arm CHINA

Application Note

Using the Example Project of STAR Application with CMSIS in MDK

Version 1.0
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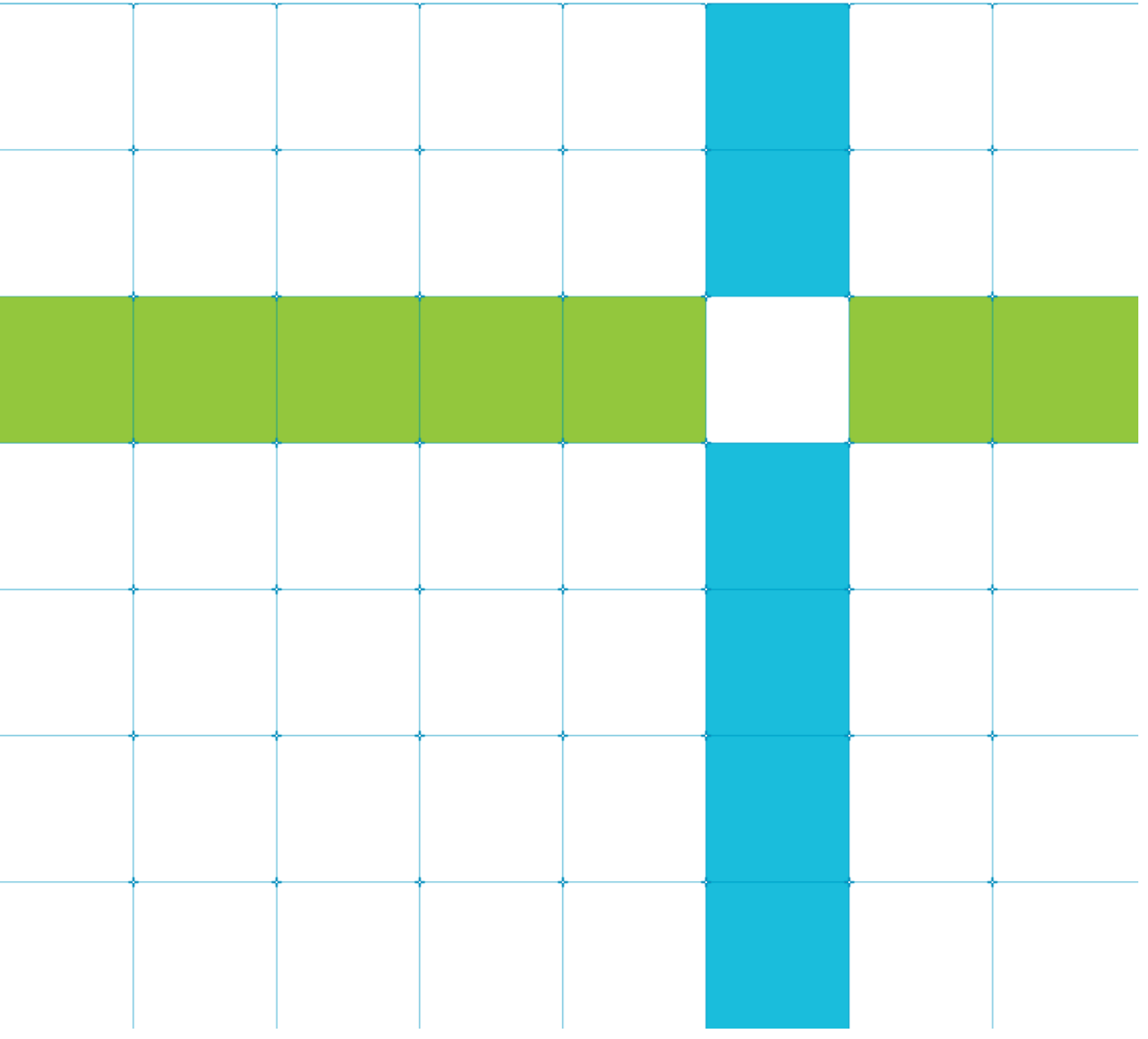
Non-Confidential



Non-Confidential Proprietary Notice

Release Information

Document History

Issue	Date	Confidentiality	Change
A	31/03/2021	Non-Confidential	Initial draft

Contents

1 About this document

This Application Note is intended for developers/programmers/users who use the Arm China STAR *Device Family Pack* (DFP). This Application Note gives you a basic understanding of the STAR DFP and describes how to use the example project of STAR application in Arm® Keil® MDK.

1.1 References

Reference	Document number	Title
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1.2 Terms and abbreviations

This document uses the following terms and abbreviations.

Term	Meaning
CMSIS	Cortex Microcontroller Software Interface Standard
DFP	Device Family Pack
MDK	Keil® MDK is the most comprehensive software development solution for Arm®-based microcontrollers and includes all components that you need to create, build, and debug embedded applications.

1.3 Conventions and feedback

The following describes the typographical conventions and how to give feedback:

Convention	Meaning
monospace	denotes text that can be entered at the keyboard, such as commands, file and program names, and source code.
monospace	denotes a permitted abbreviation for a command or option. The underlined text can be entered instead of the full command or option name.
monospace italic	denotes arguments to commands and functions where the argument is to be replaced by a specific value.
monospace bold	denotes language keywords when used outside example code.
italic	highlights important notes, introduces special terminology, denotes internal cross-references, and citations.
bold	highlights interface elements, such as menu names. Also used for emphasis in descriptive lists, where appropriate, and for Arm China processor signal names.

1.3.1 Feedback on this product

If you have any comments and suggestions about this product, contact your supplier and give:

- Your name and company.
- The serial number of the product.
- Details of the release you are using.
- Details of the platform you are using, such as the hardware platform, operating system type and version.
- A small standalone sample of code that reproduces the problem.
- A clear explanation of what you expected to happen, and what actually happened.
- The commands you used, including any command-line options.
- Sample output illustrating the problem.
- The version string of the tools, including the version number and build numbers.

1.3.2 Feedback on documentation

If you have comments on the documentation, e-mail errata@armchina.com. Give:

- The title.
- The number, [Document ID Value], [Issue].
- If viewing online, the topic names to which your comments apply.
- If viewing a PDF version of a document, the page numbers to which your comments apply.
- A concise explanation of your comments.

Arm China also welcomes general suggestions for additions and improvements.

Arm China periodically provides updates and corrections to its documentation on the Arm China Information Center, together with knowledge articles and ***Frequently Asked Questions*** (FAQs).

1.3.3 Other information

- Arm Glossary, http://infocenter.arm.com/help/topic/com.arm.doc.aeg0014-/index.html.

2 Introduction

2.1 CMSIS

The *Cortex Microcontroller Software Interface Standard* (CMSIS) is a vendor-independent hardware abstraction layer for microcontrollers.

The CMSIS defines generic tool interfaces and enables consistent device support.

The CMSIS provides:

- Simple software interfaces to processor and peripherals.
- A common approach to interface to peripherals, real-time operating systems, and middleware components.

2.2 STAR DFP

For CMSIS compliant toolchains such as Keil MDK and IAR EW, additional software components and support for microcontroller devices are provided by software packs.

A DFP is one of the CMSIS software packs. It indicates that a software pack contains support for microcontroller devices.

A DFP provides essential support for the software targets on a specific device, such as ‘startup’, ‘system’, linker scripts, and debug configuration.

The STAR processor is the first processor in the Arm China STAR series processor family.

STAR is a fully featured microcontroller class processor based on the Armv8-M mainline architecture with Arm TrustZone technology (depending on the actual core).

In STAR CMSIS DFP v1.2.0 and later, there are example projects of STAR application. These example projects can help you quickly build projects and run the application software.

3 Preparations

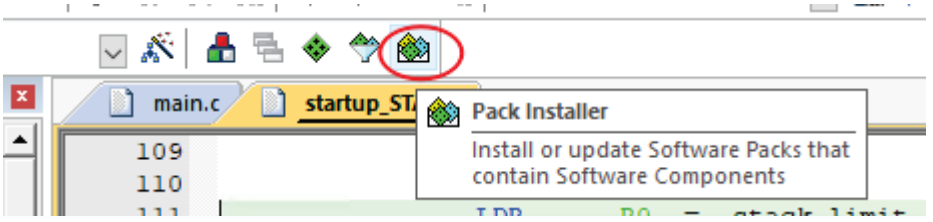
The example project of the application software will run on an MPS2 FPGA board.

Before using the example project, you need to:

- Ensure that you have an MPS2/MPS2+ FPGA board and had a STAR-based device implemented on the board.
- Check the STAR CMSIS DFP version.

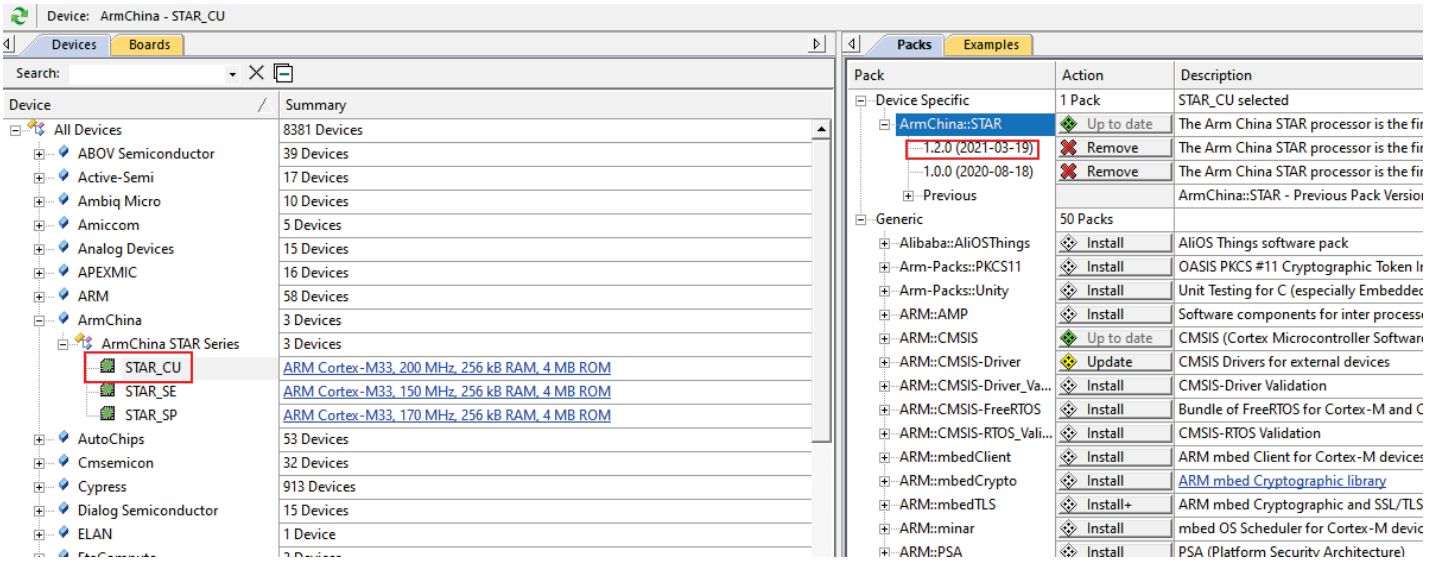
To check the STAR CMSIS DFP version:

1. Start MDK.
2. On the toolbar, click the **Pack Installer** icon.



3. On the **Devices** tab, select a device (for example, **STAR_CU**) and check the version of the installed pack.

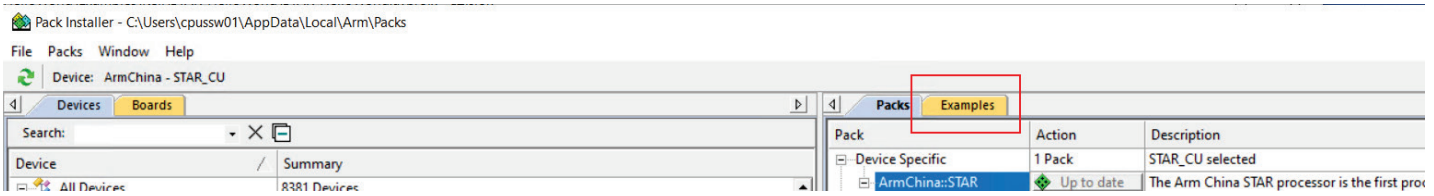
   As shown in the following figure, the version of the ArmChinaSTAR pack should be 1.2.0 or later.



4 Using the example project of STAR application

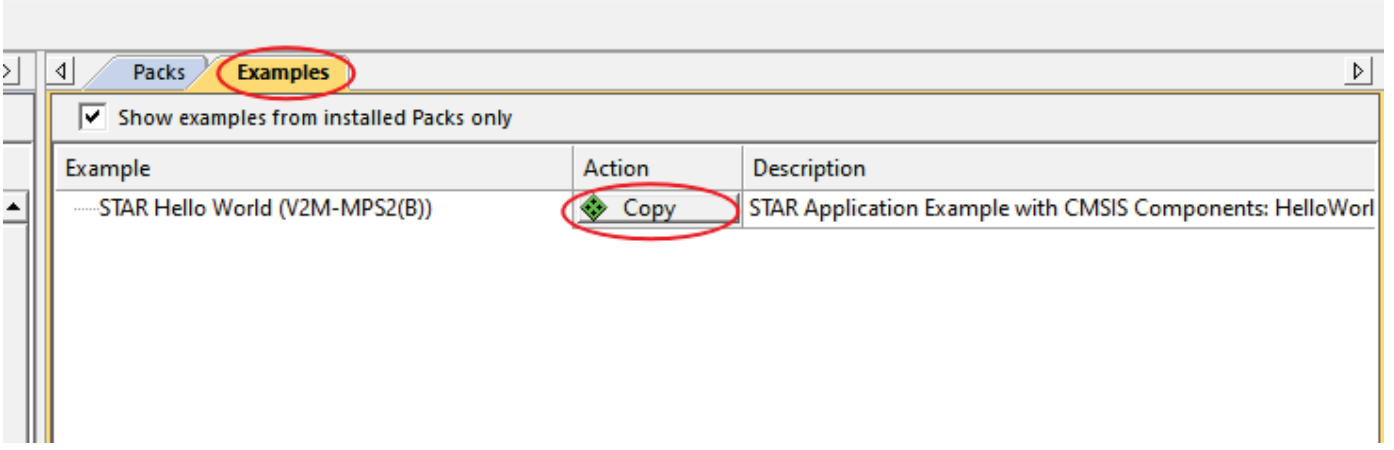
Follow these steps to get started with the software development using the example project of STAR application in the MDK environment:

1. In the Pack Installer, click the **Examples** tab.

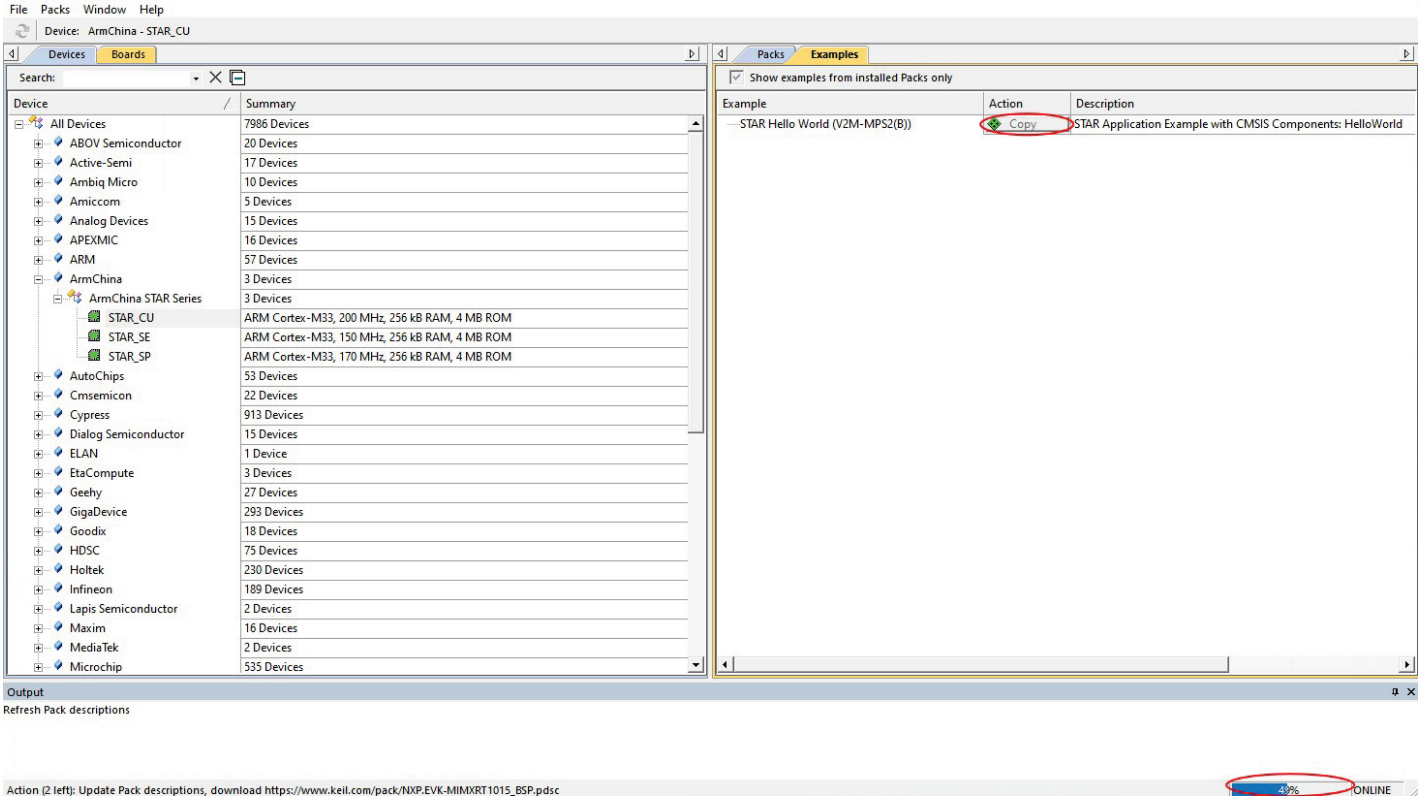


2. On the **Examples** tab, select the example that you want to use and click **Copy**.

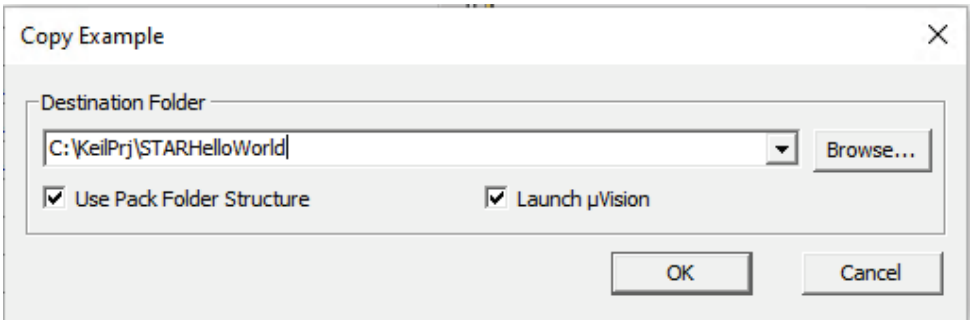
   In STAR CMSIS DFP v1.2.0, there is only one example named 'STAR Hello World' available. This example project enables `printf` and `scanf` through standard IO functions. The standard functions are retargeted to the low-level functions based on the UART driver provided by STAR CMSIS DFP.



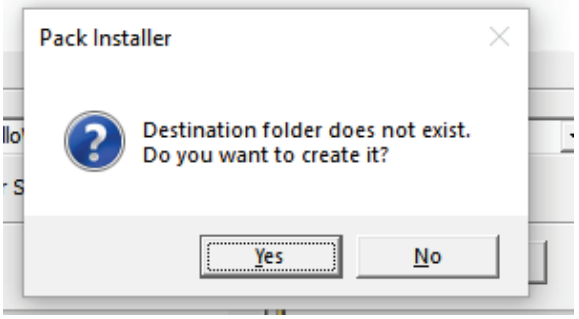
   Note: Sometimes the Copy button is disabled in gray because there are some packs need to be updated. You can check the progress bar to confirm this situation. When the progress reaches 100%, the Copy button will be enabled.



3. In the **Copy Example** dialog box that appears, specify the destination folder path to save the project, and then click **OK**.



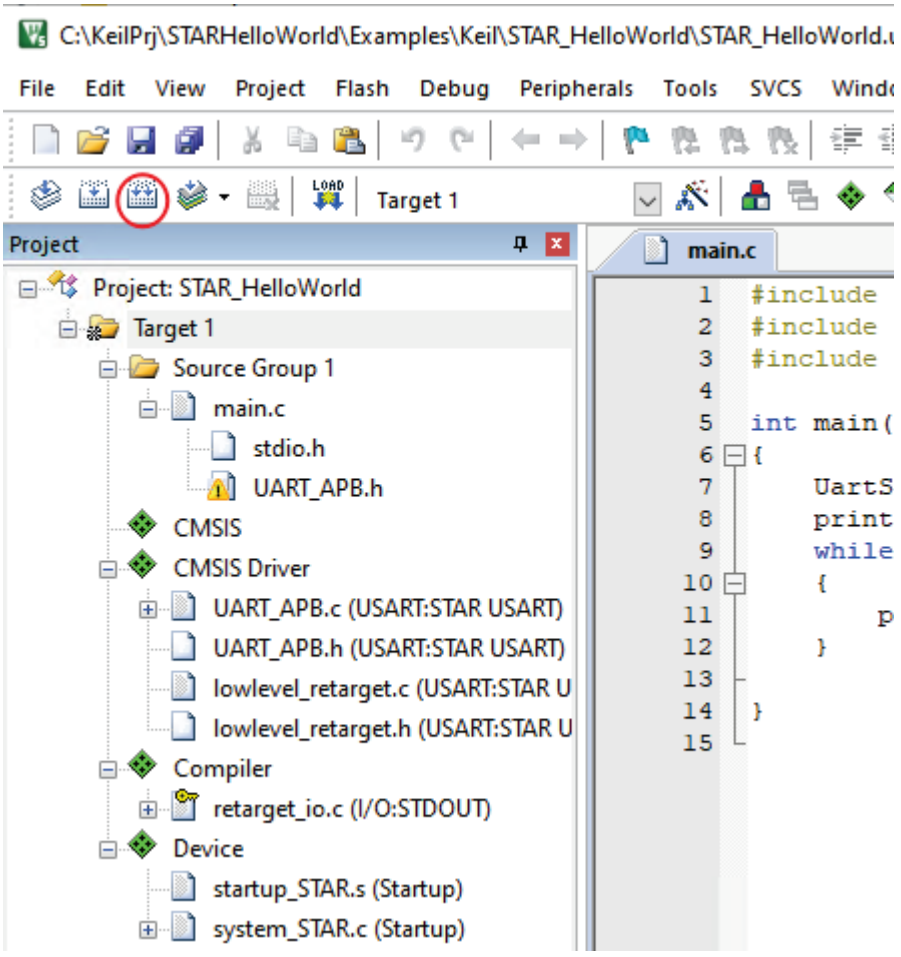
If the destination folder does not exist, click **Yes** to create it.



A project is created in the destination folder.

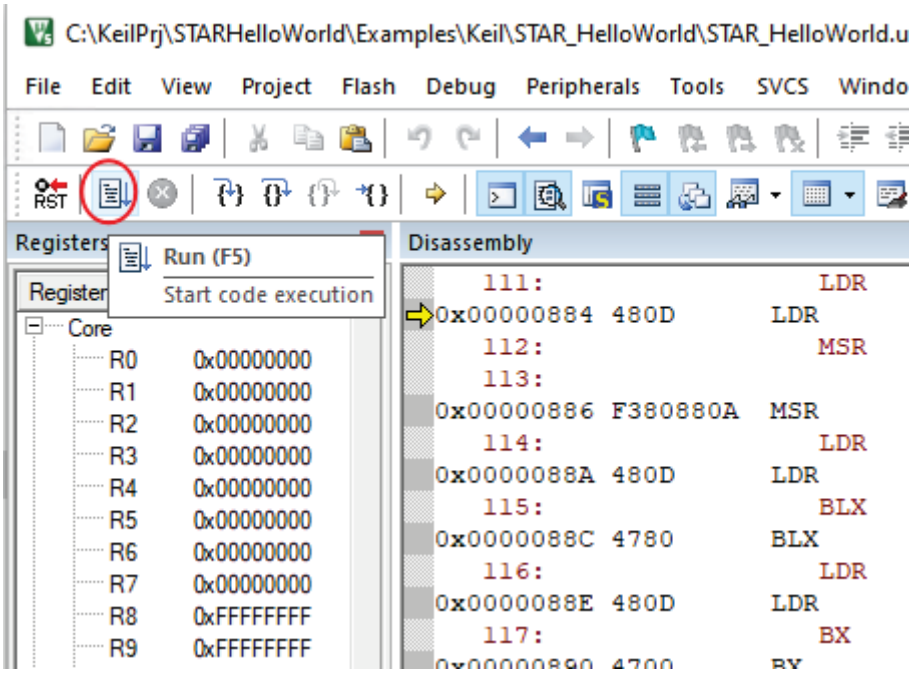
The µVision will start automatically and open the created project. In the Project pane, you can see all the required files.

4. Click the **Rebuild** icon to recompile and build the project.



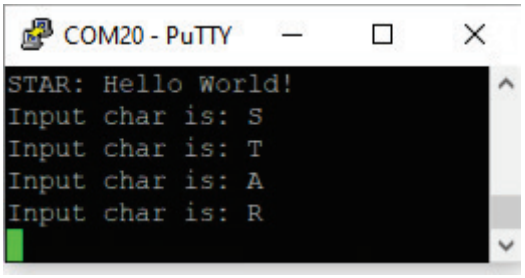
5. Click **Start/Stop Debug Session** to start the debug session.

6. Click the **Run** icon to run the built software.



You can see “STAR: Hello World!” in the UART terminal window.

The window can also receive the char you input.



Based on this project, you can start to develop your STAR-based application software.