How to develop and debug radar sensor firmware with ARC GNU IDE Eclipse

Calterah Semiconductor

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2019.05.15	Ver0.2.0	Change Alps build command	Yingzhe Zhou
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Contents

CHAPTER

ONE

Overview

The purpose of this document is to explain the procedure on the development of radar sensor firmware with ARC GNU IDE (Eclipse).

GNU Toolchain is free, complete, open source, tools for Synopsys DesignWare ARC processor cores including IDE compiler, debugger and all needed libraries and utilities. Besides GNU toolchain, Synopsys also provide DesignWare ARC MetaWare Development Toolkit for Safety enables developers to generate and debug highly efficient code for deeply embedded applications with an optimizing compiler, debugger and instruction set simulator. The MetaWare compiler toolchain is ASIL D Ready certified and includes a safety manual and a safety guide to help developers meet the requirements of the ISO 26262 standard and prepare for compliance testing of their safety-critical systems. For more info about MetaWare toolchain, please check Synopsys website.

Please note that before referring to this document, we assume that you have already read the "Alps SoC Chip Radar Development Platform Quick Start" document released by Calterah in advance.

CHAPTER

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Environment Preparation

This section illustrates some environment preparation work on radar sensor firmware development.

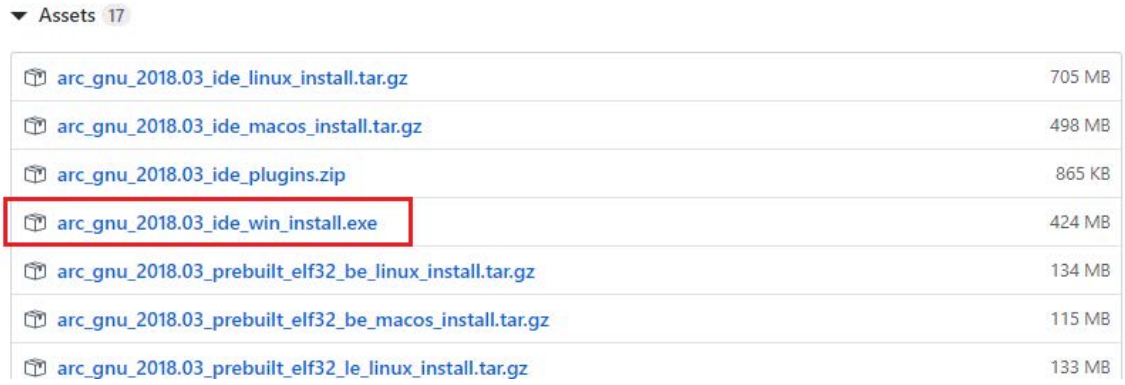
1.1 Download radar sensor firmware source code:

The radar sensor firmware source code can be downloaded from software release package on Calterah website. Please contact Calterah FAE for more information.

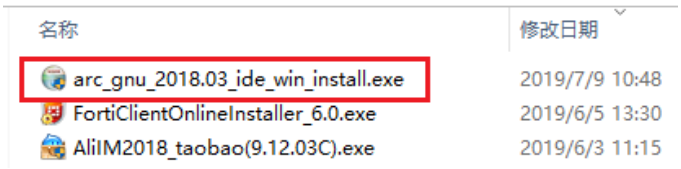
1.2 Download and install ARC GNU Toolchain:

GNU Toolchain for Synopsys DesignWare ARC Processors can be downloaded from:
https://github.com/foss-for-synopsys-dwc-arc-processors/toolchain/releases
Please select "2018.03" version as the PIC shown below:

On windows platform, select "arc_gnu_2018_03_ide_win_install.exe" as the PIC shown below and download it to your own windows platform:

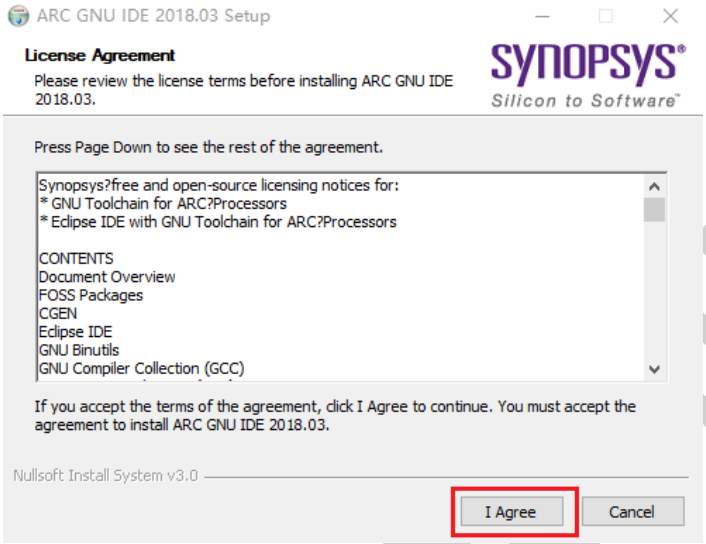


After download finished, start the installation by clicking below icon:

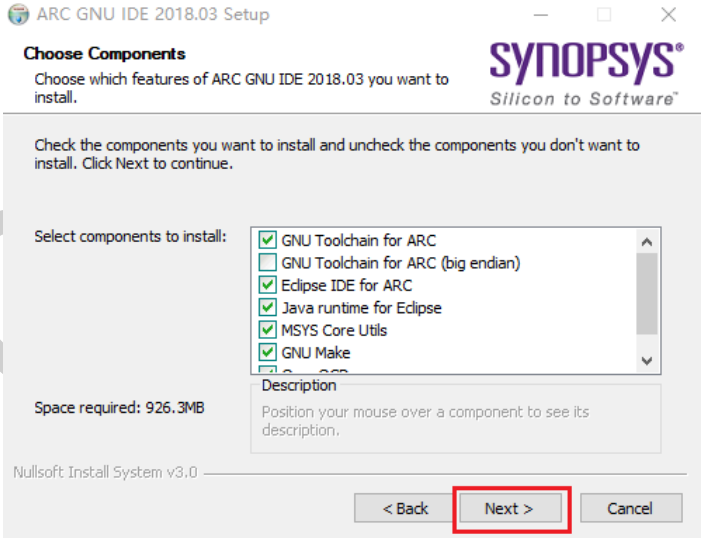


The detailed installation procedure is shown as below:

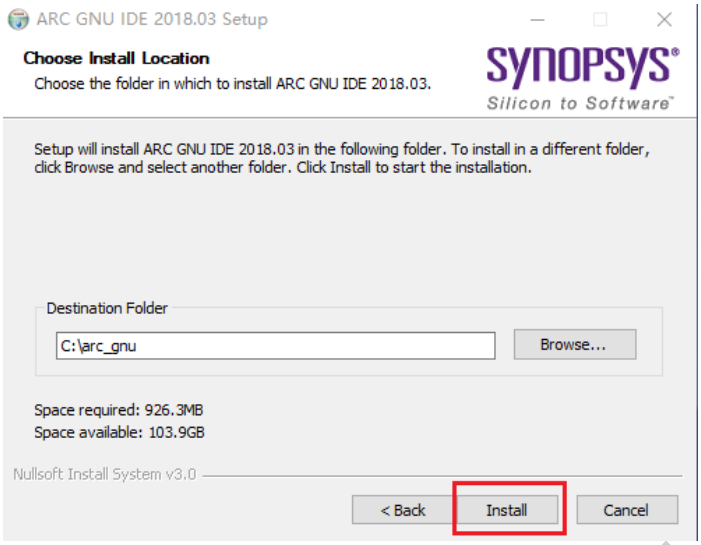
1) Select “I Agree” for License Agreement:



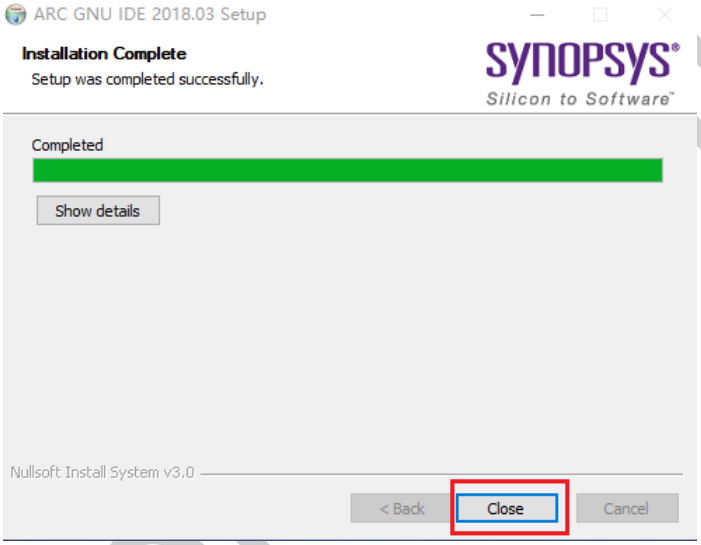
2) Select “Next” to next procedure:



3) Select “Install” to start the installation:



4) Click "Close" to finish the GNU Toolchain installation:



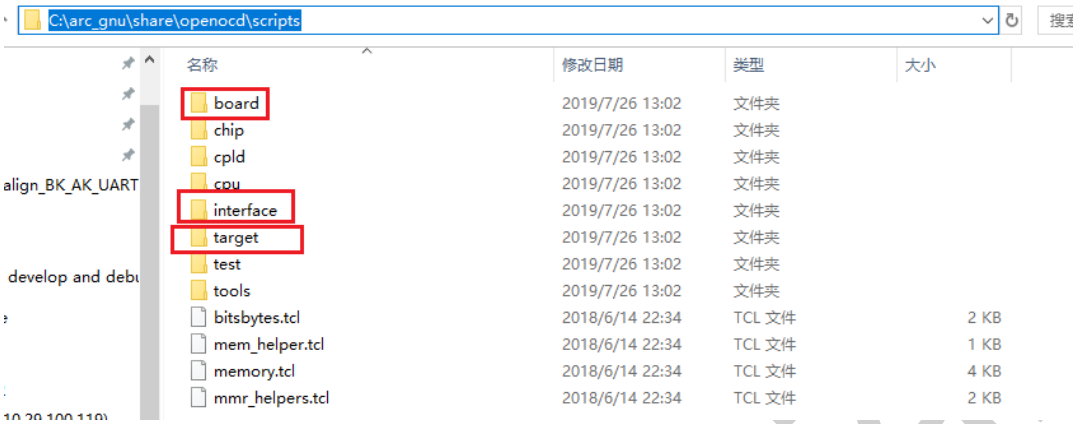
5) After installation finished, an "ARC GNU IDE Eclipse" icon can be found on the desktop:

1.3 Copy "Openocd" configuration file to ARC GNU Installation path:

Unzip the "arc_gnu.zip" file stored in the same folder of this document from software release package provide by Calterah at ".\Document\How to develop and debug radar sensor firmware with ARC GNU IDE Eclipse" and go to the ARC GNU installation path that should be

“C:\arc_gnu\share\openocd\scripts”.

For below three folders: “board”, “interface” and “target”:



(1). Copy “alps.cfg” in “arc_gnu\share\openocd\scripts\board” unzipped from “arc_gnu.zip” to “C:\arc_gnu\share\openocd\scripts\board”.

(2). Copy “calterah_alps.cfg” in “arc_gnu\share\openocd\scripts\interface\ftdi” unzipped from “arc_gnu.zip” to “C:\arc_gnu\share\openocd\scripts\interface\ftdi”.

(3). Copy “alps.cfg” in “arc_gnu\share\openocd\scripts\target” unzipped from “arc_gnu.zip” to “C:\arc_gnu\share\openocd\scripts\target”.

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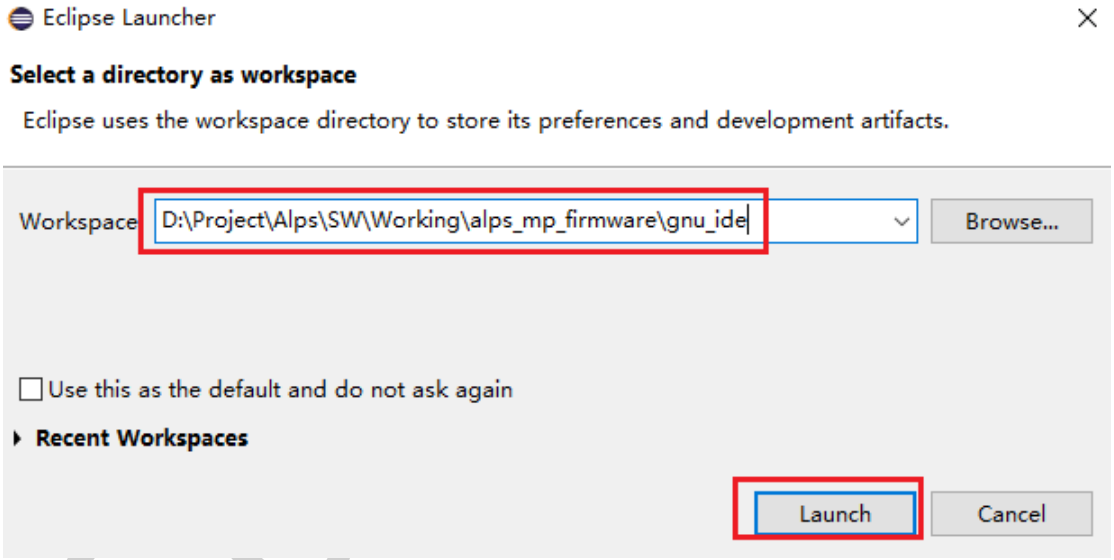
Configuration on ARC GNU IDE Eclipse

This section illustrates the necessary configuration on ARC GNU IDE (Eclipse) for debugging radar sensor firmware.

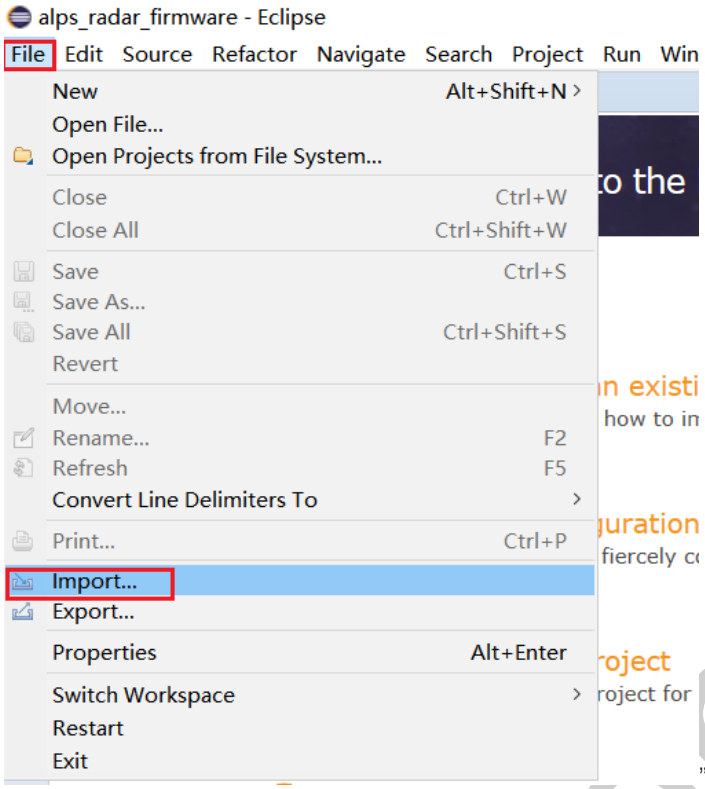
2.1 Create the workspace

Double click “ARC GNU IDE 2018.03 Eclipse” icon on the desktop, select the workspace location and click “Launch” button:

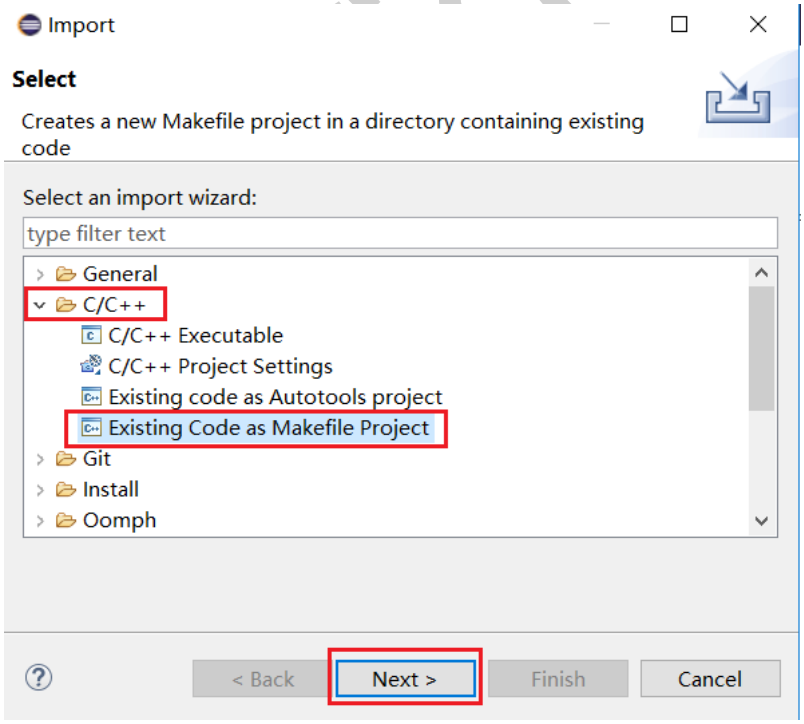


2.2 Import the project

1) Select “File->import”:

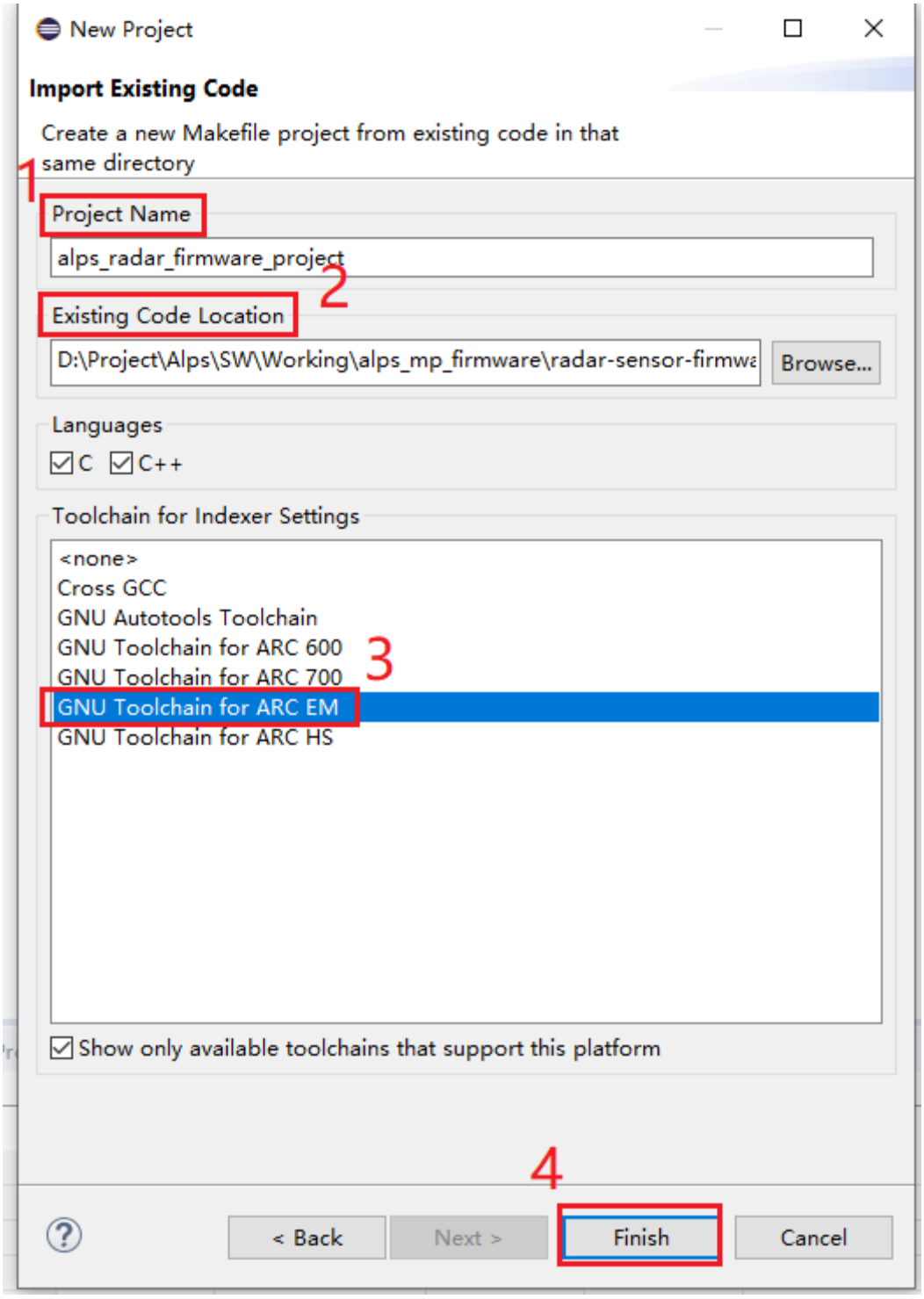


2) Select “C/C++ -> Existing Code as Makefile Project” and click “Next” button :

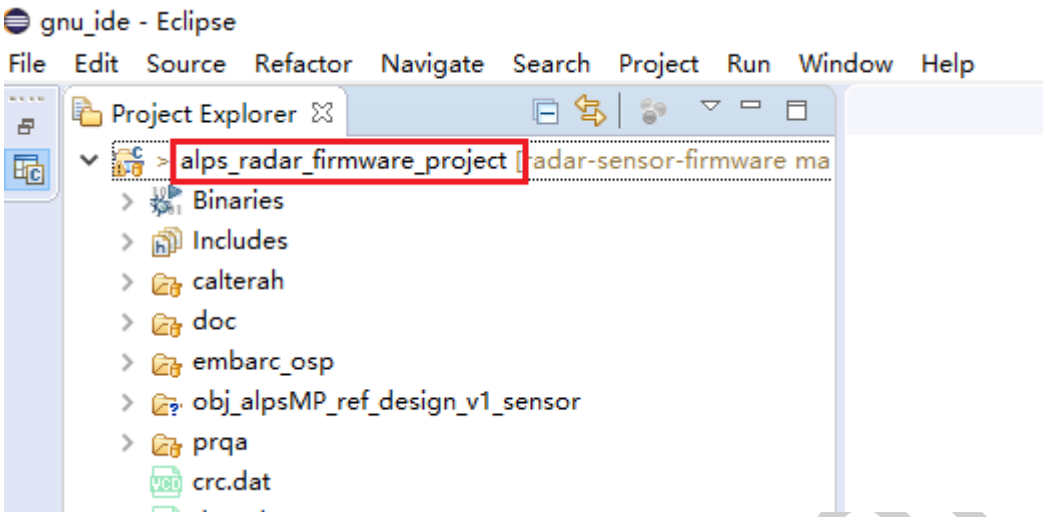


3) Input the “Project Name” and specific the directory of radar sensor firmware source code stored in your own PC in “Existing Code Location”, select “GNU Toolchain for ARC EM”

and click “Finish” button :

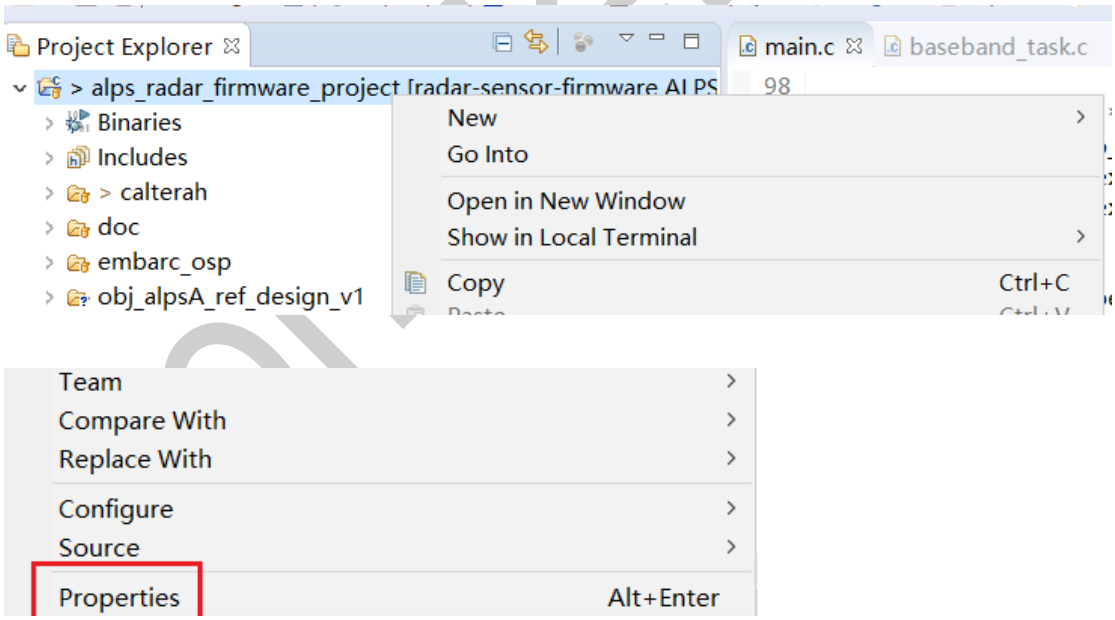


4) Click  icon on the top left corner, the created “alps_radar_firmware_project” will be displayed in “Project Explorer”

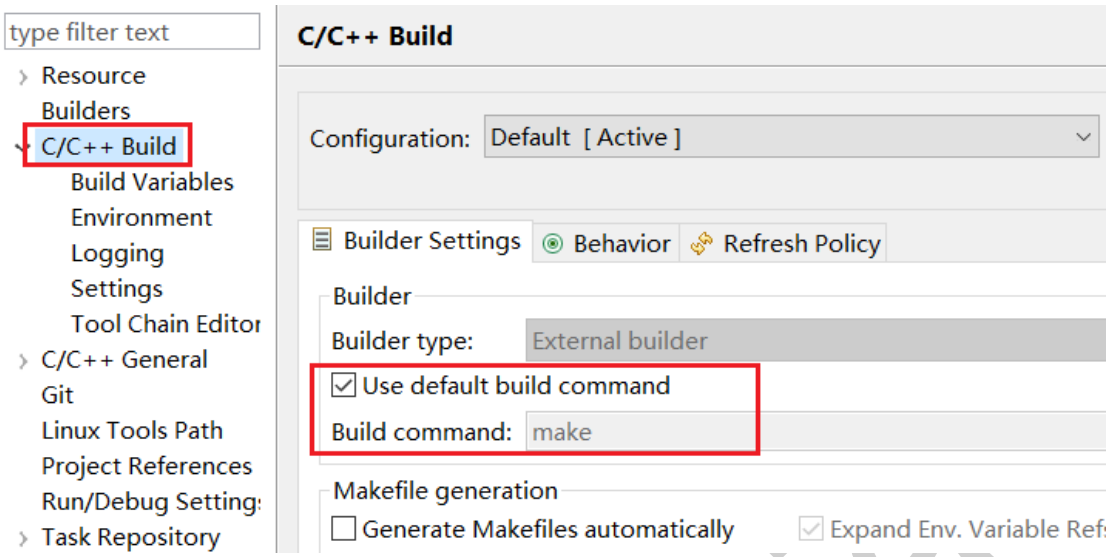


2.2 Build the project

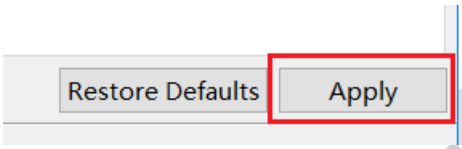
1) Right click the created "alps_radar_firmware_project" on "Project Explorer" and select "Properties" item:



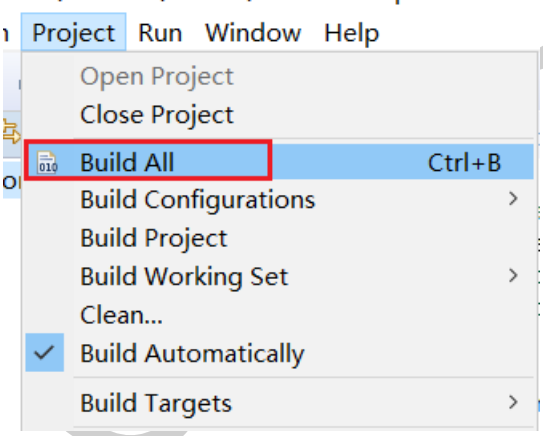
2) Click "C/C++ Build" on the left column, use the default "Build command" "make" which can be applied for building Radar Sensor Firmware project.



3) Click “Apply” button on the low right corner to let above configuration take effect:



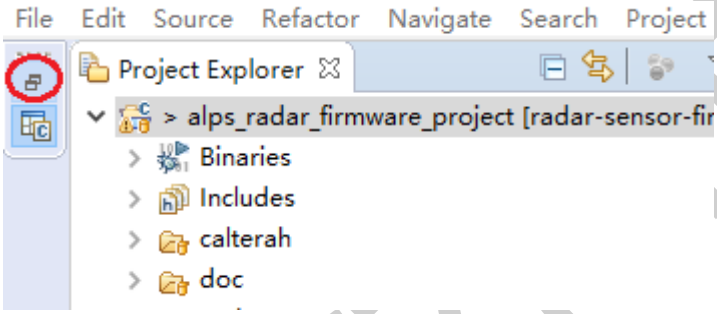
4) Go to “Project” and click “Build All” to kick off build process



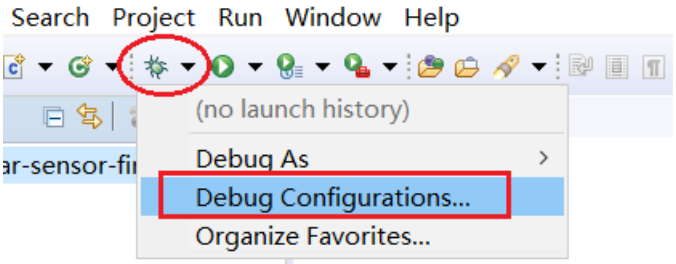
5) The Build process can be checked from “CDT Build Console” view:

2.3 Configure the "Debug Configuration"

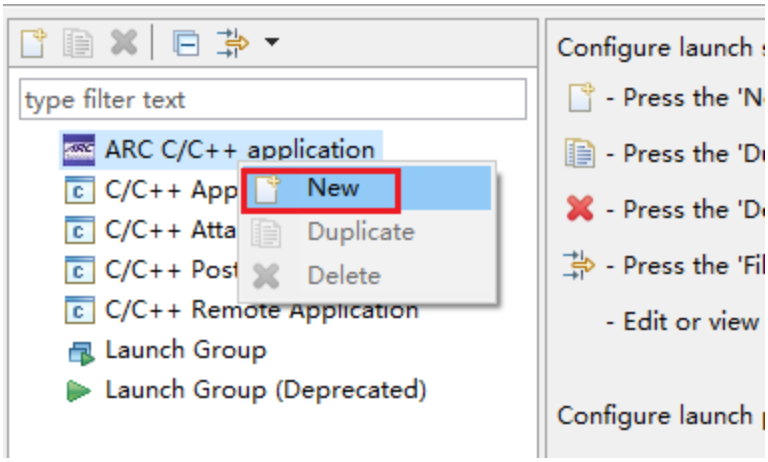
1) Click below icon on the top left corner:



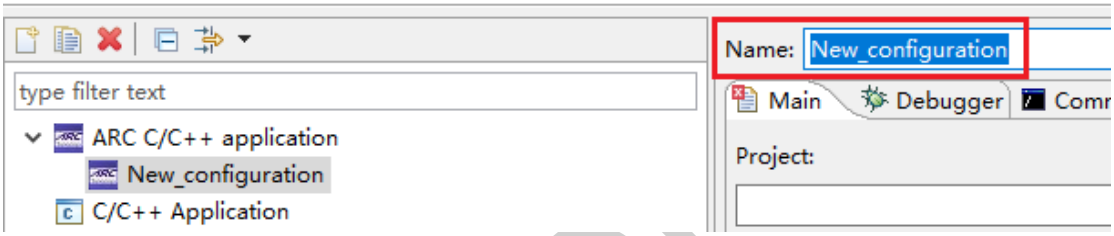
2) Open "Debug Configurations"



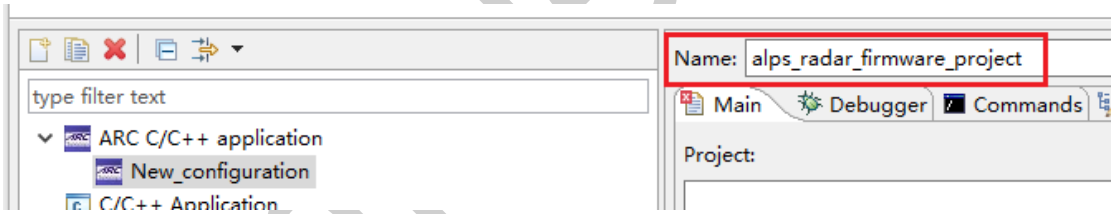
3) For the first time, no default project will be shown under "ARC C/C++ application" item. So please right click the "ARC C/C++ application" item and select "new":



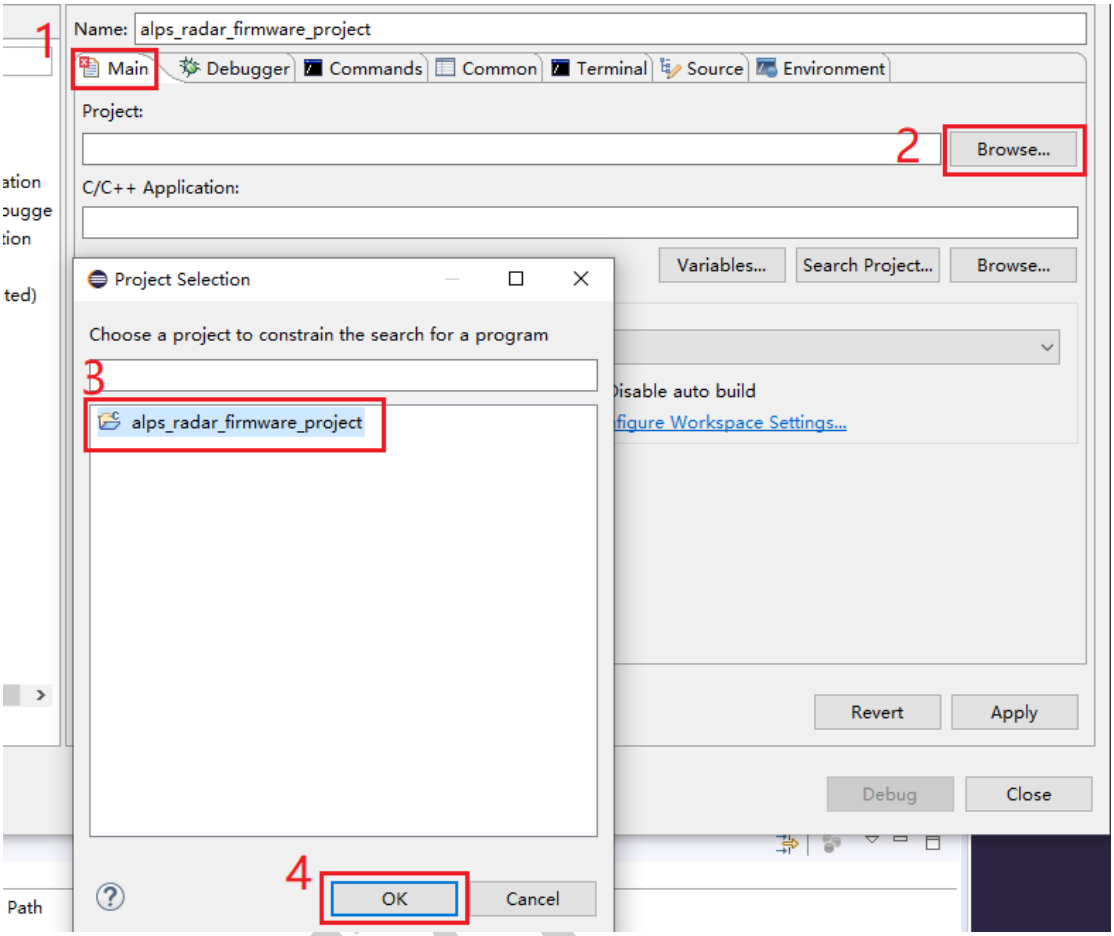
Key-in the configuration name to replace “new configuration”:



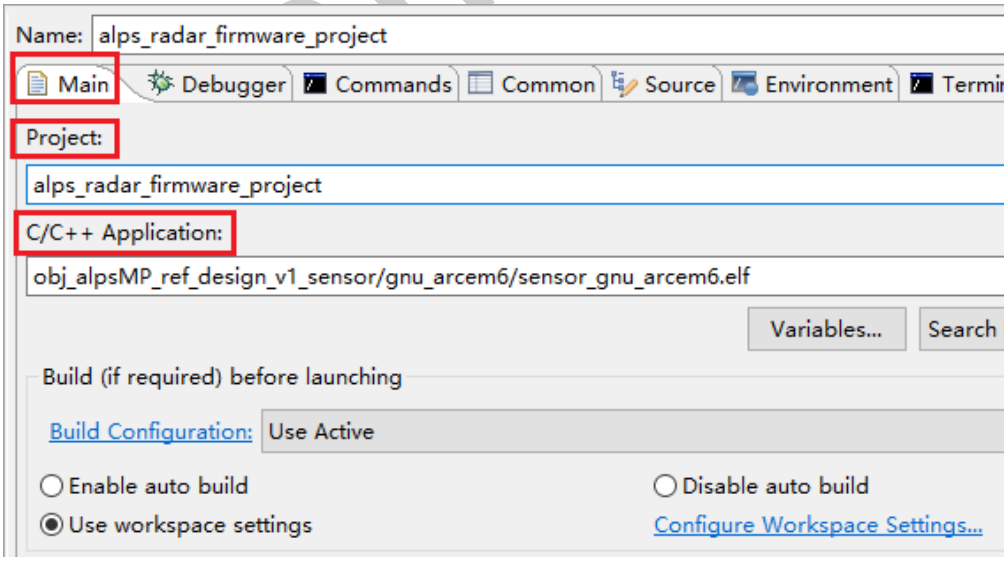
For example, key-in the configuration name as “alps_radar_firmware_project”:



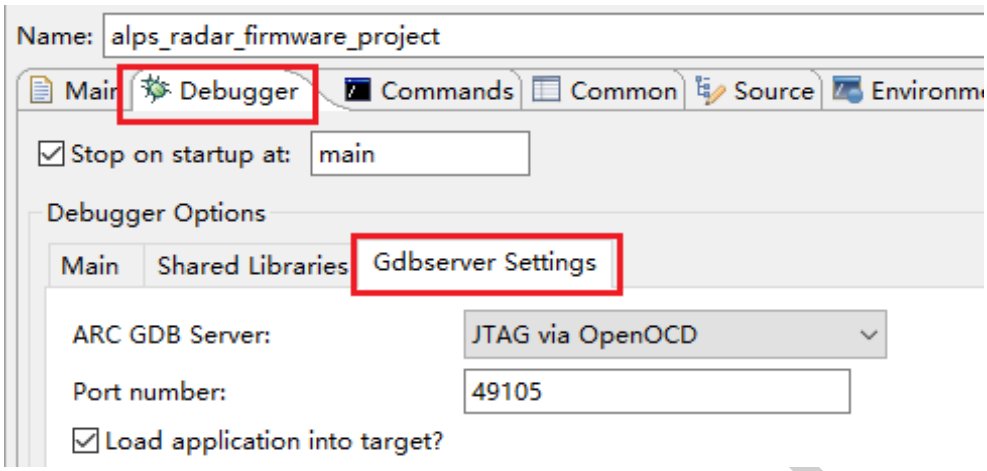
4) Select “Main”, click “Browse” button and double click the existed project, here the existed project is “alps_radar_firmware_project”, click “OK” to continue:



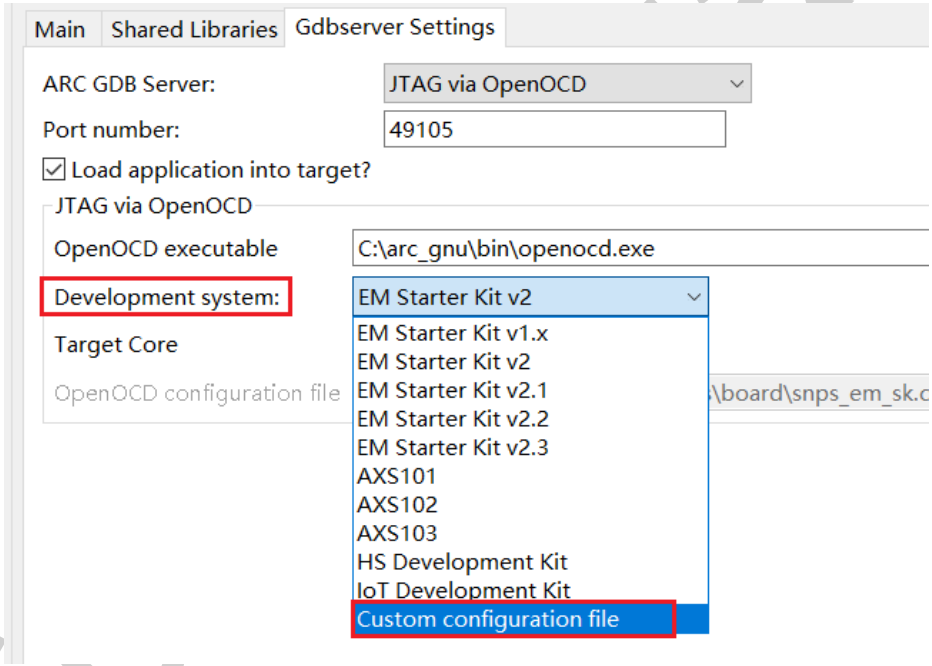
After above process complete, the "Main" window should be shown as below:



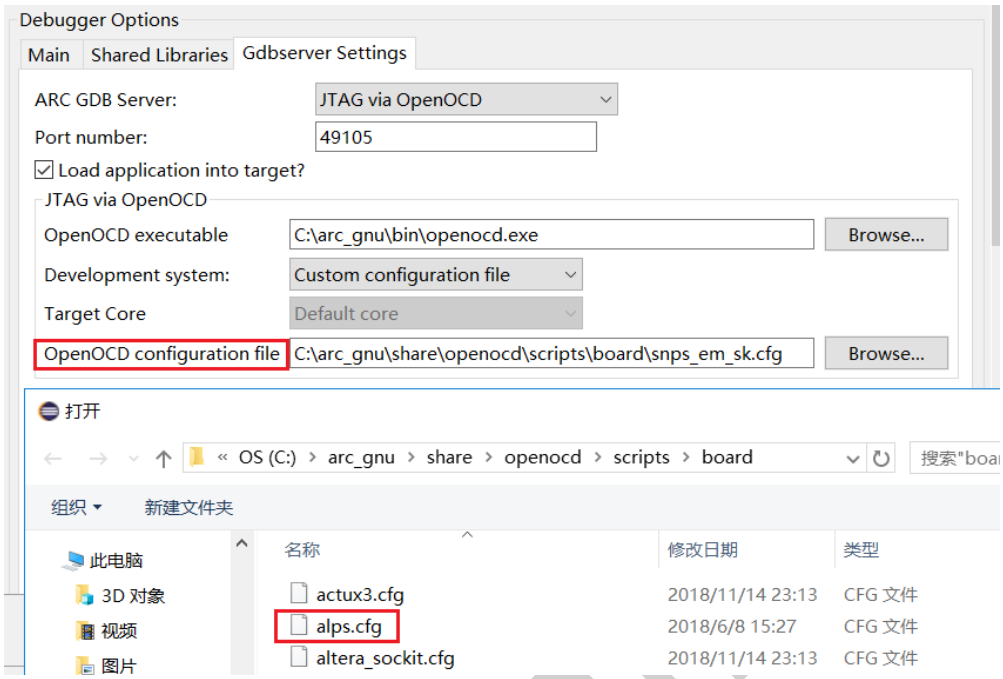
5) Select "Debugger" and select "Gdbserver Setting":



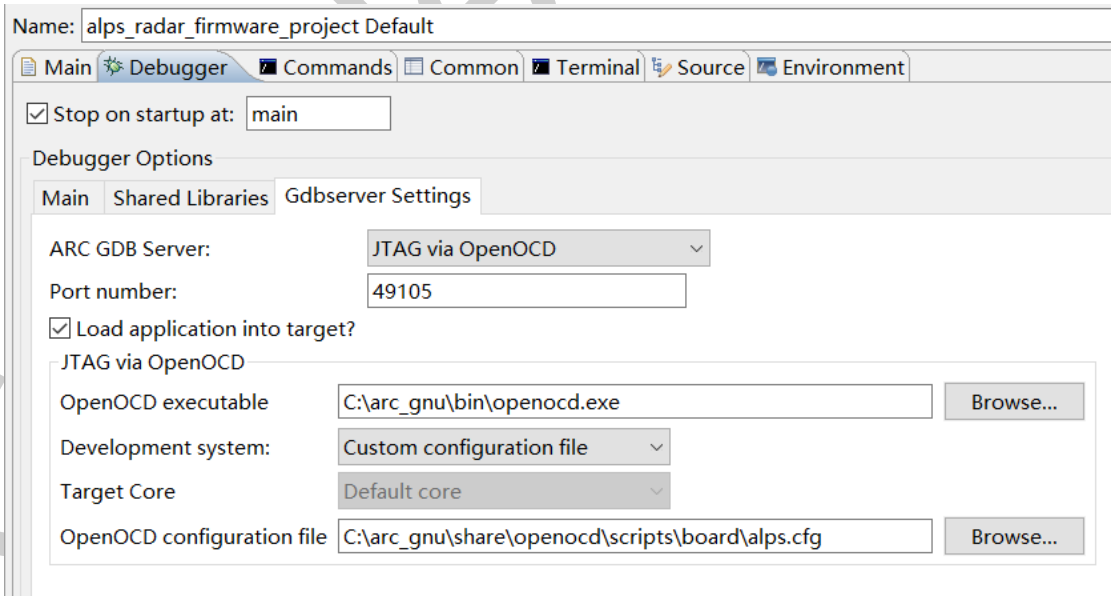
Change “Development system” to “Custom configuration file”:



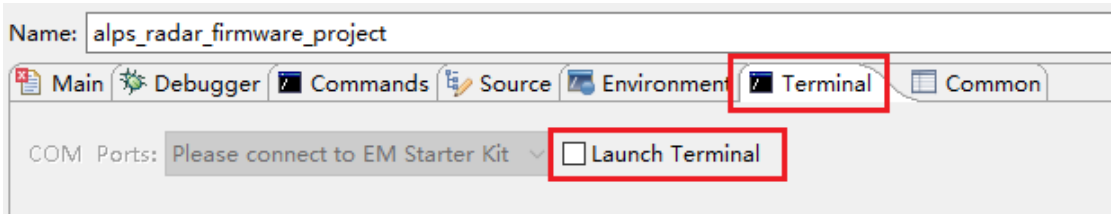
Change “OpenOCD configuration file” to “alps.cfg” which should be located under “C:\arc_gnu\share\openocd\scripts\board” directory on your own PC. The “alps.cfg” file has been introduced in section 1.3.



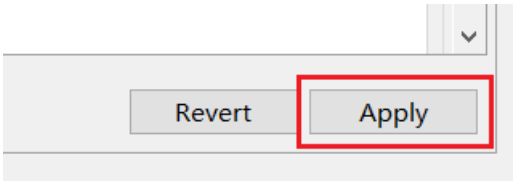
After above configuration complete, the "Gdbserver Setting" should be shown as below:



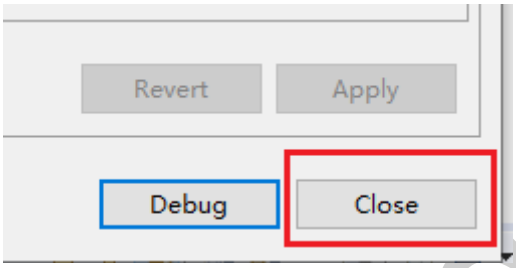
6) Go to "Terminal", uncheck "Launch Terminal" to avoid the VCOM data output conflicting with Calterah Radar GUI.



7) Click “Apply” button on the low right corner to let all the above configuration take effect:



8) Click “Close” button on the lower right corner:



CHAPTER

THREE

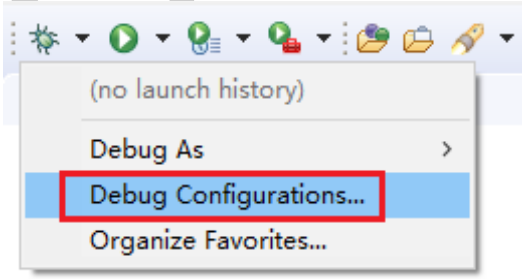
Start debugging

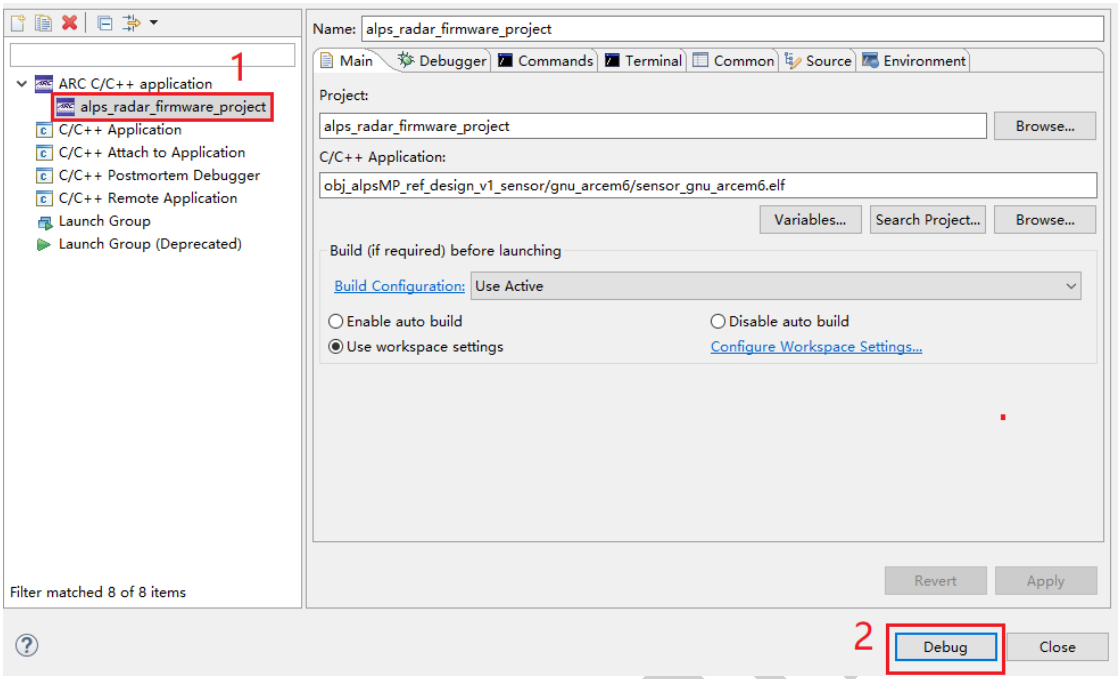
This section illustrates the debug process on the created “alps_radar_firmware_project”.

3.1 Debug Process

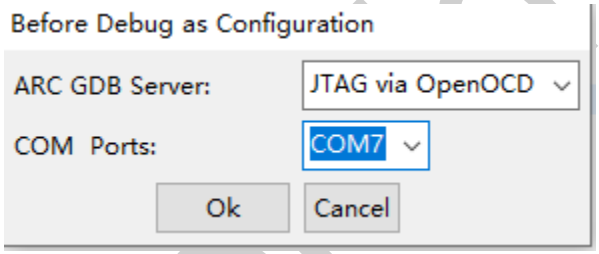
1) Connect the Calterah Radar Development Platform (RDP) to your own PC. Make sure COM port can be recognized on “Device Manager”:

2) Open “Debug Configuration” again and select the already existed project (here is “alps_radar_firmware_project”) under “ARC C/C++ application” item, click “Debug” button on the lower right corner:

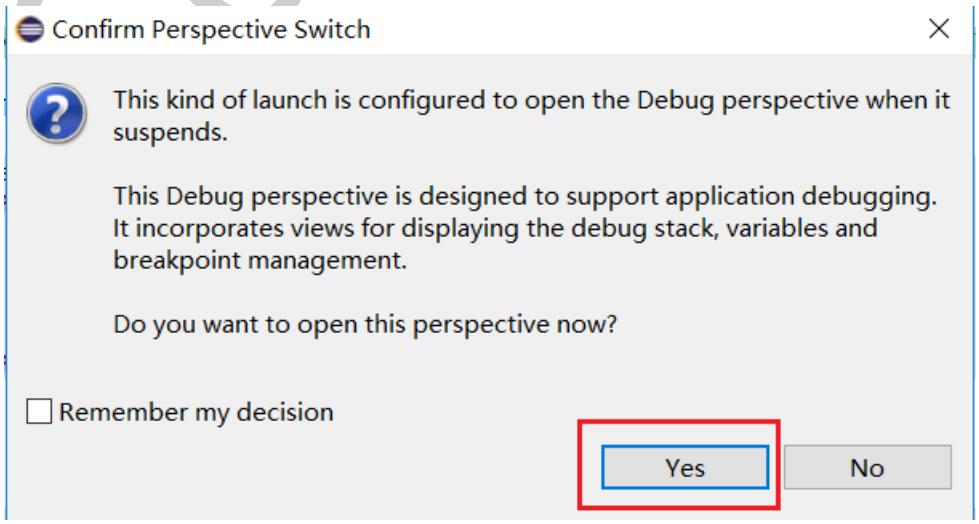




3) A “Before Debug as Configuration” box may pop up,
Select the “ARC GDB Server” as “JTAG via OpenOCD” and corresponding COM Ports number of Calterah RDP board according to “Device Manager” on your own PC, click “OK” button:



4) A “Confirm Perspective Switch” box will pop up and click “Yes” to continue:



5) Debug page will be shown and you can debug the project now.