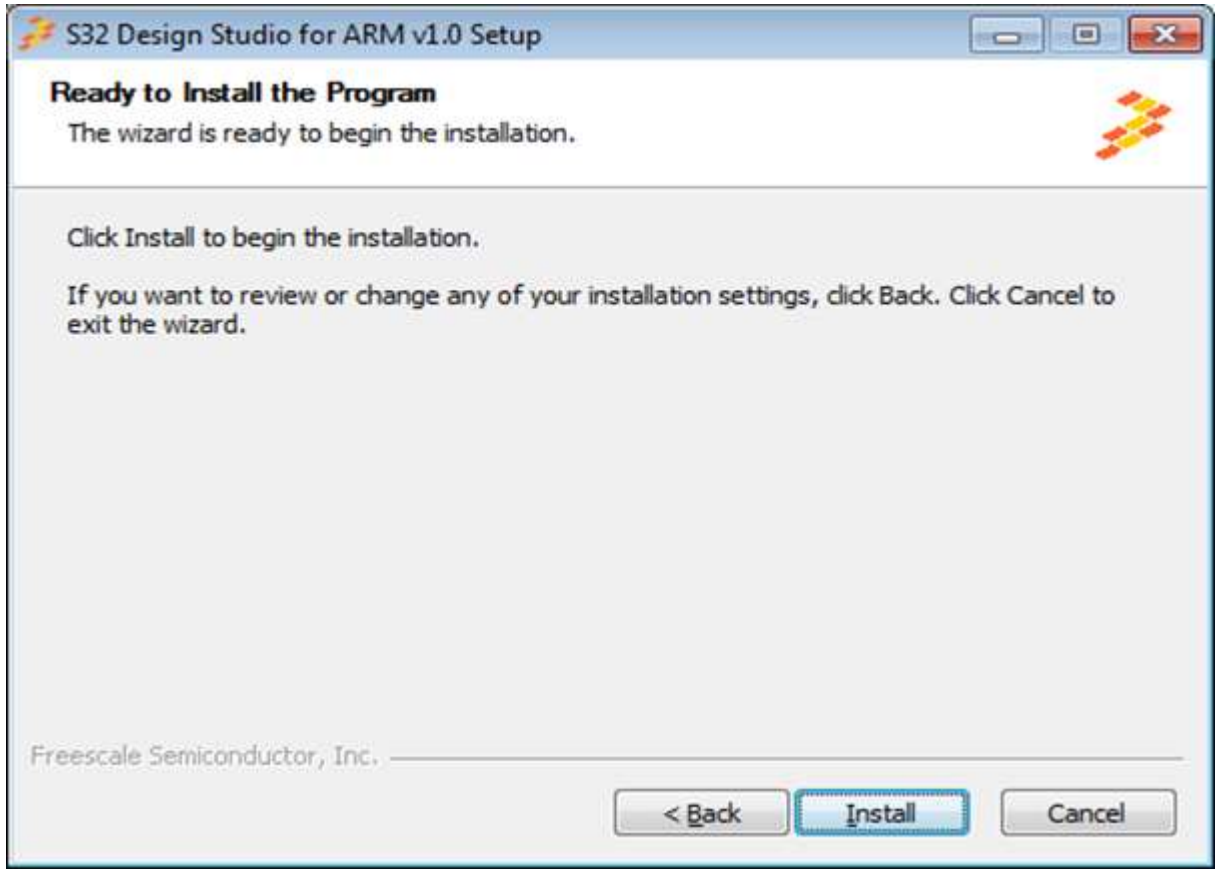
Download and Install S32 Design Studio Software

- Click **Next** to accept the default installation location (could be changes, but recommended to install into path without spaces).



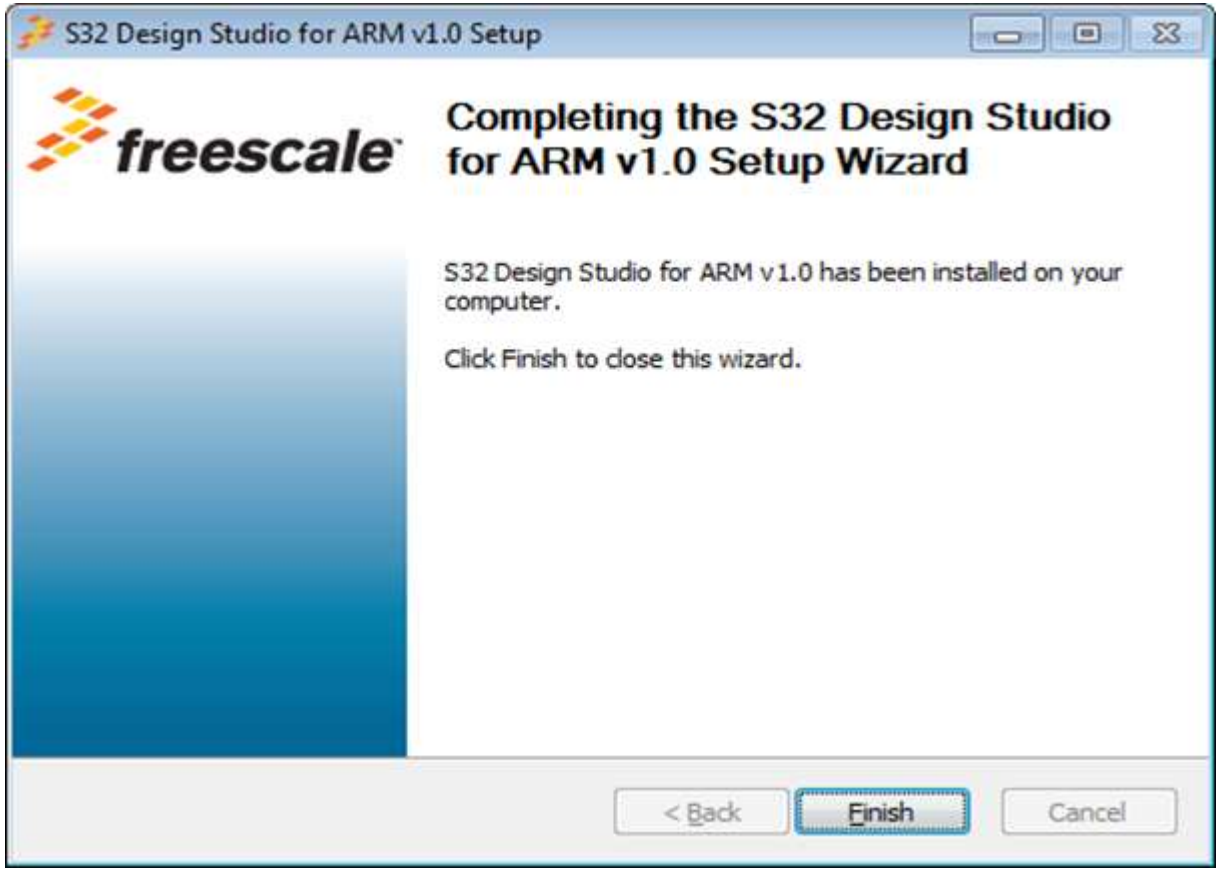
Download and Install S32 Design Studio Software

- Click **Install** to start installation.



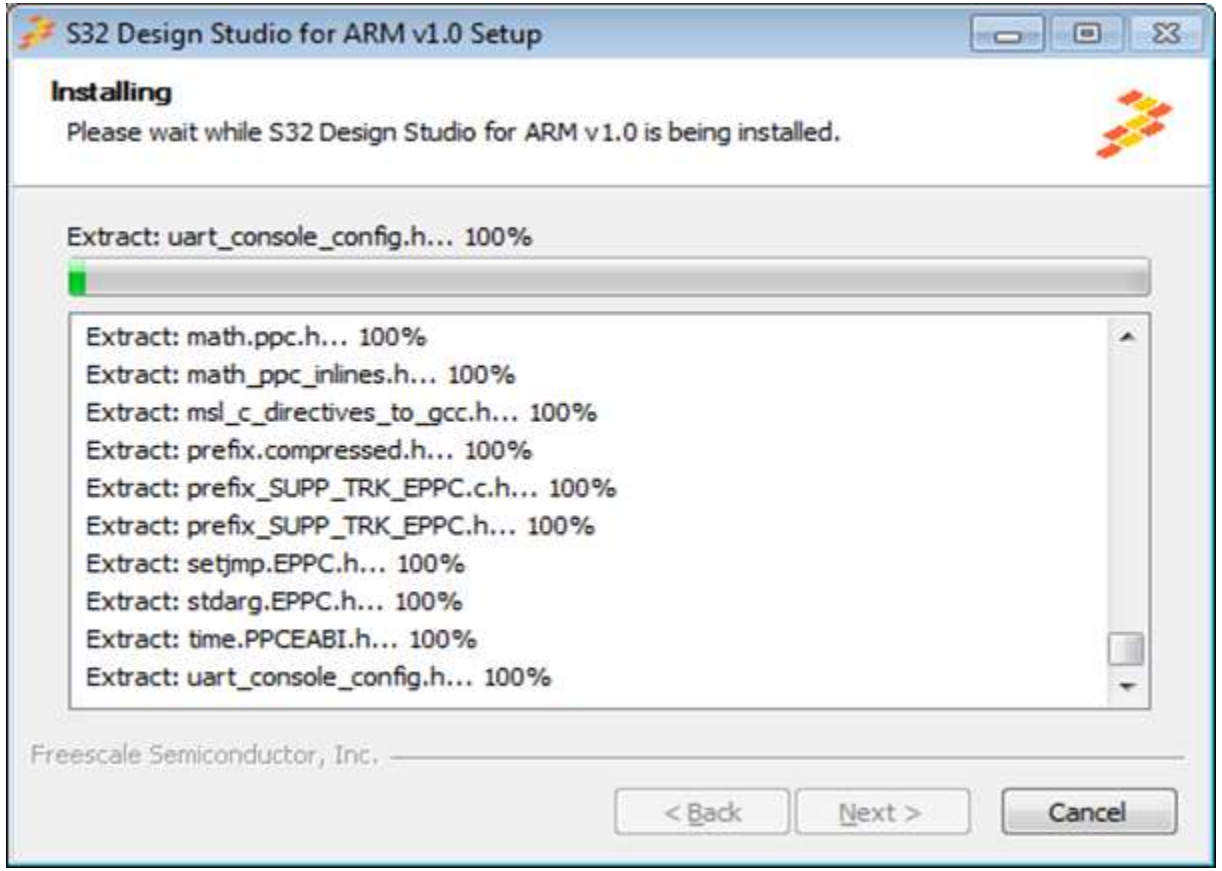
Download and Install S32 Design Studio Software

- Click Finish to complete S32DS for ARM® installation.



Download and Install S32 Design Studio Software

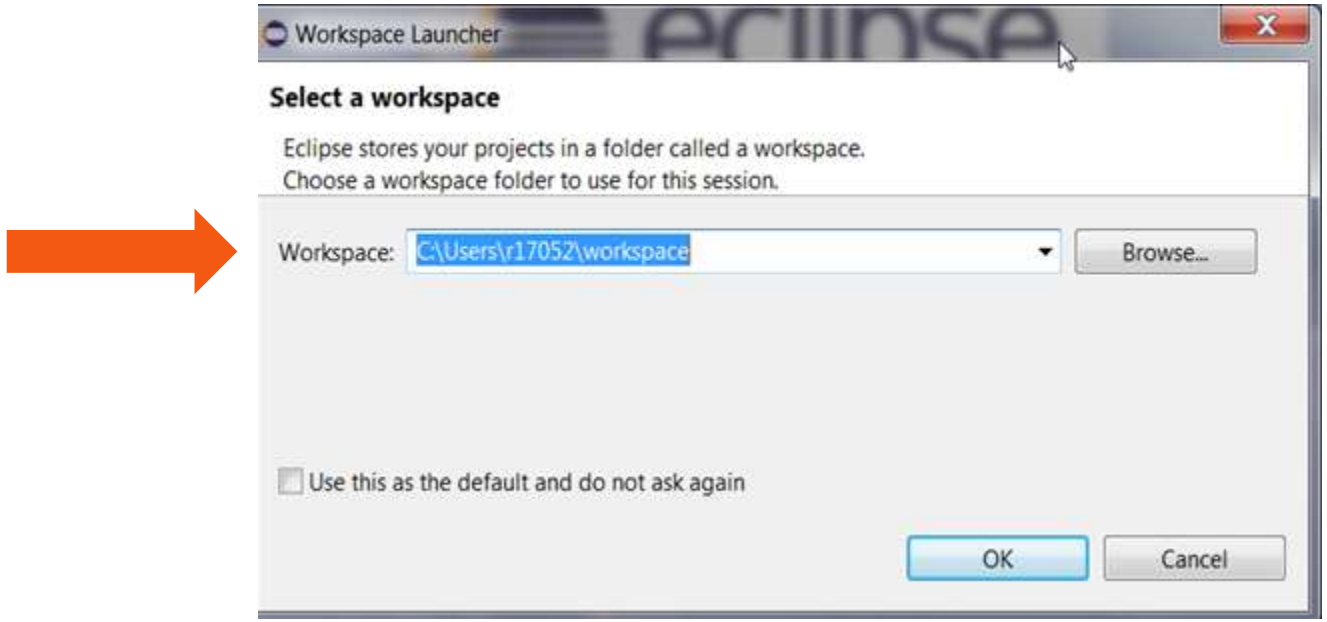
- Wait while the installation proceeds.



Create a New Project in S32 Design Studio

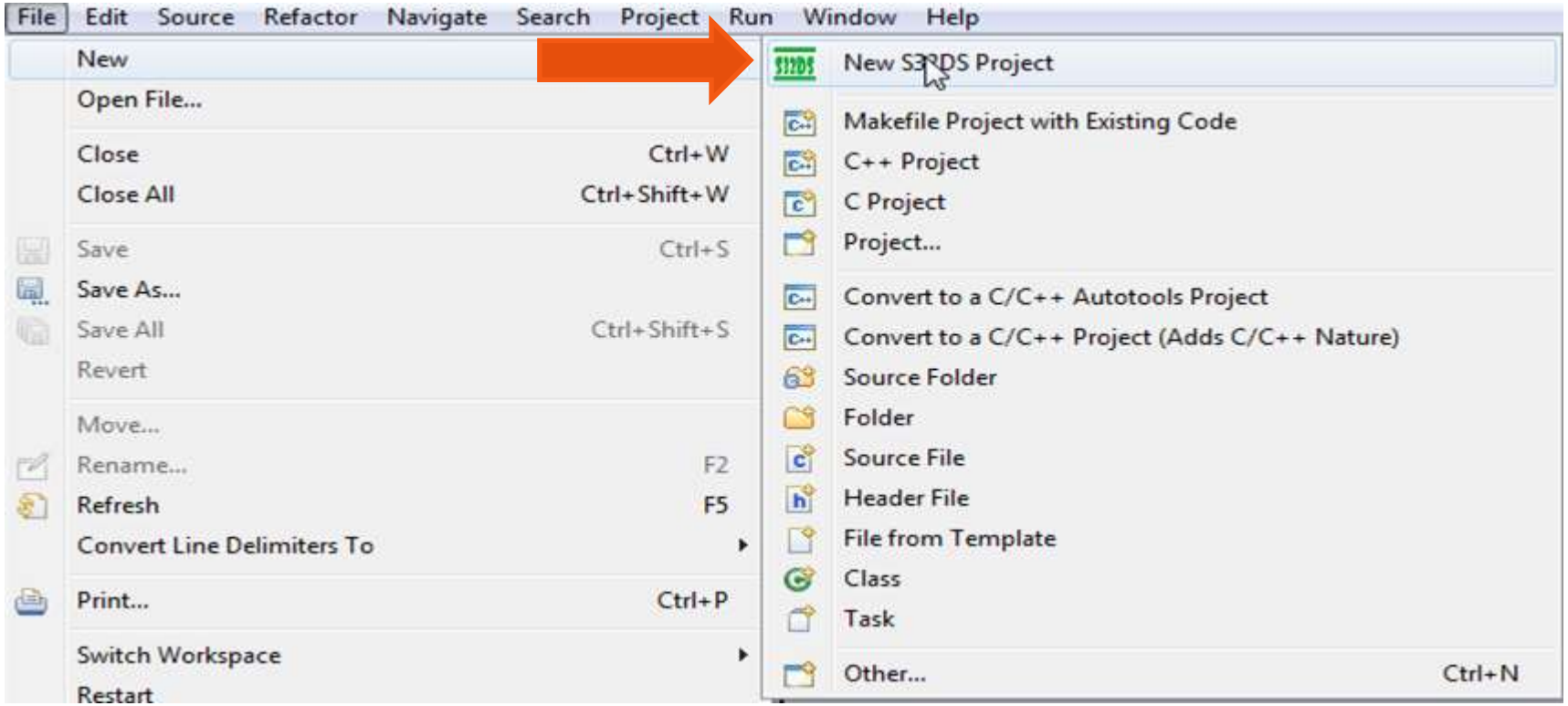
Create New Project: First Time – Select a Workspace

- Start program: Click on “S32 Design Studio for ARM v1.0” icon
- Select workspace:
  - Choose default (see below example) or specify new one
  - Suggestion: Uncheck the box “Use this as the default and do not ask again”
  - Click OK



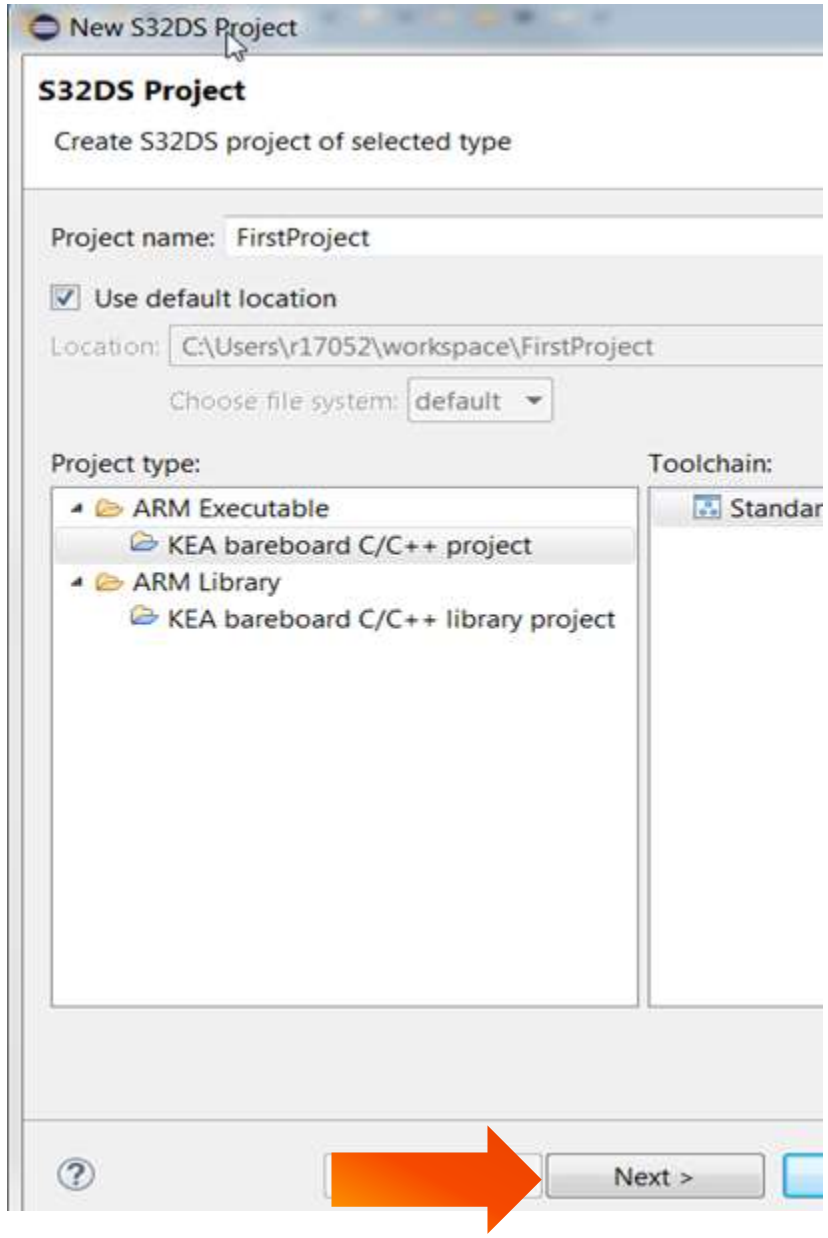
Create New Project: Top Menu Selection

- File – New – S32DS Project



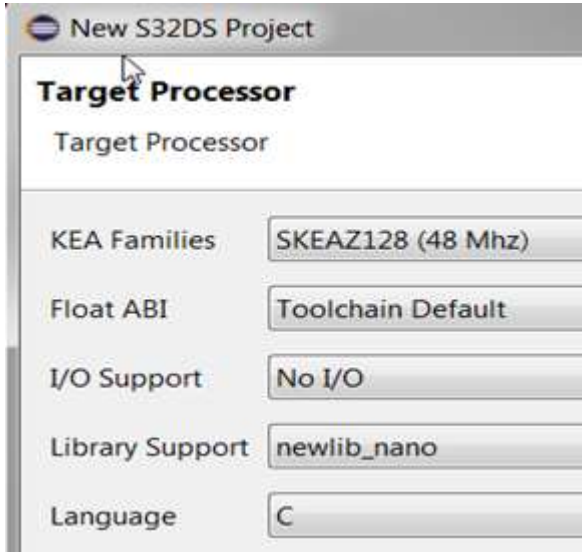
Create New Project: **S32DS Project**

- Project Name:
  - Example: FirstProject
- Project Type:
  - Select from inside executable or library folder
- Next



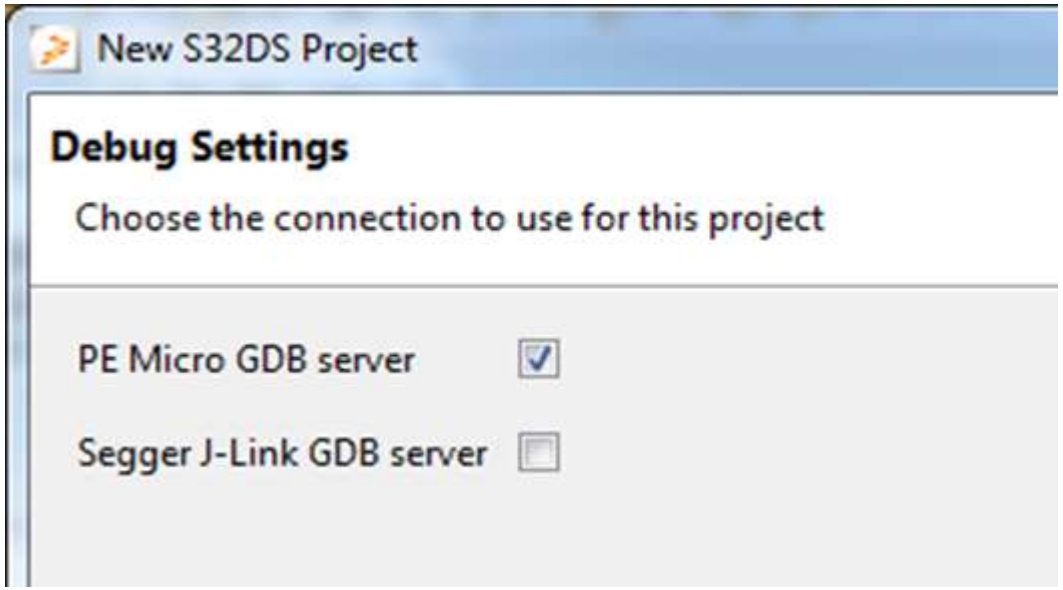
Create New Project: Target Processor

- KEA Families: select micro
- Float ABI: default or none
- I/0 Support (for any console msgs)
  - UART
  - Debugger console
  - No I/O (None)
- Library Support (ARM libraries)
  - newlib
  - newlib_nano (suggested starting point)
  - ewl
- Language
- Click “Next”



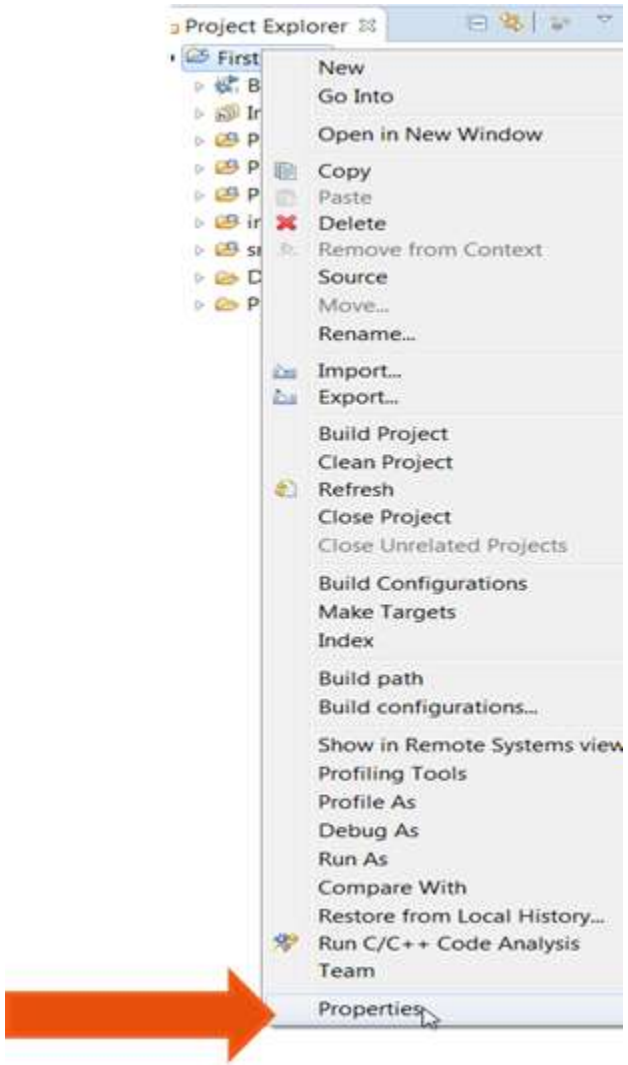
Create New Project: Target Debug

- Run Control Support:
  - PE Micro GDB server
  - Click “Finish”



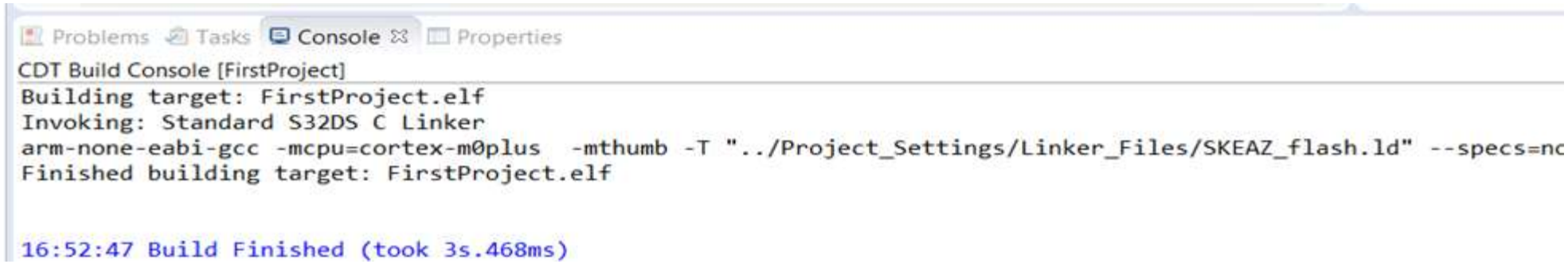
Create New Project: Enabling Debugger Viewing I/0

- (Temporary step for early release of software)
- Right click on project
- Select “Properties” at bottom
- Select “EmbSys Register View”,
  make selections as per below & click “OK”



Create New Project: Build Project

- Select project
- If code was altered, save before building
- Project – Build Project
- Console tab has message that build finished

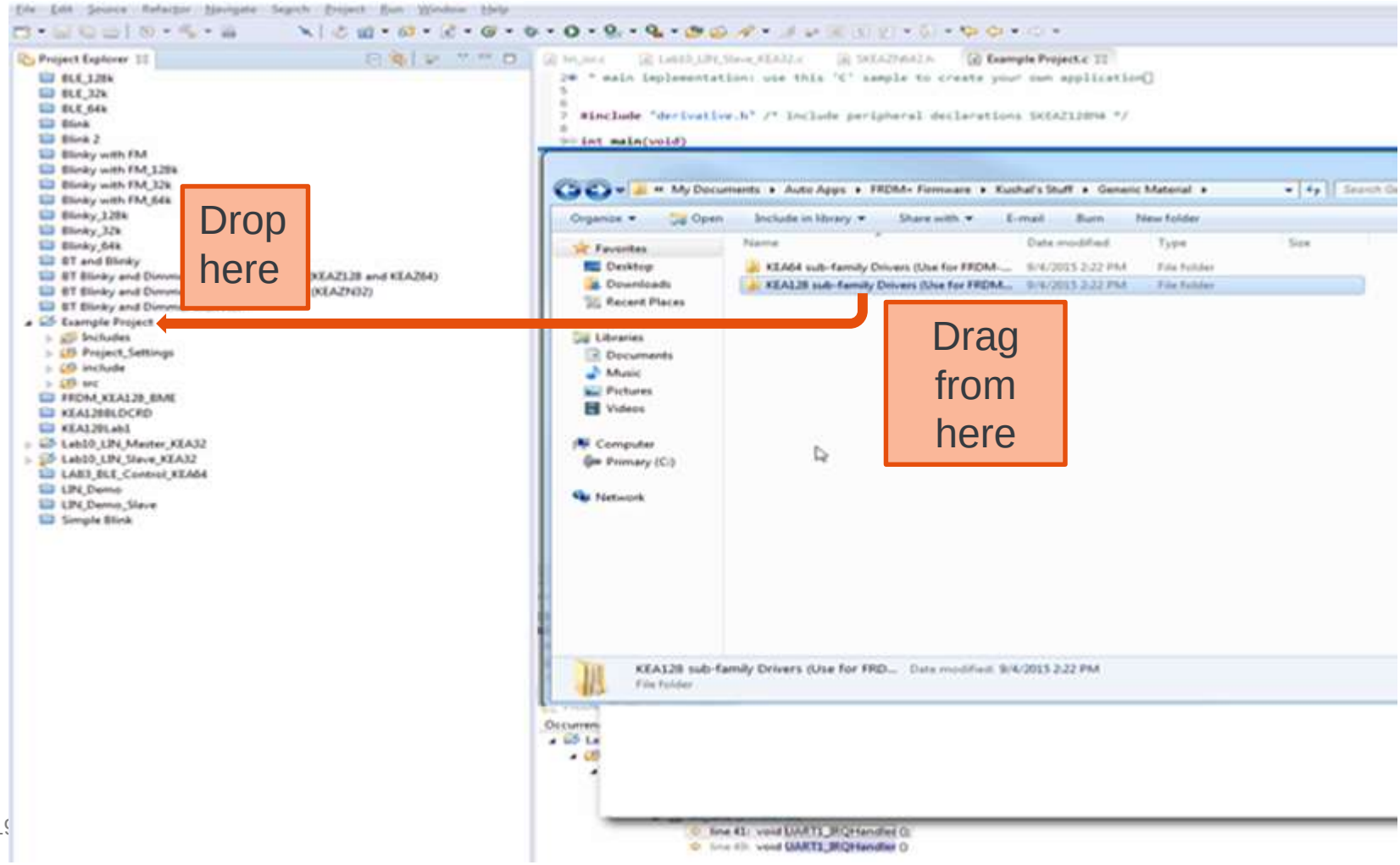


Import SDK Evaluation Drivers into Project

Copy Drivers into Project Directory

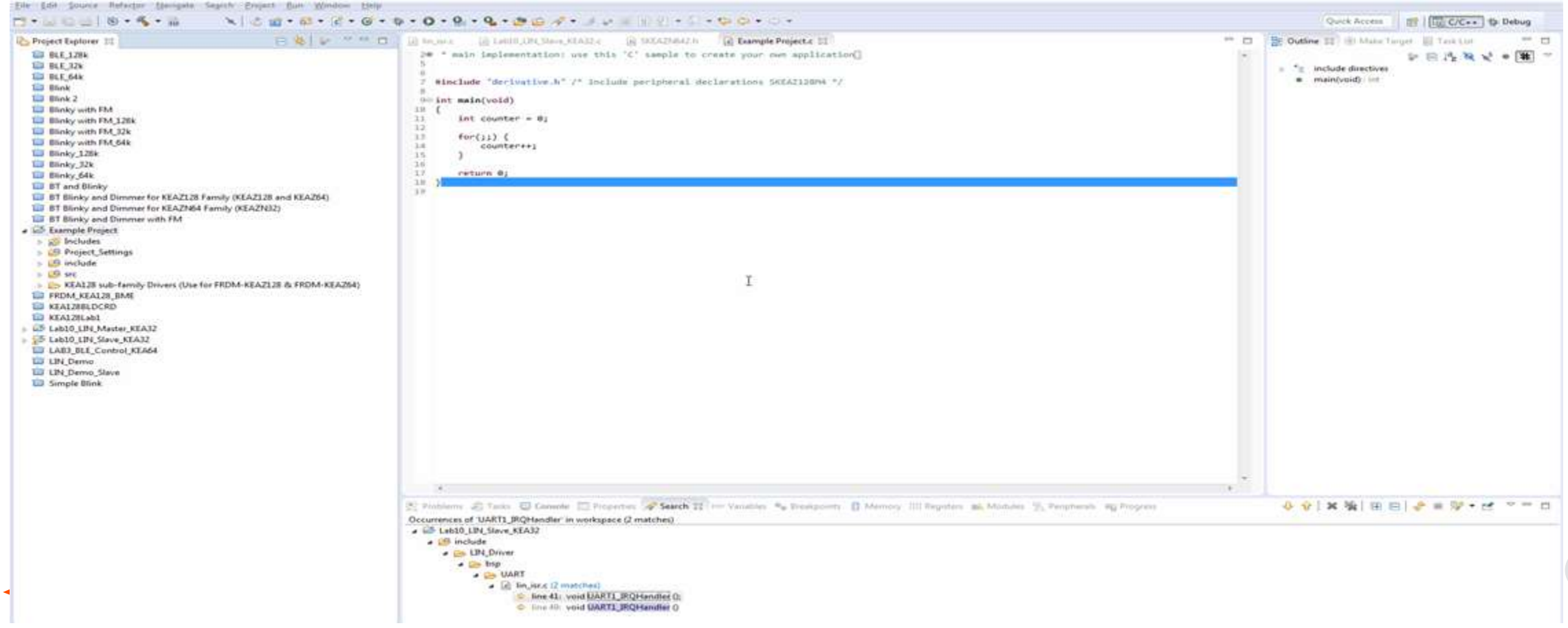
NOTE: The following steps to import SDK drivers into a S32DS for ARM project are only needed until the next release of S32DS in Q1'16 when they will be integrated into tool

- Drag and drop the SDK drivers into your project workspace in S32DS
  - To get SDK driver package go to www.freescale.com/kea and download the Quick Start Package (QSP) under "Getting Started" section
- You can choose to copy or link the driver folders in S32DS
  - In this example, folders are copied



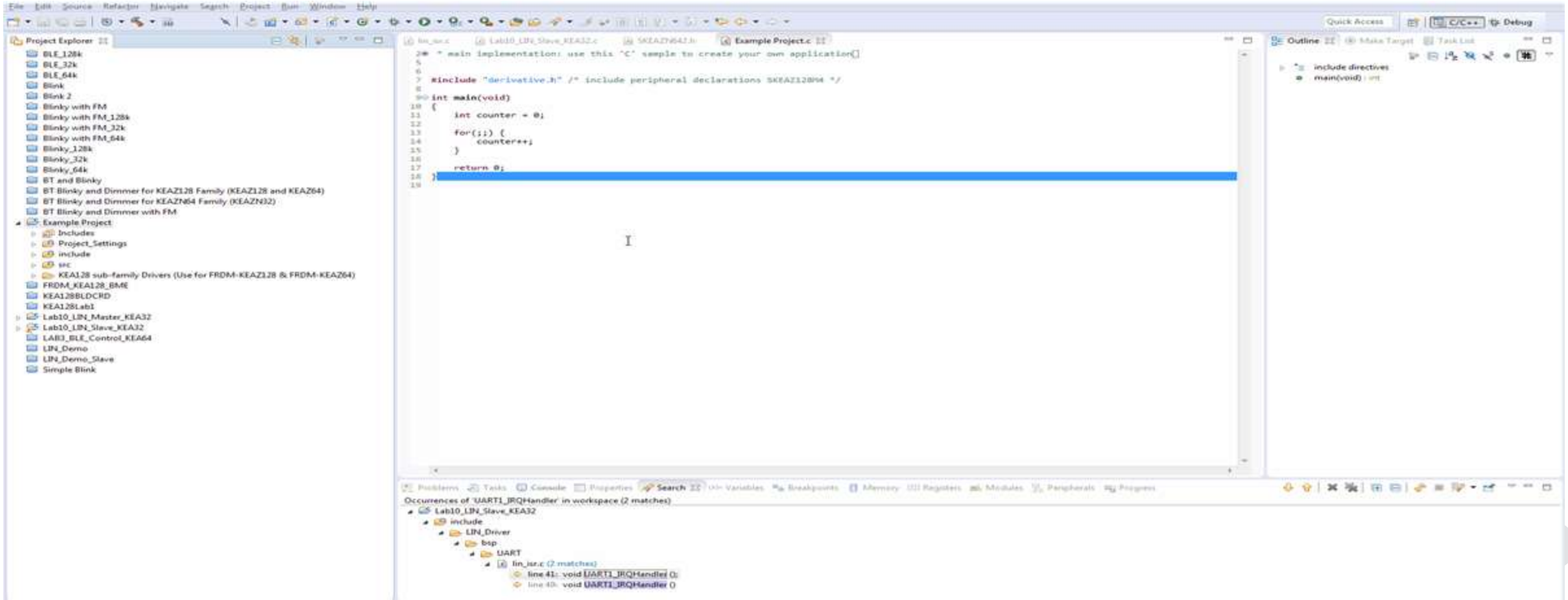
Include Driver Folder Paths

- Right-click on project>*Properties*>*C/C++ Build*>*Settings*>*Standard S32DS C Compiler*>*Includes*>*Include paths (-I)*
- Add the driver folder paths by clicking on the icon with the green '+' and specifying to folder directory. Include *all* folders and subfolders



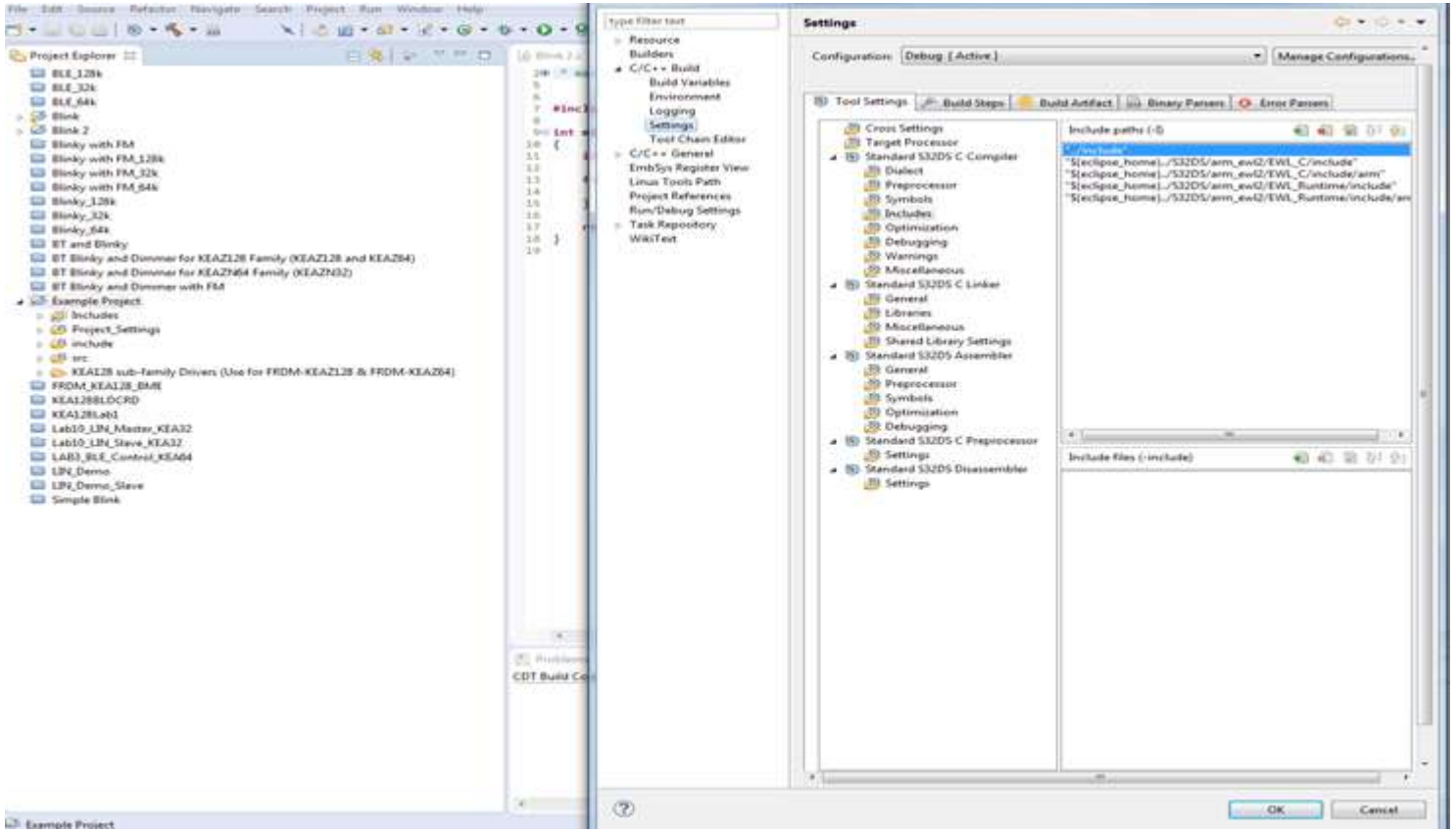
Add the Drivers to Build Configurations

- Right-click on project>*Build Configurations*
- Click the top level driver folder to include all drivers into the build for Debug, Release, and Debug_RAM modes. Make sure they have green ‘+’ instead of grey ‘x’ next to them
- Otherwise, compiling will not include the driver files



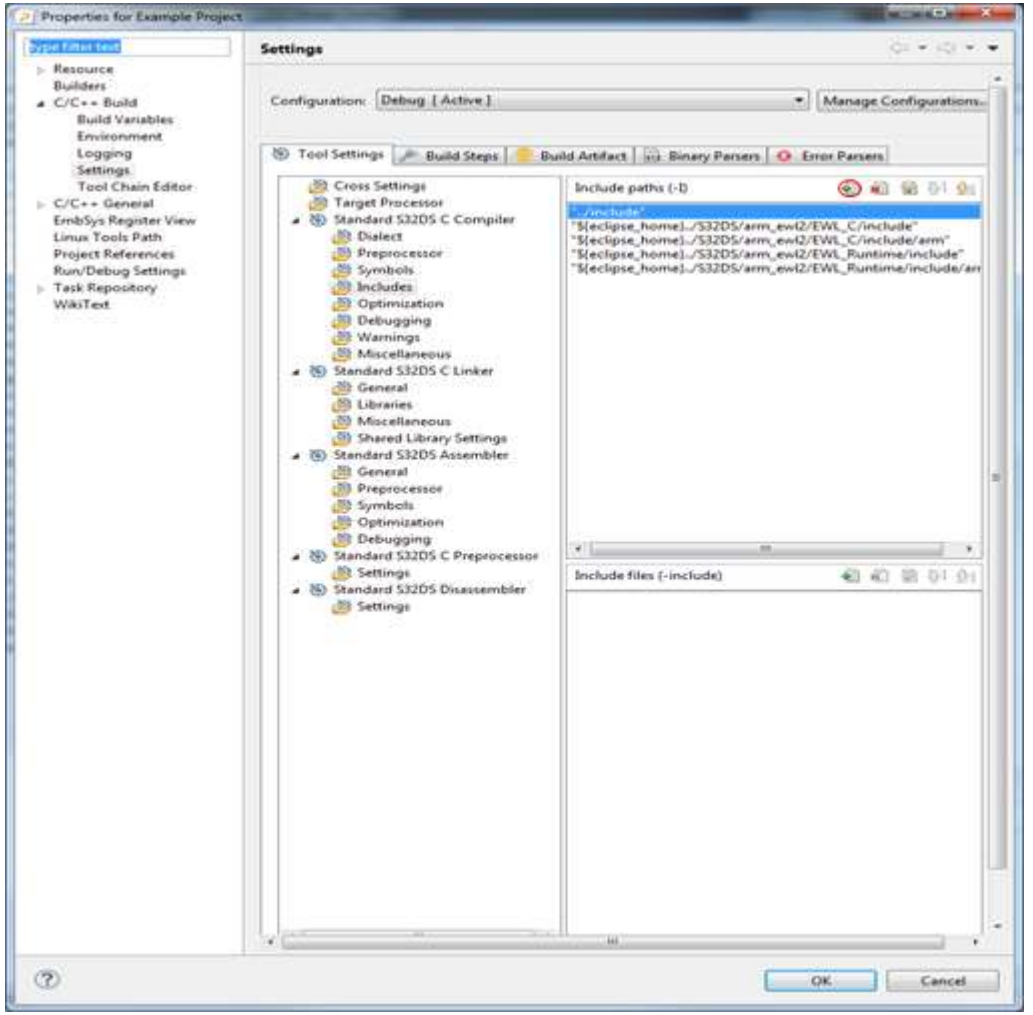
Include Driver Folder Paths

- Right-click on the project
- Go to *Properties>C/C++ Build>Settings>Standard S32DS C Compiler>Includes*



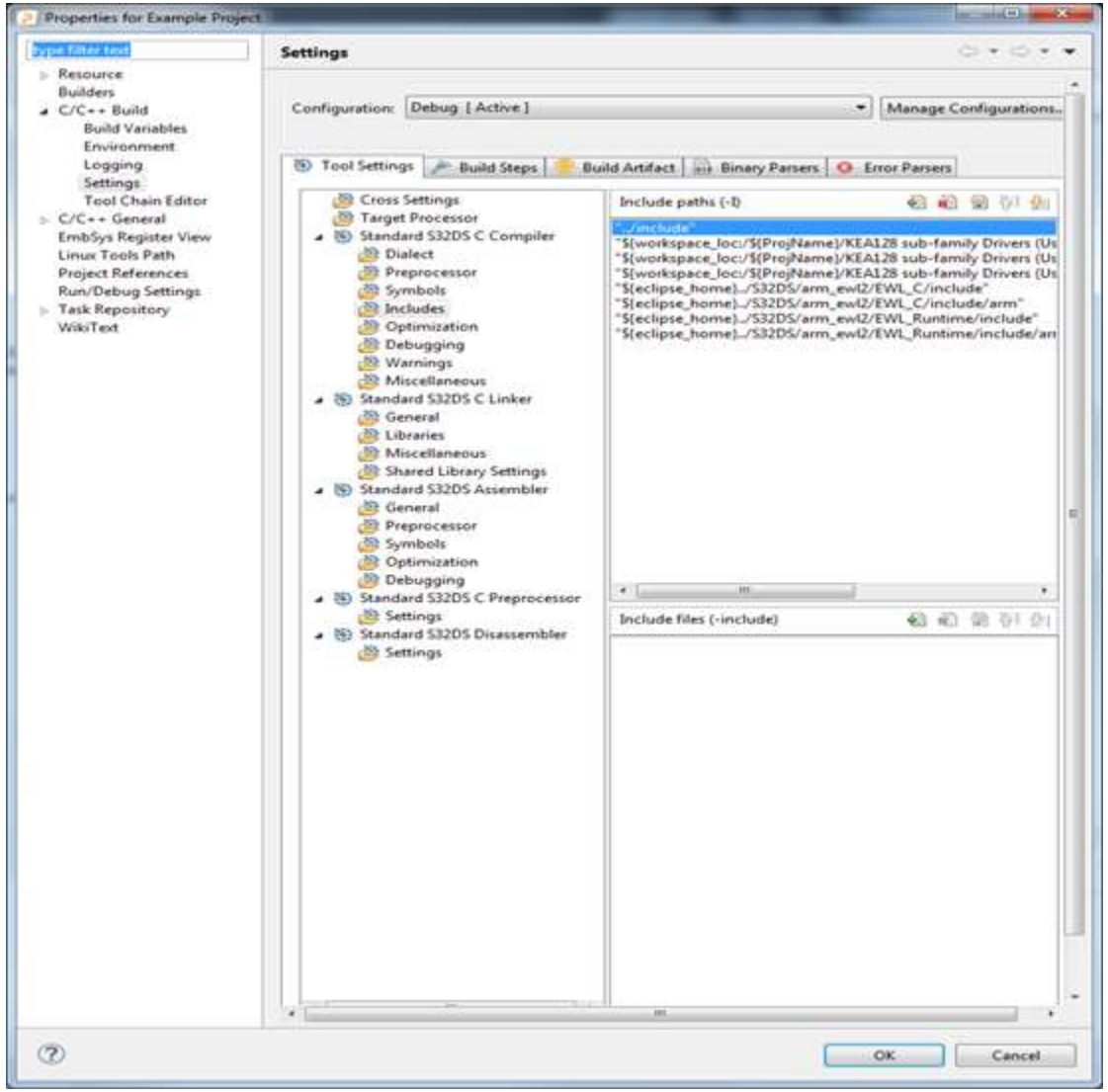
Include Driver Folder Paths

- Click on the '+' icon to include the SDK folders
- This lets the tool know where to look for the folders



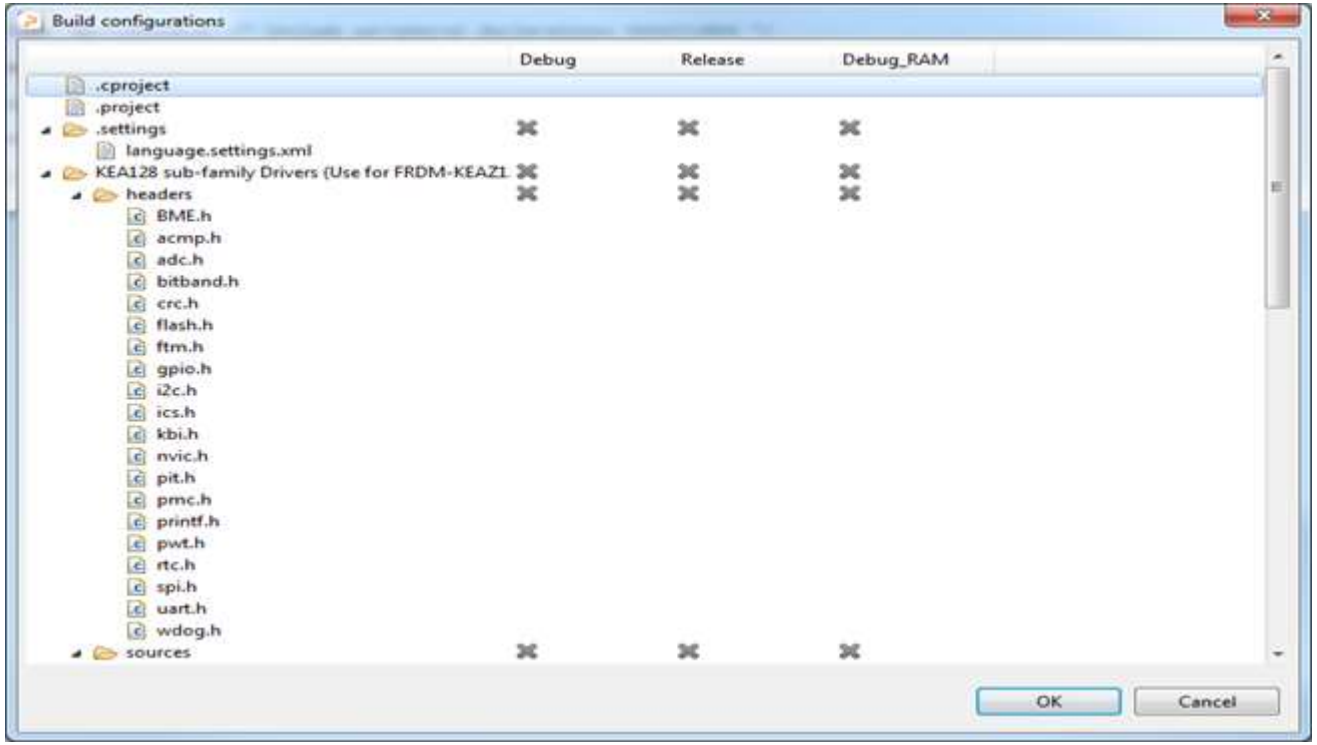
Include Driver Folder Paths

- Add all SDK folders and subfolders
  - *SDK*
  - *SDK/headers*
  - *SDK/sources*
- Hit *OK*



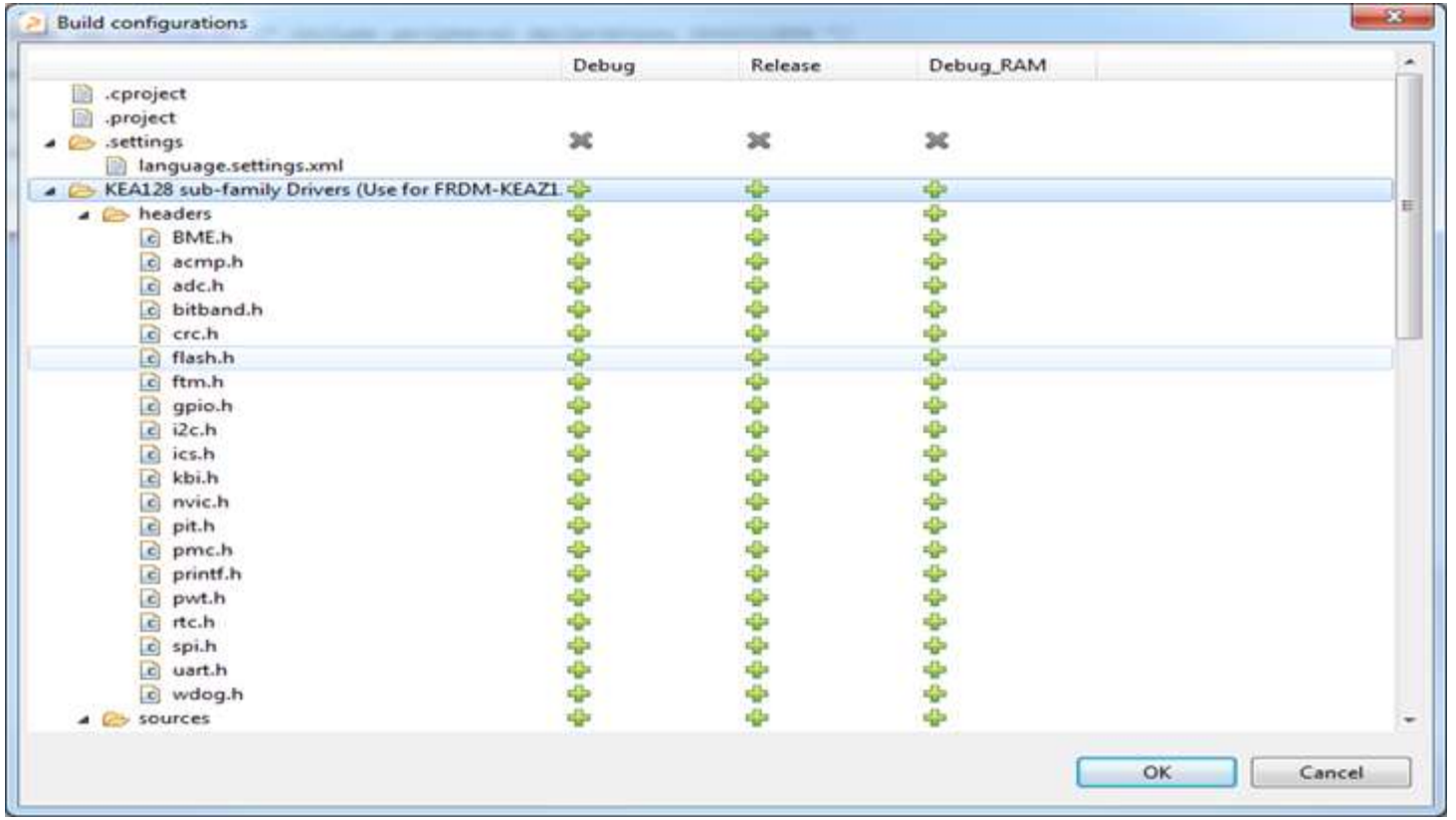
Add SDK to Build Configurations

- Enable the SDK folders in the build configurations
- Right-click on the project, go to *Build configurations*
- This lets S32DS know to incorporate the SDK into the build, having told it where to look.



Add SDK to Build Configurations

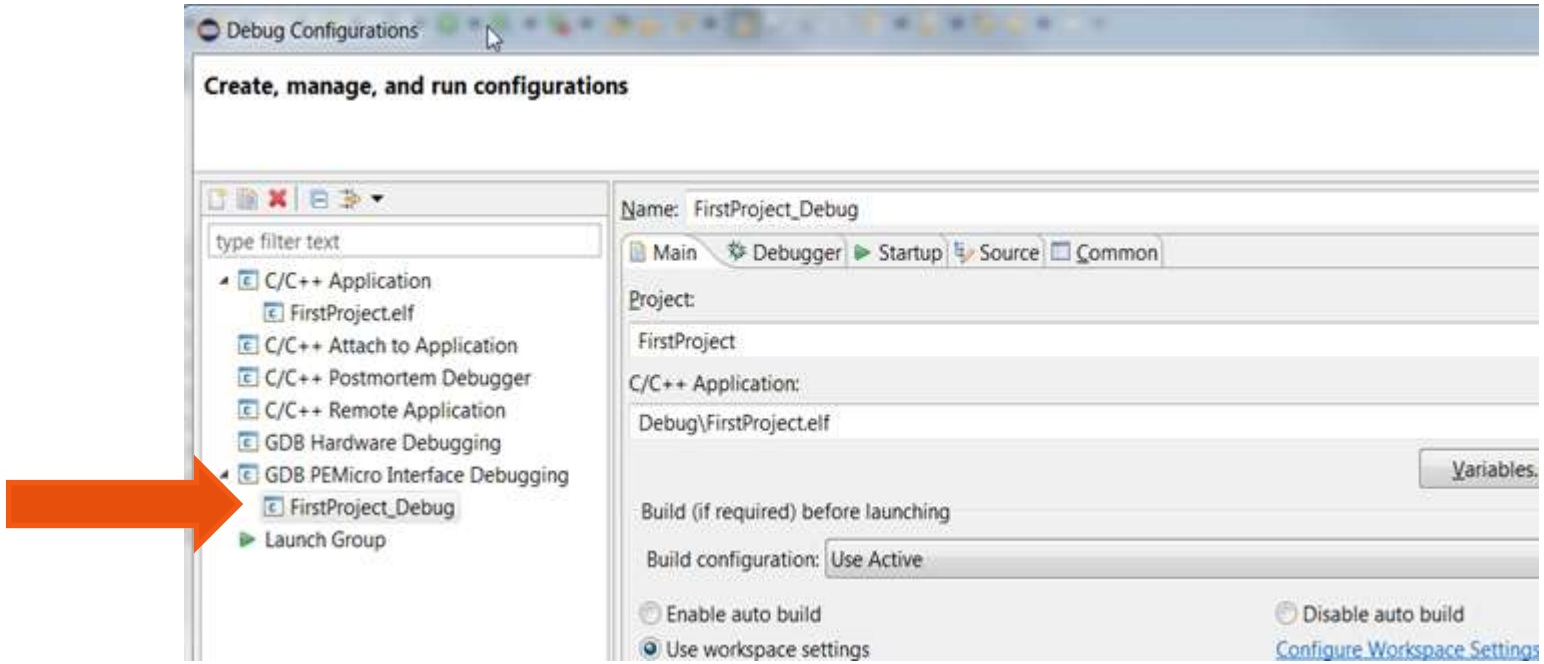
- The grey ‘X’ icon means the folder is not included in the build
- Click on the ‘X’ to turn them into green ‘+’
- Hit *OK*



Basic Configuration

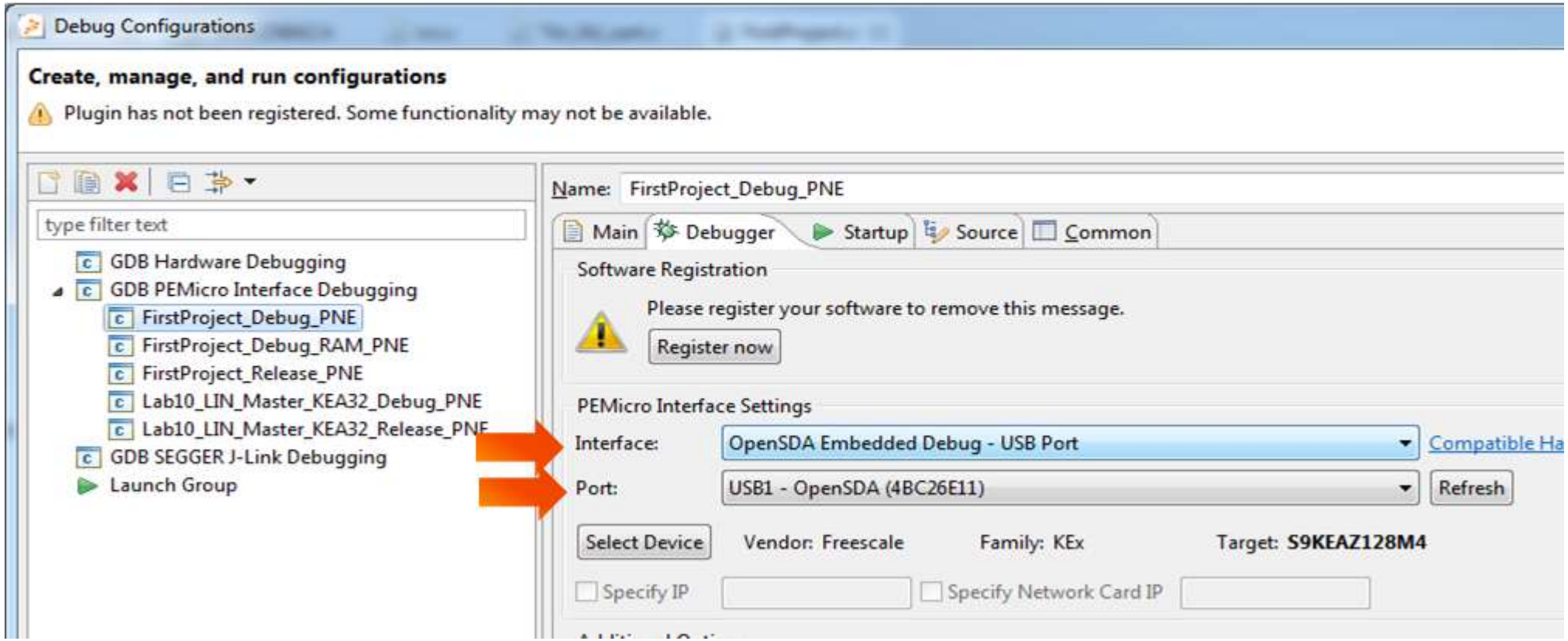
Debug Configuration: Select Interface & Project

- Connect target to PC
- Run – Debug Configurations
- Example: FirstProject_Debug - GDP PEMicro Interface Debugging
- Main tab displays selections



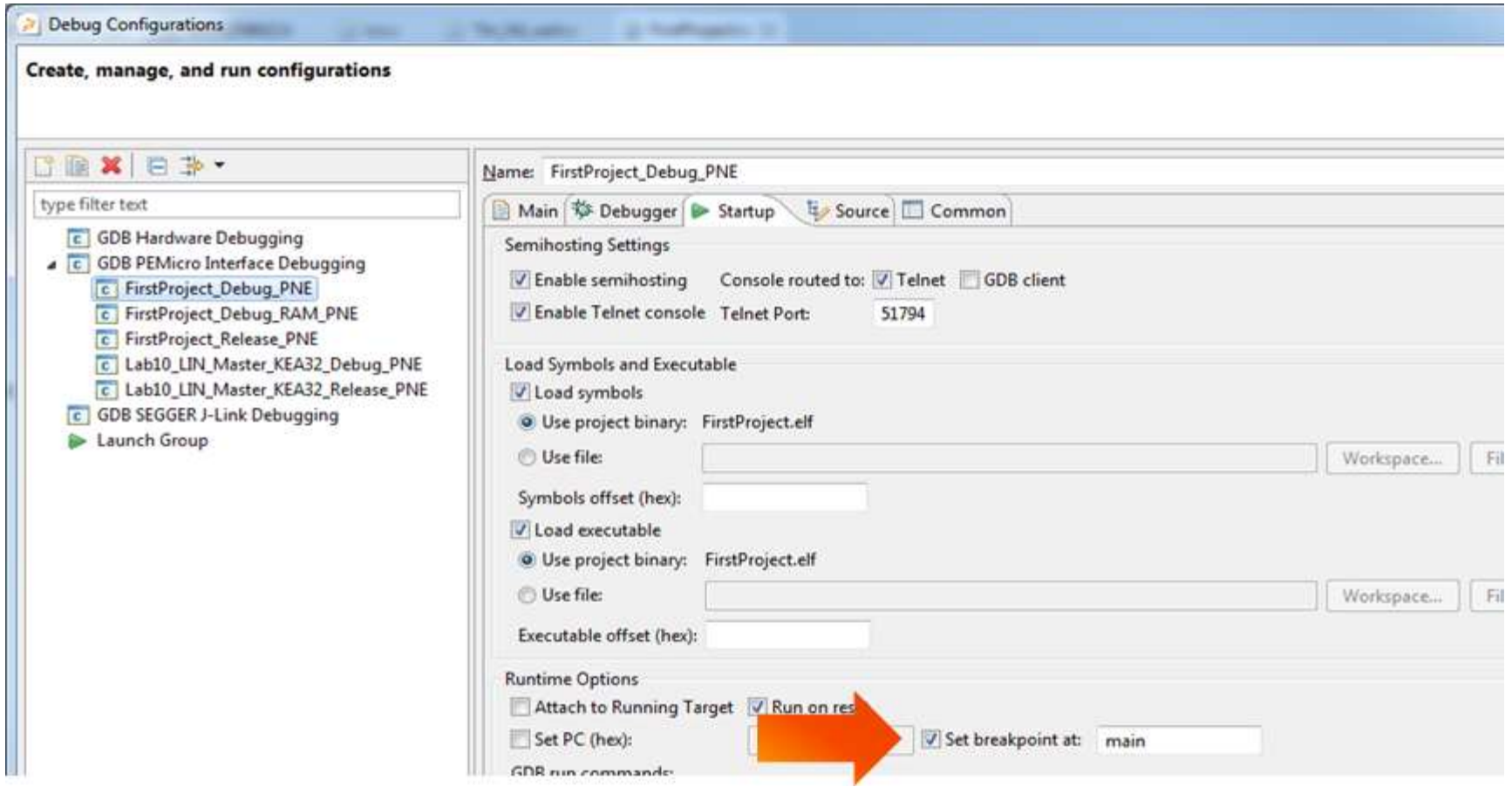
Debug Configuration: Verify Debugger Settings

- Click on Debugger tab
- Verify Interface is correct or make proper selection
- Verify Port is found. If the target is disconnected from USB port, connect target and hit refresh



Debug Configuration: First Breakpoint

- Click on Startup tab. Modify breakpoint if desired.



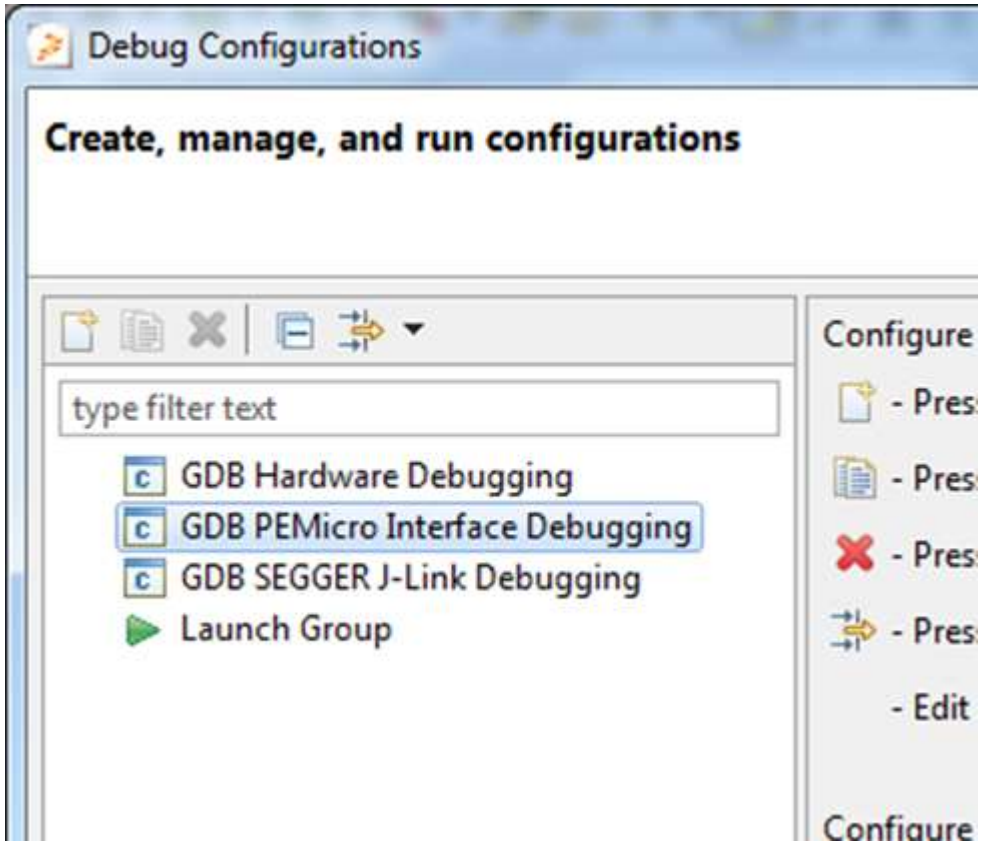
Basic Configuration

Creating Your Own Debug Configuration

Sometimes after you build a project, the debug configuration for that project does not generate automatically. You will have to create one from scratch

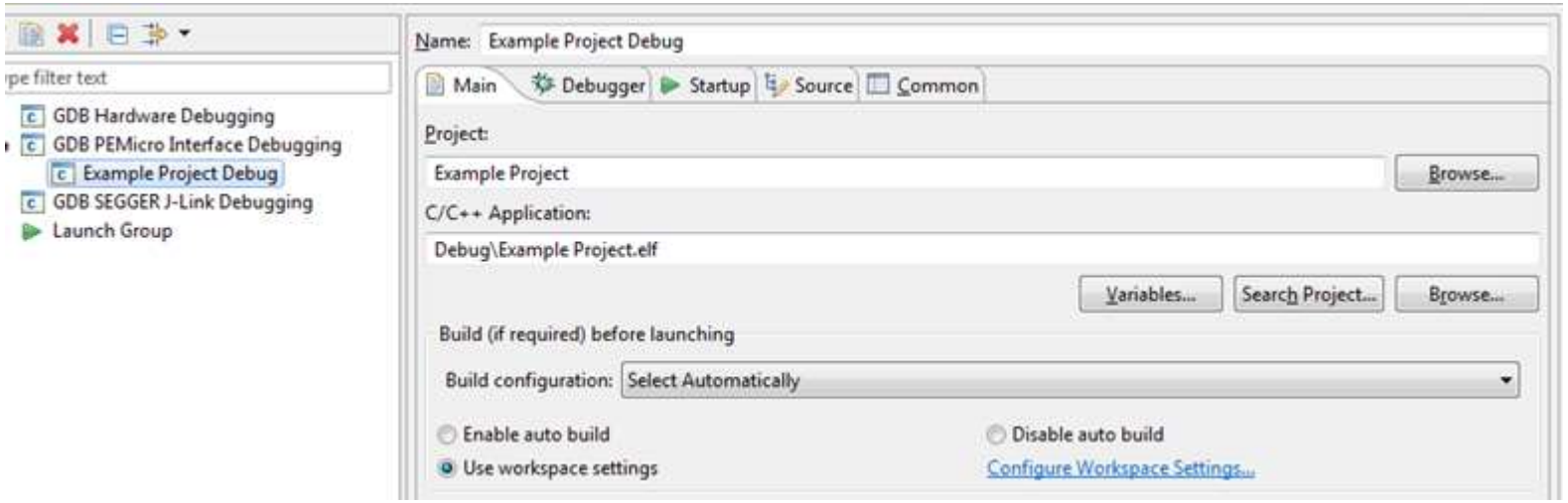
Go to the Debug Configurations

- In this example, a blank project for KEAZ64 called Example Project was created and compiled under Debug mode
  - You can  ct which mode to build under by selecting from the drop-down menu next to the hammer icon
  - Building in Debug mode will generate a Debug folder in the project workspace; Release mode would generate a Release folder
- Click on the drop-down menu next to the bug icon, select Debug Configurations



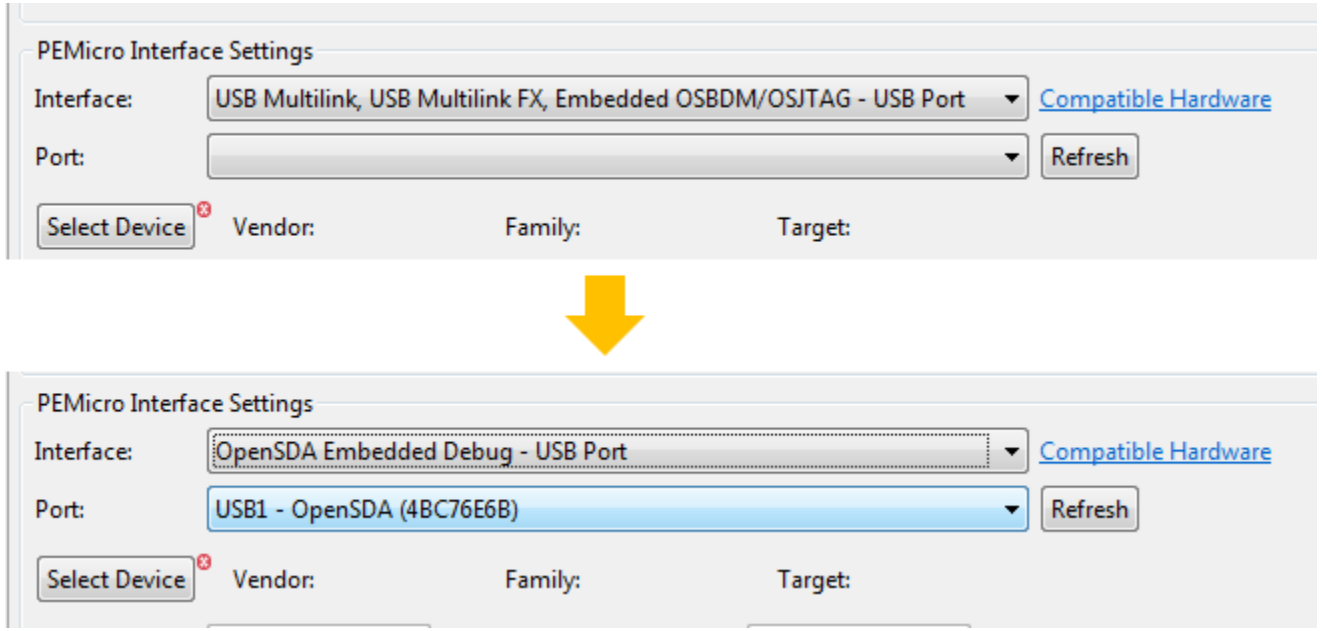
Create New Configuration

- The KEA connects via P&Emicro
- Right-click on GDB PEMicro Interface Debugging and select New
- A blank debug config will generate
  - Default name and settings of new config will depend on which project is selected in your project workspace at the time the debug config window is opened
- Because Example Project was selected, config called Example Project Debug and Example Project and its .elf file are selected



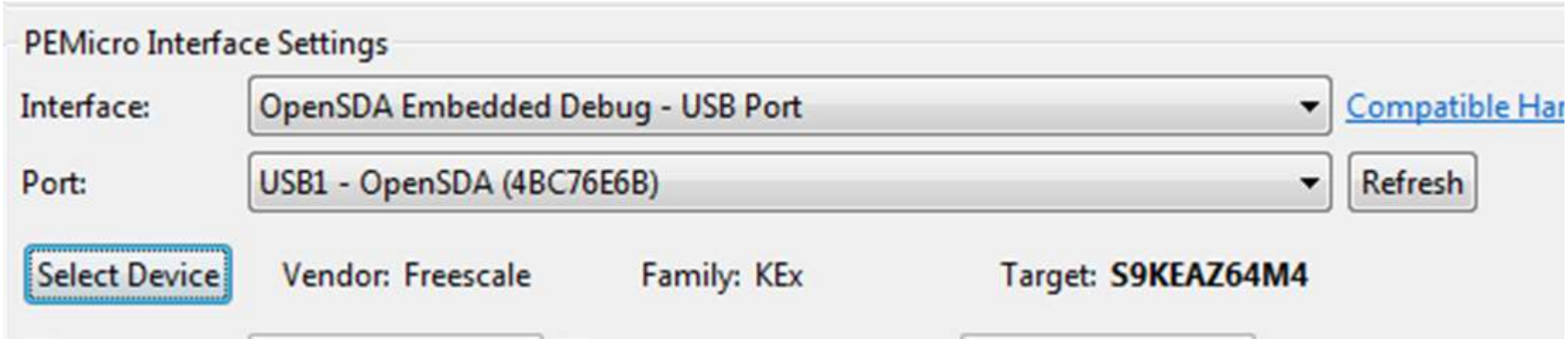
Select Correct Interface

- Go to the Debugger tab of the new config
- USB Multilink is selected by default under Interface
- KEA talks through OpenSDA, select OpenSDA for the interface
- *Port* field will populate automatically when you select OpenSDA if board is recognized. If still blank, unplug/replug your board



Select Correct Device

- Press the Select Device button and find your device from the available list
- Your device will be printed on the top of the chip



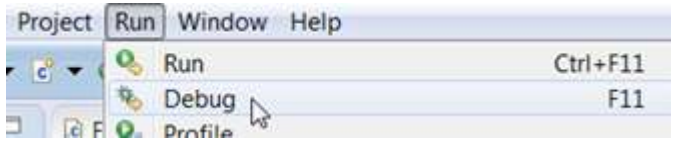
Check Debugger Pointer

- In Eclipse, you have to specify where the debugger executable resides
- Pointer is also in *Debugger* tab, at GDB Client Settings>Executable
- When you create a config from scratch, S32DS will sometimes generate an incorrect pointer or none at all. Make sure the relative path is as in the screenshot: ${cross_prefix}gdb${cross_suffix}
- You are now ready to debug under your new debug config

Debug Basics

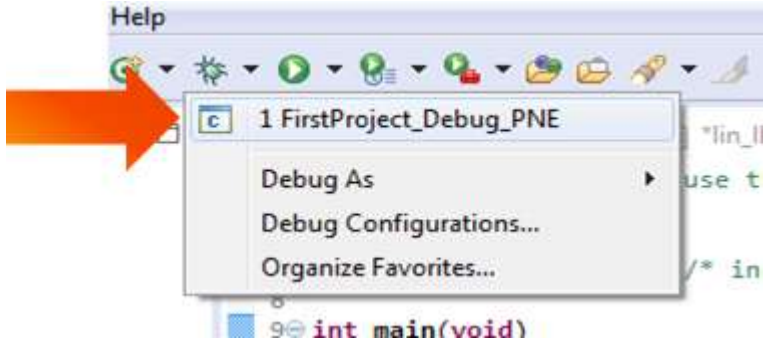
Debug Basics: Starting the Debugger

- Debug configuration is only required once. Subsequent starting of debugger does not require those steps.
- Three options to start debugger:
  - If the “Debug Configuration” has not been closed, click on “Debug” button on bottom right
  - Select Run – Debug (or hit F11)



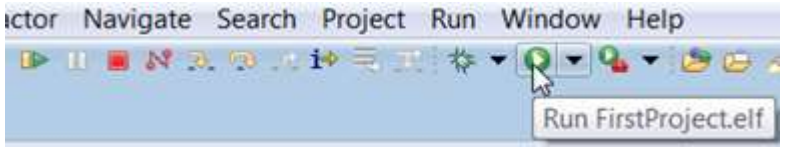
Note: This method currently selects the desktop target (*project.*elf) and gives an error. Do not use until this is changed.

  - *Recommended Method*: Click on pull down arrow for bug icon and select …_debug.elf target



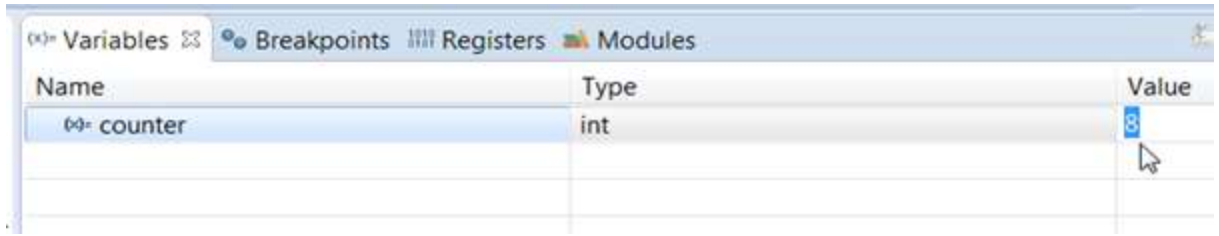
Debug Basics: Step, Run, Suspend, Resume

- Step Into (F5)
- Step Over (F6)
- Step Return (F7)
- Run
- Suspend
- Resume (F8)



Debug Basics: View & Alter Variables

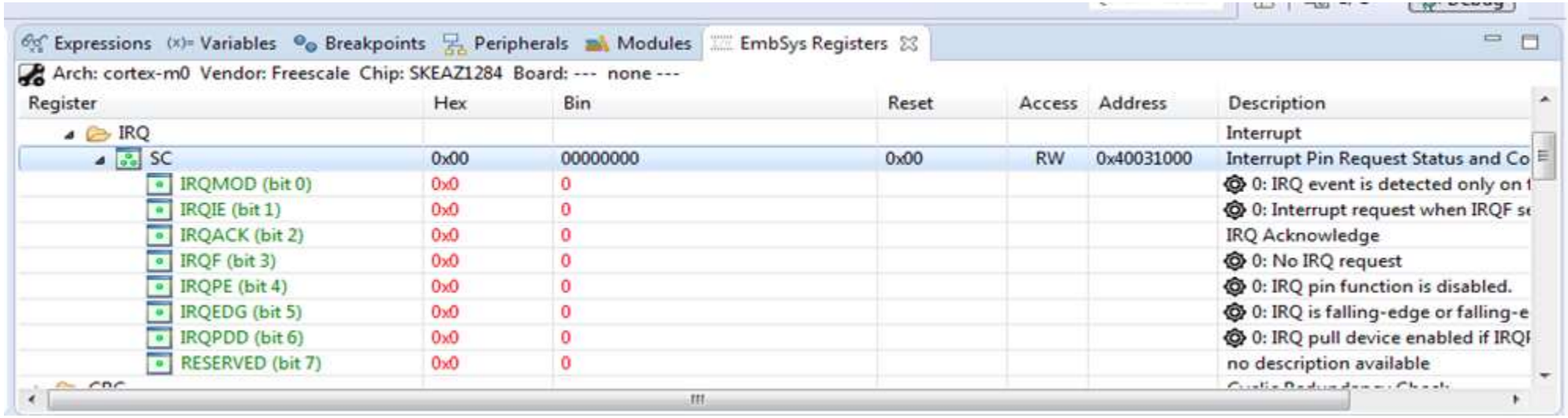
- View variables in “Variables” tab.
- Click on a value to allow typing in a different value.



Debug Basics: View & Alter Registers

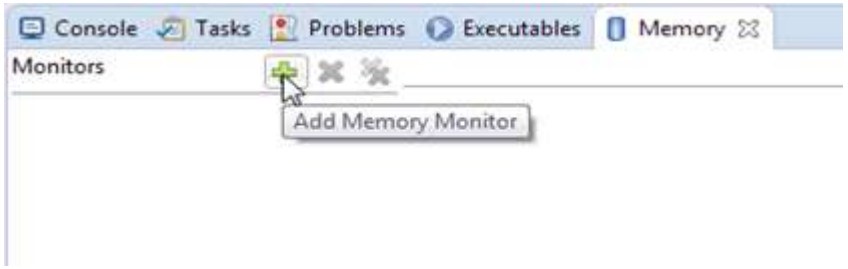
- View CPU registers in the “Registers” tab
- Click on a value to allow typing in a different value

- View peripheral registers in the EmbSys Registers tab

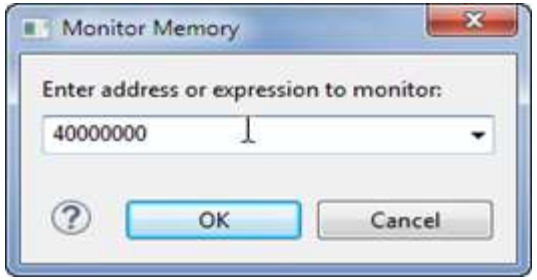


Debug Basics: View & Alter Memory

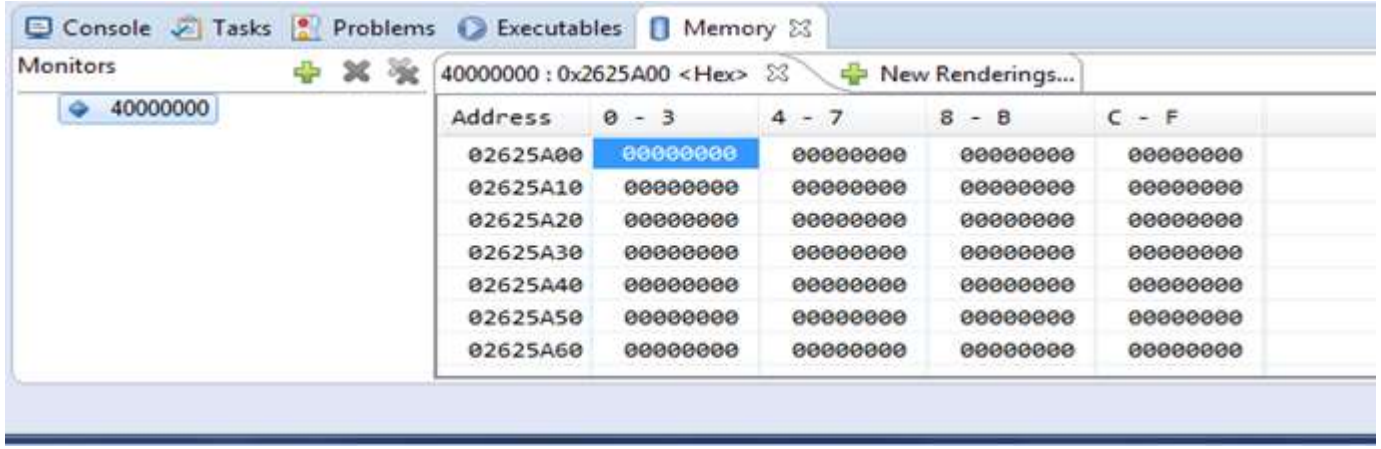
- Add Memory Monitor



- Select Base Address to Start at : 40000000



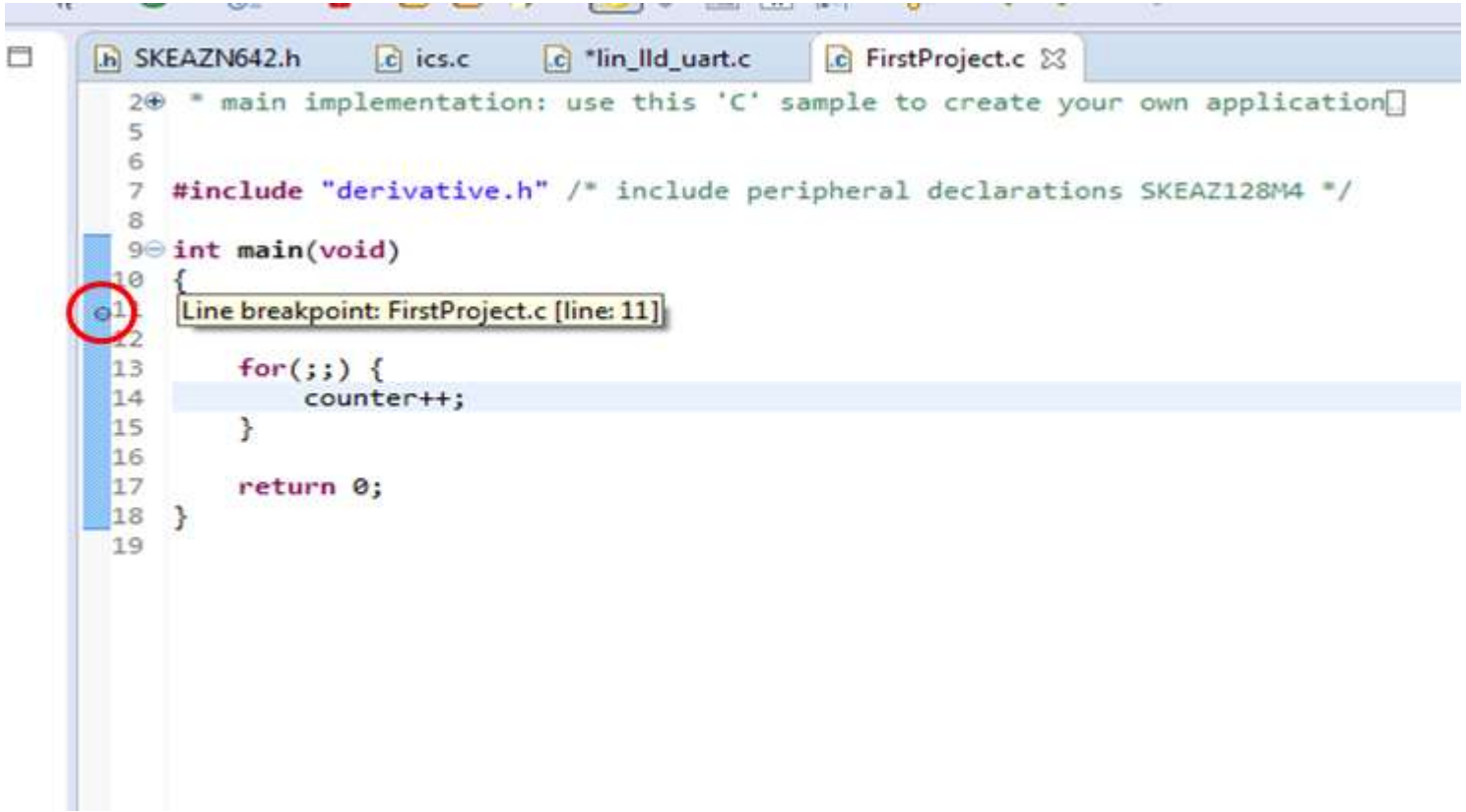
- View Memory



Debug Basics: Breakpoints

Add Breakpoint: Point and Click

- light blue dot represents debugger breakpoint



Debug Basics: Reset & Terminate Debug Session

- Reset program counter

- Terminate Ctl+F2()

Startup Code Reset

Startup Code: Reset*

- System reset begins with:
  - on-chip regulator in full regulation
  - System clocking generation from an internal reference
- On reset exit the following is preformed:
  - Note: Vector-table is located at 0x0000_0000 on KEA128
  - Reads start SP (SP_main) from vector-table offset 0
  - Reads start program counter (PC) from vector-table offset 4
  - Link Register (LR) is set to 0xFFFF_FFFF
- On chip peripherals are disabled
- Non-analog I/O pins configured as disabled except:
  - SWD_DIO/SWD/DCLK
  - NMI
  - RESET
- Analog pins are set to their default analog function

* KEA128 Sub-Family Reference Manual, Rev. 2, July 2014 chapter 6

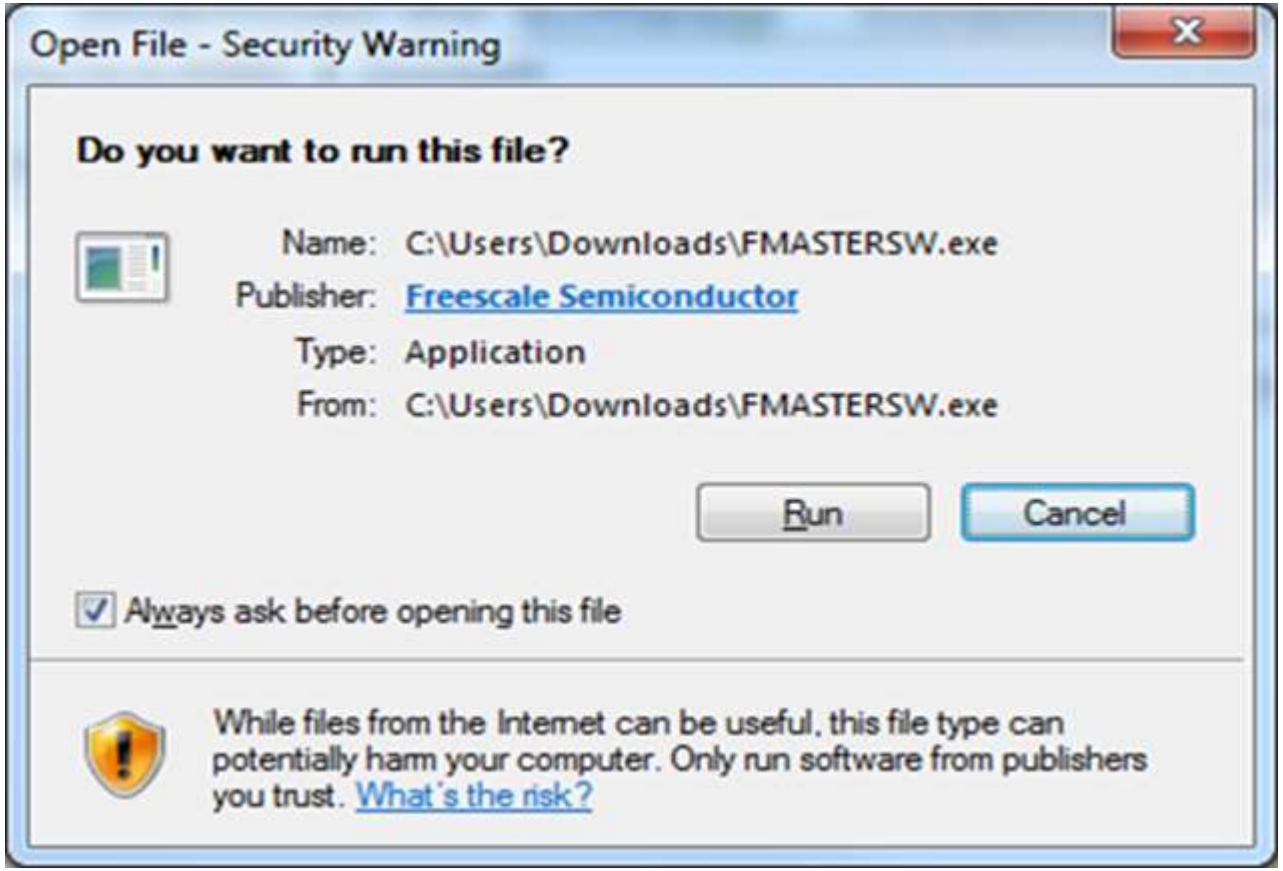
Install FreeMaster – Serial Real-Time Monitor Tool

Download FreeMASTER for Real-Time Monitoring

- Go to www.freescale.com/freemaster
- Download both *FreeMASTER* (Rev 2.0 or latest) and *FreeMASTER Communication Driver* (Rev 1.9 or latest)

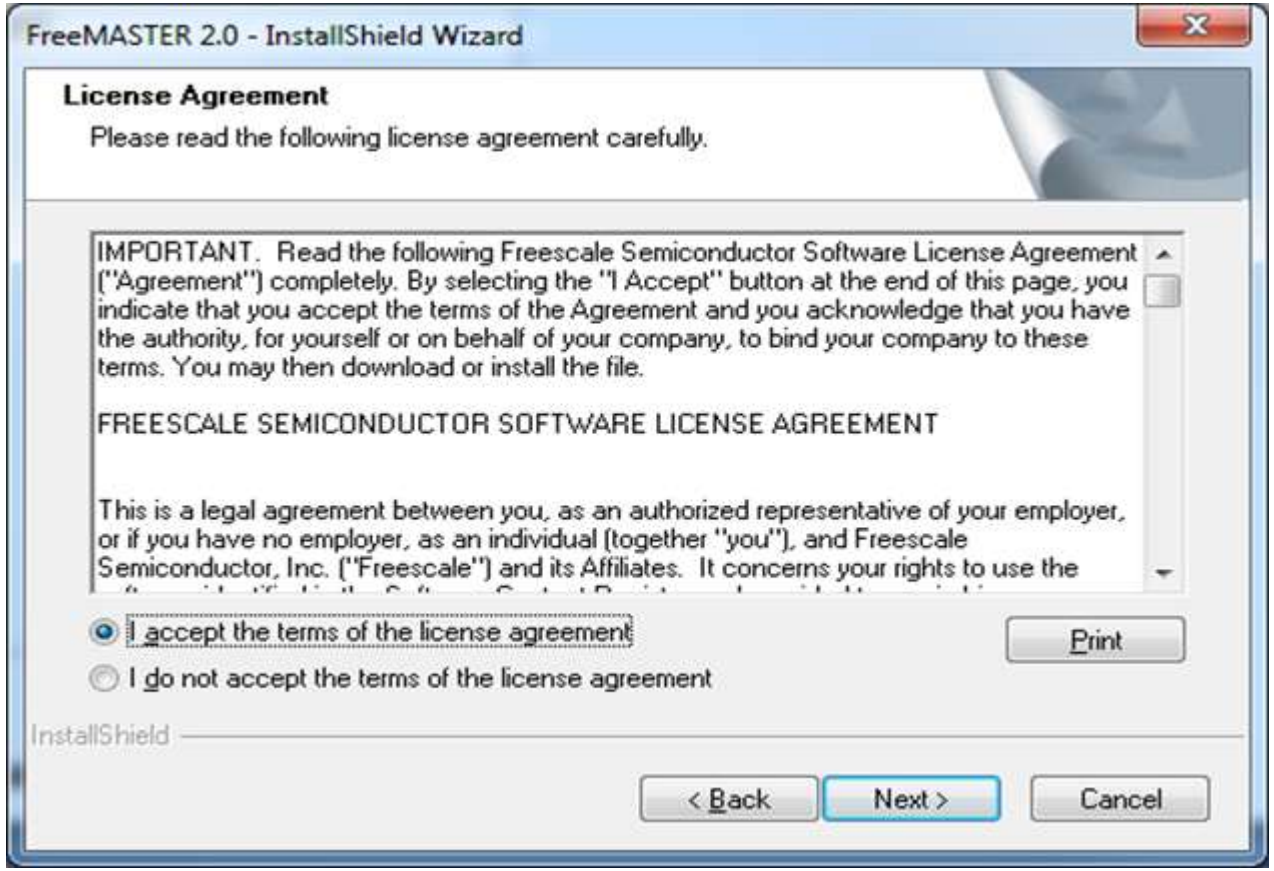
Downloading FreeMASTER for Real-Time Monitoring

- Double-click on *FMASTERSW.exe*
- Trust Freescale ☺
- Hit *Run*



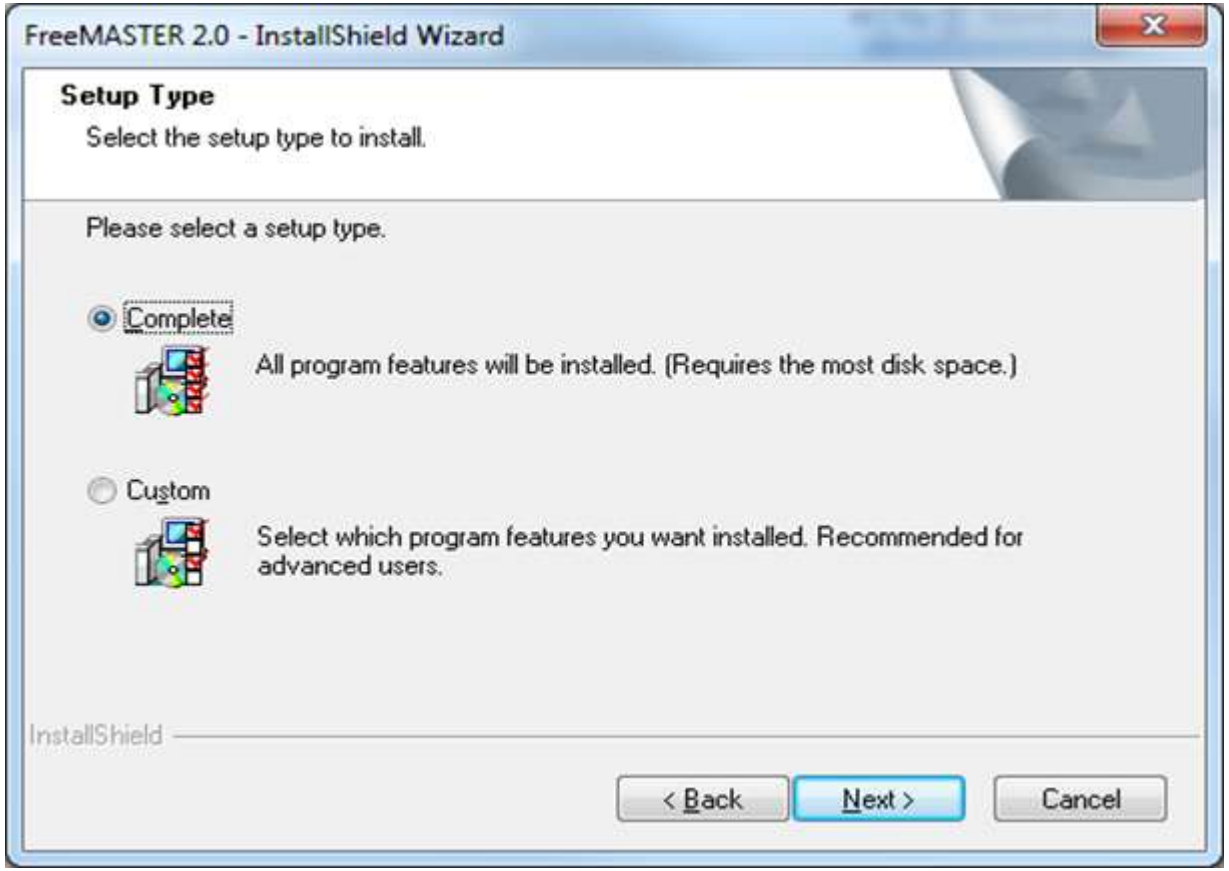
Downloading FreeMASTER for Real-Time Monitoring

- Accept the Freescale license agreement
- Hit *Next*



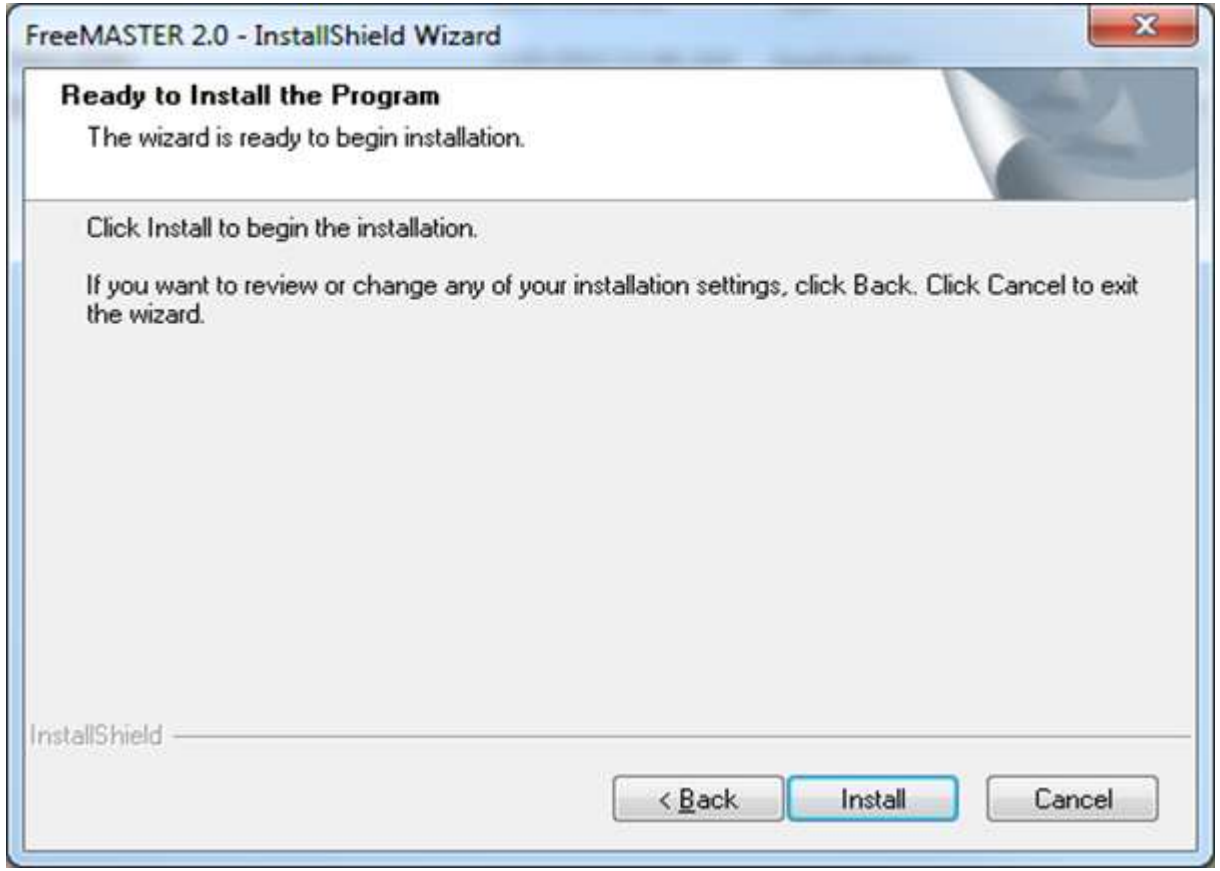
Downloading FreeMASTER for Real-Time Monitoring

- Select the complete install
- Hit *Next*



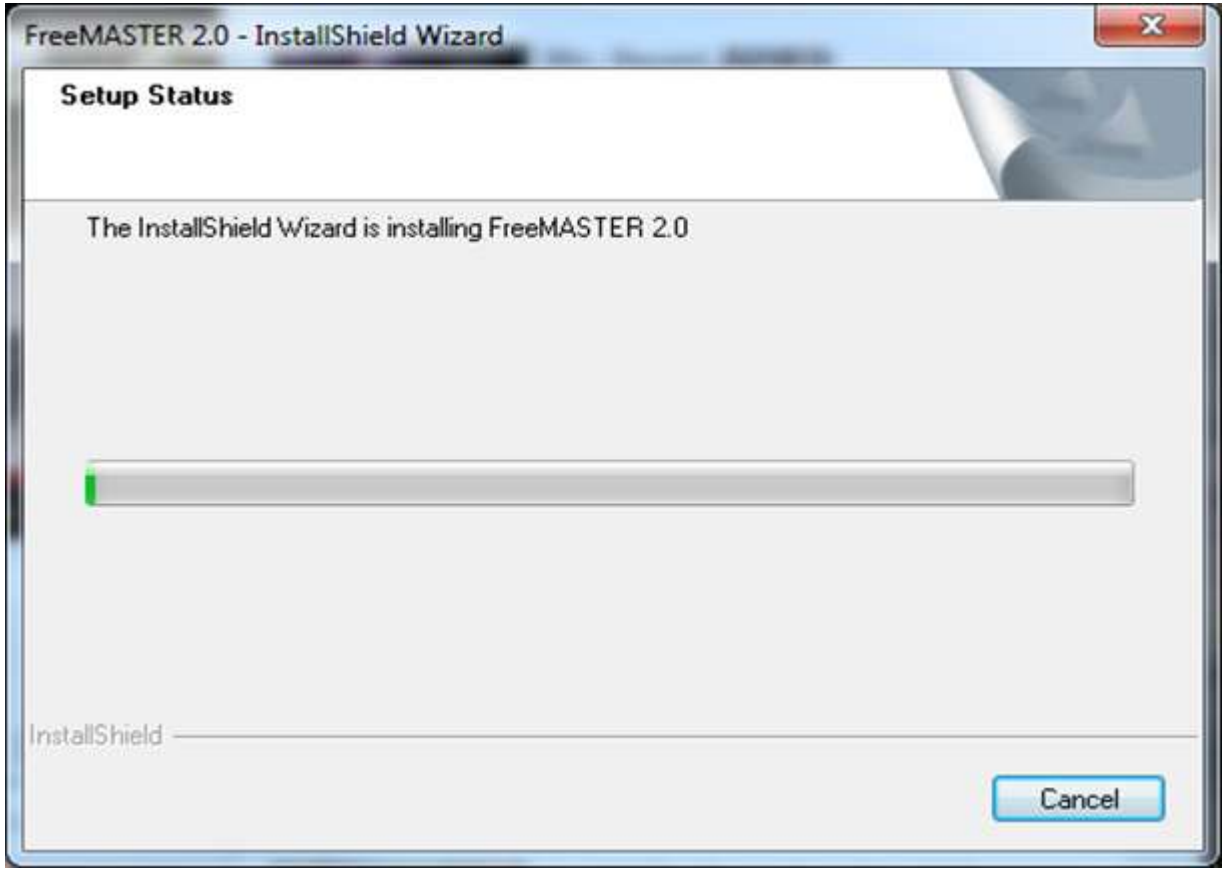
Downloading FreeMASTER for Real-Time Monitoring

- Install



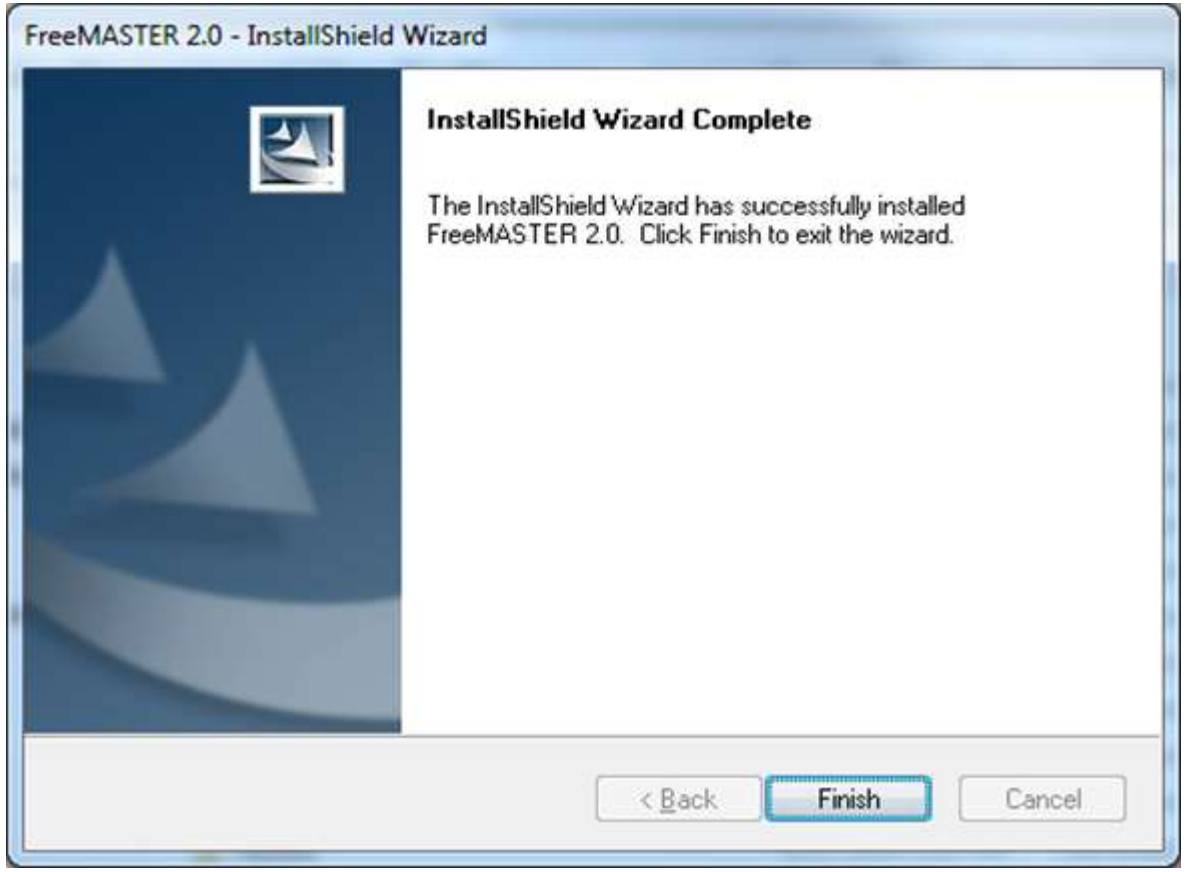
Downloading FreeMASTER for Real-Time Monitoring

- Wait for the installer to complete the installation



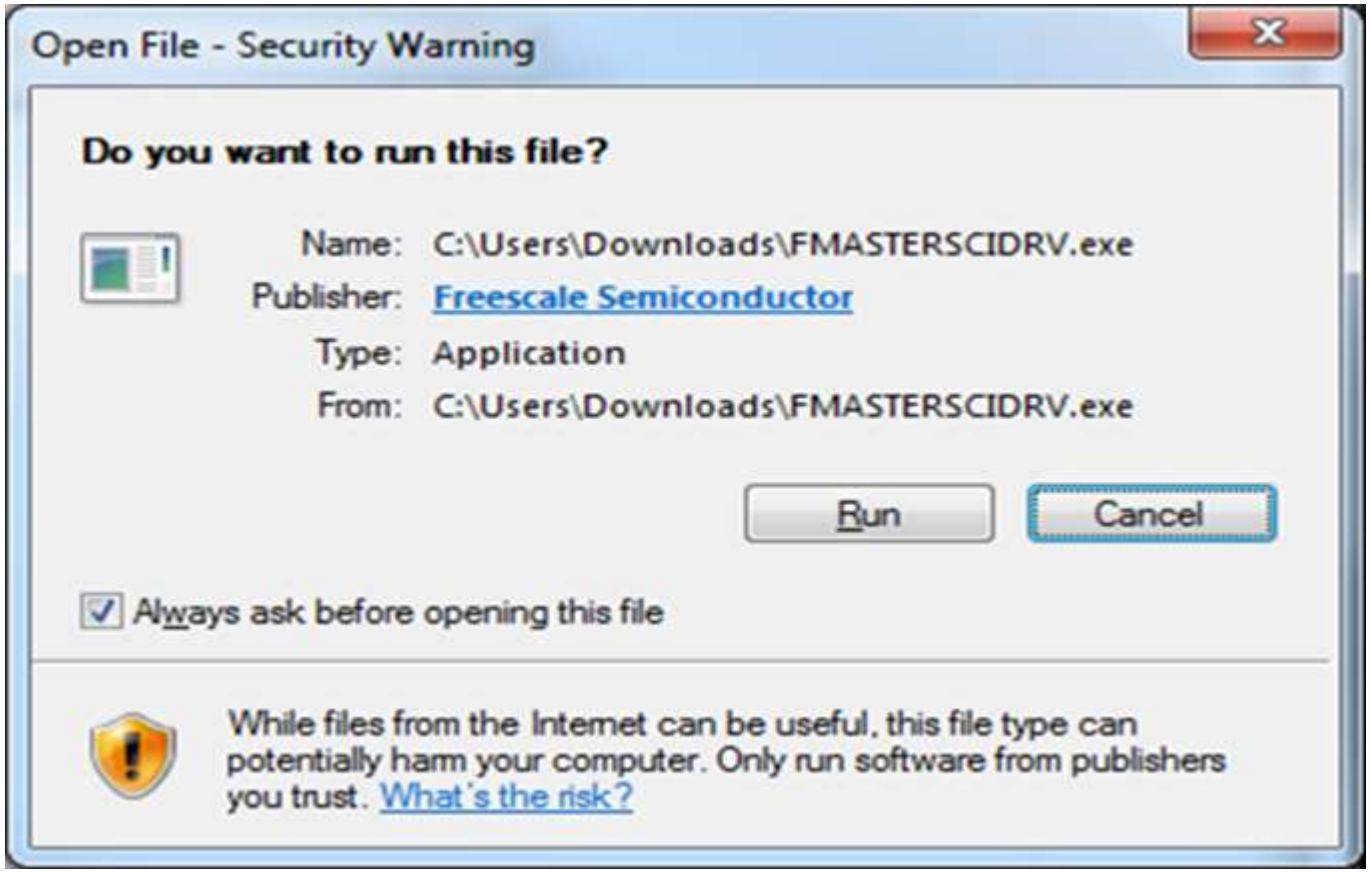
Downloading FreeMASTER for Real-Time Monitoring

- Click *Finish*
- FreeMASTER does not let you select an install path. The default location is C:\Program Files (x86)\Freescale\FreeMASTER 2.0\



Downloading FreeMASTER for Real-Time Monitoring Communication Driver

- Double-click *FMASTERSCIDRV.exe*
- Click *Run* when prompted



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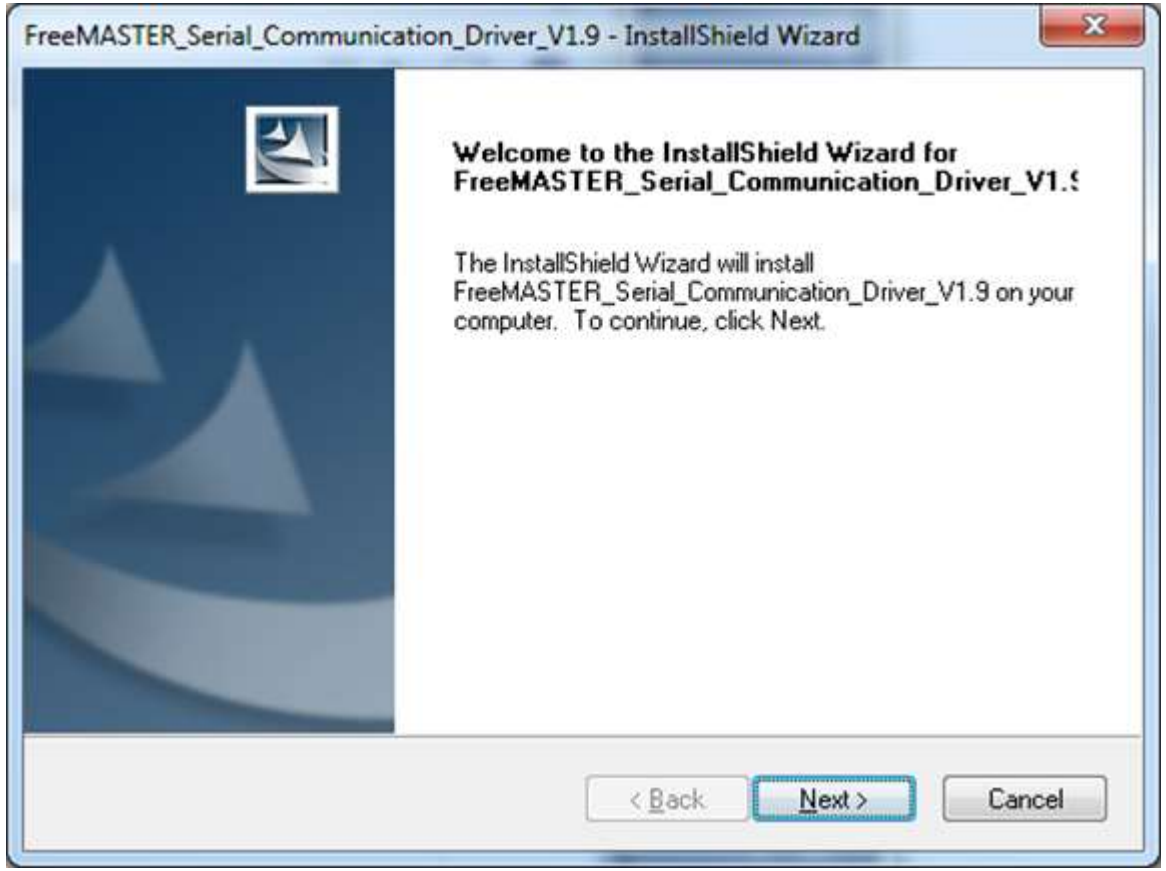
- This dialog-box will appear
- Hit *Next*



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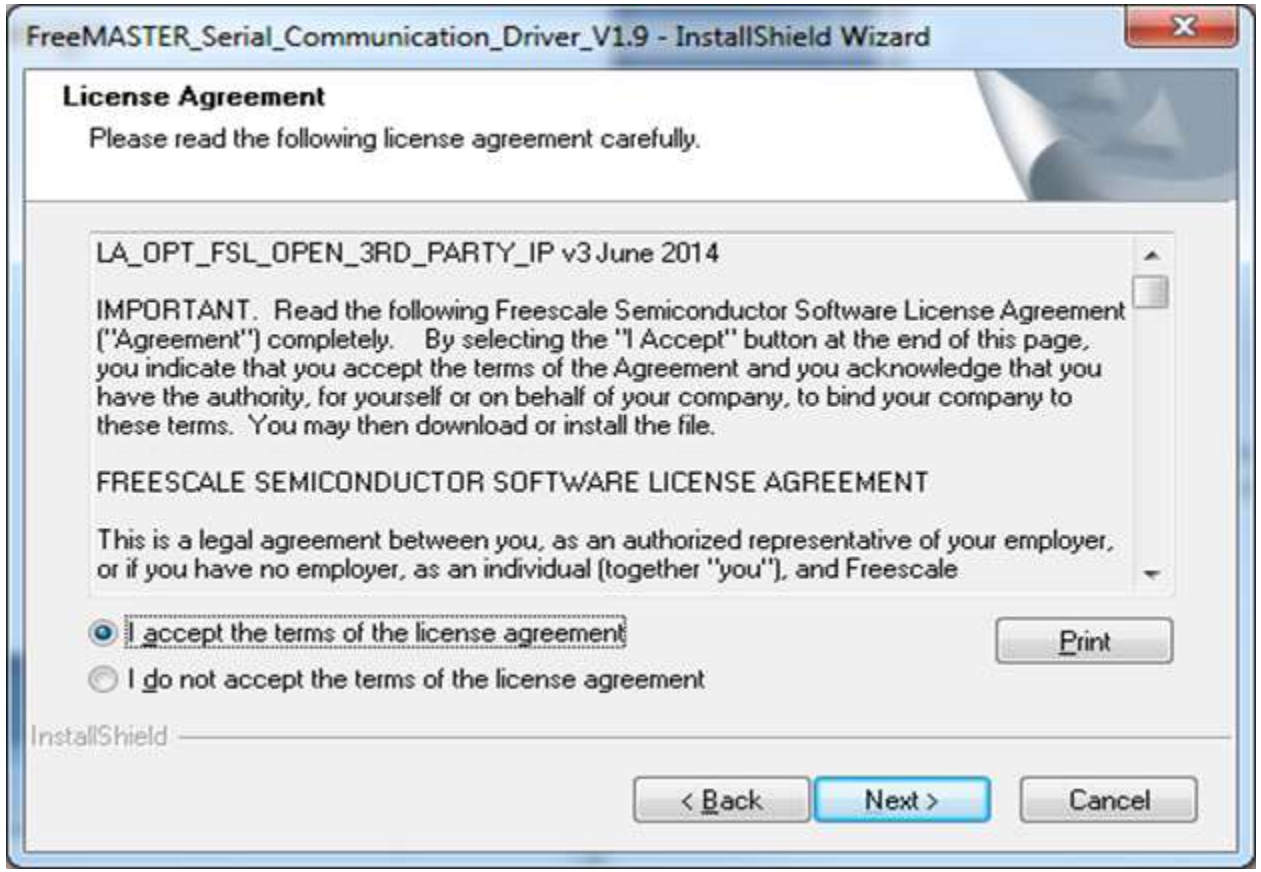
- Accept the Freescale license agreement



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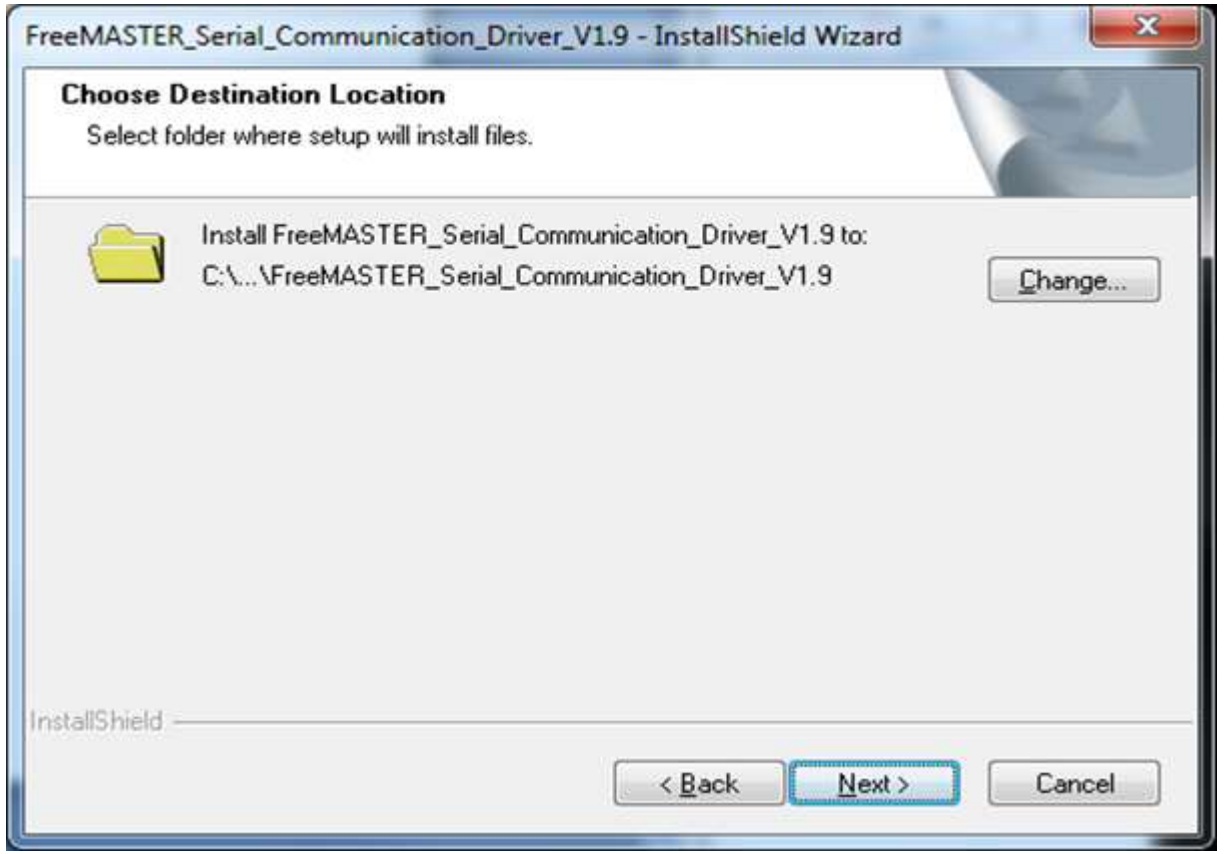
- It is recommended that you install FreeMASTER Communication Driver in the default location, since FreeMASTER must know where to look for it
- But you can change the directory if you so choose. Just make sure FreeMASTER settings are adjusted to reflect the change



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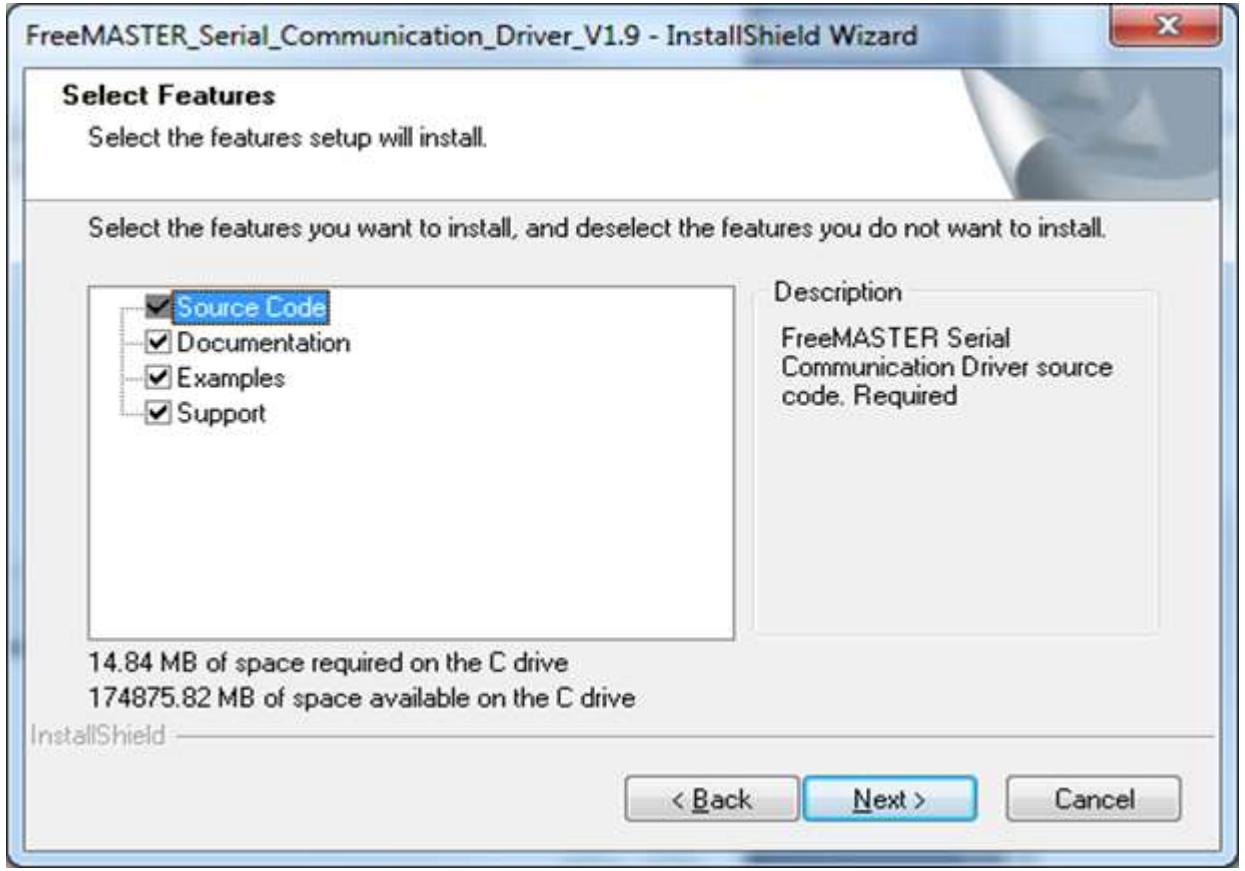
- Select everything



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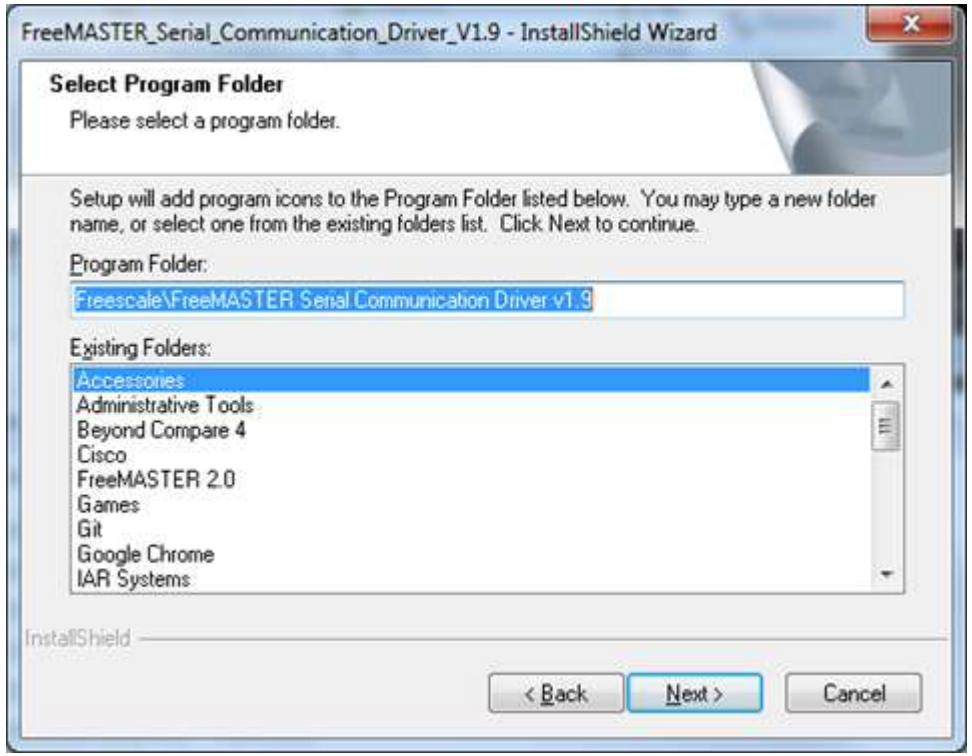
- Choose the program folder
- This differs from the installation folder. The program folder is where the FMSCDrv appears in the Windows start menu
- Again, it is recommended to use the default location



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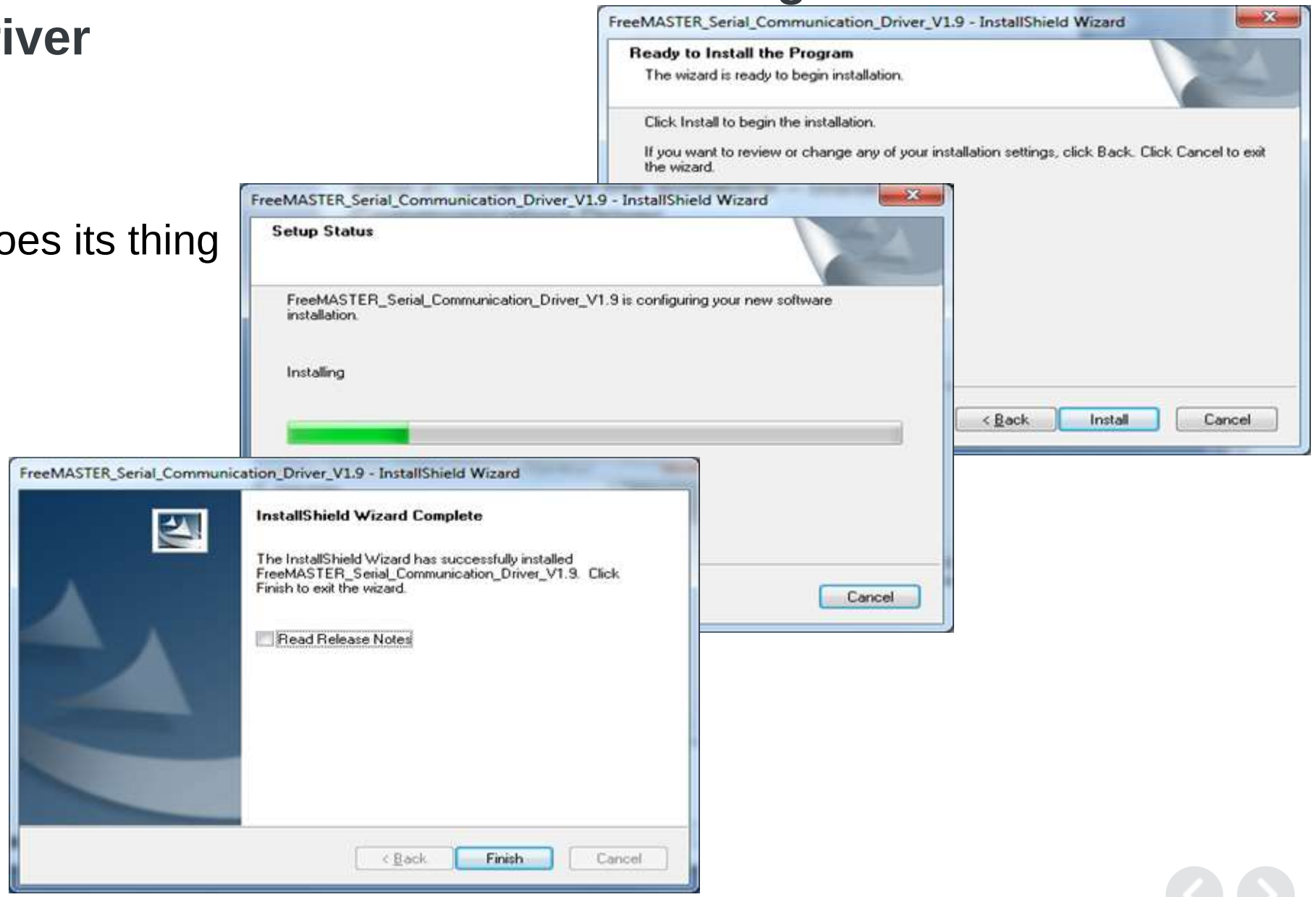
- Click Install
- Wait as the installer does its thing
- Hit *Finish*



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