

WSC355 – Laboratory Setup

Setting up Keil uVision

Introduction

The purpose of this document is to provide a guide on downloading and installing Arm's Keil uVision IDE (integrated Development Environment) to enable us to write, compile and load code to the STM32F3Discovery boards.

The Keil uVision IDE is free to use without a license up a code size limit. All the exercises within this module should be well below this threshold. You do have to provide basic contact information to Keil to use register the software.

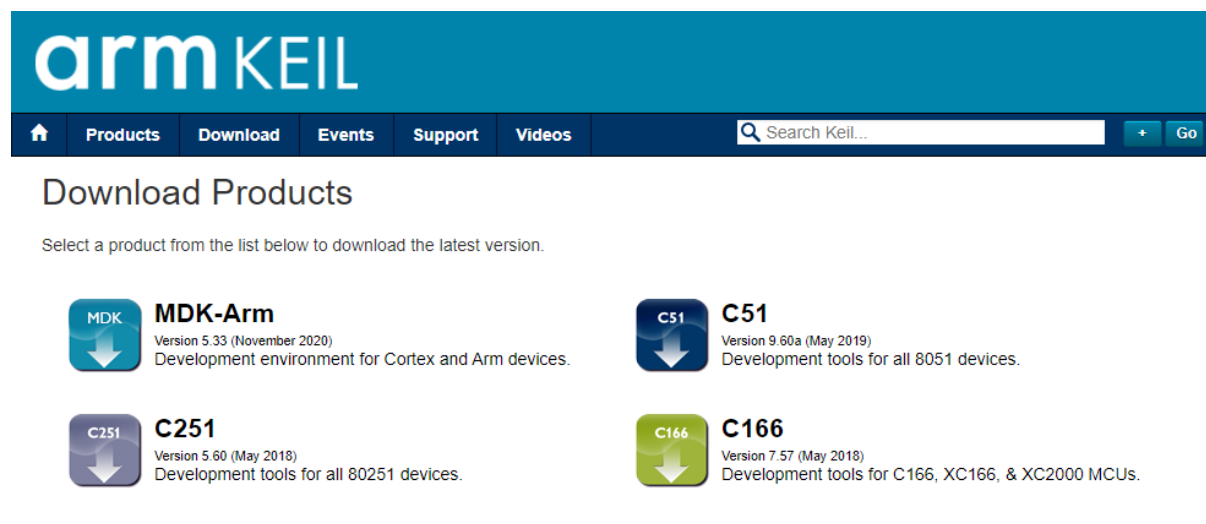
Download and Install

Principally this involves following on-screen instructions, but the final setup parts are particular to our exercises so please pay attention to these.

Navigate to the link:

<https://www.keil.com/download/product/>

to get to the following screen:



We require the MDK-Arm to programme the ARM Cortex M4 architecture the forms the STM32 device. Click on this icon to proceed.

The following form will appear:

[Home](#) / [Product Downloads](#)

MDK-ARM

MDK-ARM Version 5.33

Version 5.33

Complete the following form to download the Keil software development tools.

Enter Your Contact Information Below

First Name:

Last Name:

E-mail:

Company:

Job Title:

Country/Region:

Phone:

☐ Send me e-mail when there is a new update.

NOTICE:

If you select this check box, you **will** receive an e-mail message from Keil whenever a new update is available. If you don't wish to receive an e-mail notification, don't check this box.

Which device are you using?
(eg, STM32)

Arm will process your information in accordance with the Evaluation section of our [Privacy Policy](#).

☐ Please keep me updated on products, services and other relevant offerings from Arm. You can change your mind and unsubscribe at any time.

Submit

Reset

Fill in the details to proceed. The Device we are using is the **STM32**.

After submitting, follow the instructions to download the software. **This is a large download of ~1Gb** so allow time for this to happen. This took my home device 15 minutes to download.

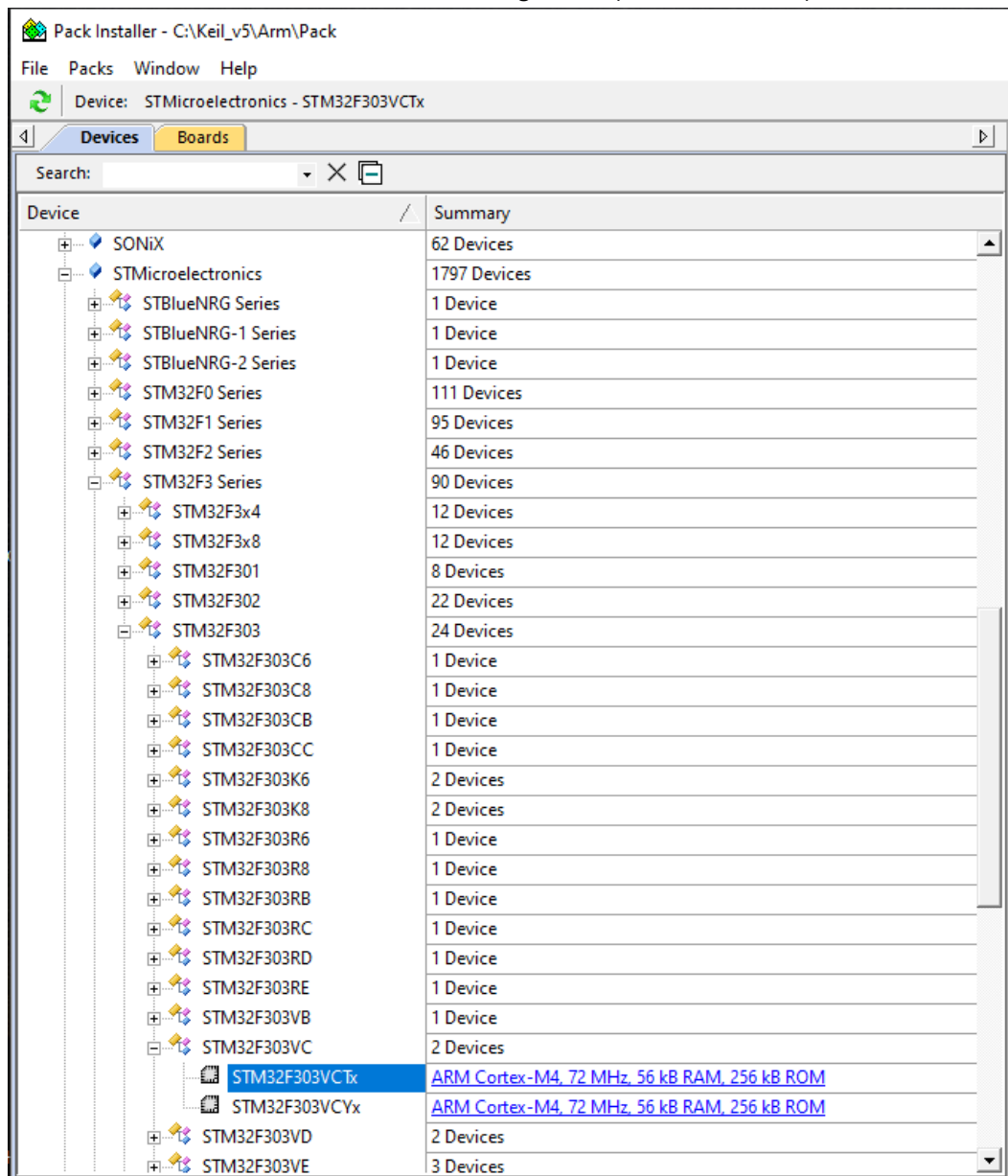
Run the executable to install the software. This took around 10 minutes for my machine.

Pack Installation

Installing 'packs' effectively downloads firmware/header files that contain all the definitions and default setting for the microcontroller. The definitions of register mapping inclusive of onboard peripheral interfacing are all contained within this. The different versions contain slightly different mappings so ensure you install the correct versions.

Following installation, the pack installer automatically opened. If this does not happen then it can be accessed through the main IDE environment. The Pack installer interface allows us to select our device from the left hand window, then choose the necessary packs from the right hand window.

From the left hand window, select the following device (STM32F303VCTx).



This down-selects the available packs for our model of device. From the right hand window, install the following packs:

V1.4.0 of the Keil::STM32F3xx_DFP

Pack	Action	Description
Device Specific	1 Pack	STM32F303VCTx selected
Keil::STM32F3xx_DFP	Install	STMicroelectronics STM32F3 Series Device Support and Examples
2.1.0 (2018-01-16)	Install	STMicroelectronics STM32F3 Series Device Support and Examples
Previous		Keil::STM32F3xx_DFP - Previous Pack Versions
2.0.0 (2017-11-...	Install	STMicroelectronics STM32F3 Series Device Support and Examples
1.4.0 (2017-02-...	Install	STMicroelectronics STM32F3 Series Device Support and Examples
1.3.0 (2015-03-...	Install	STMicroelectronics STM32F3 Series Device Support and Examples
1.2.0 (2014-11-...	Install	STMicroelectronics STM32F3 Series Device Support and Examples
1.1.0 (2014-10-...	Install	STMicroelectronics STM32F3 Series Device Support and Examples
1.0.1	Install	STMicroelectronics STM32F3 Series Device Support and Examples
1.0.0	Install	STMicroelectronics STM32F3 Series Device Support and Examples

And:

V5.0.1 of the ARM::CMSIS

Pack	Action	Description
Generic	50 Packs	
Alibaba::AliOSThings	Install	AliOS Things software pack
Arm-Packs::PKCS11	Install	OASIS PKCS #11 Cryptographic Token Interface
Arm-Packs::Unity	Install	Unit Testing for C (especially Embedded Software)
ARM::AMP	Install	Software components for inter processor communication (Asymmetric Multi I
ARM::CMSIS	Up to date	CMSIS (Cortex Microcontroller Software Interface Standard)
5.7.0 (2020-04-09)	Remove	CMSIS (Cortex Microcontroller Software Interface Standard)
Previous		ARM::CMSIS - Previous Pack Versions
5.6.0 (2019-07-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
5.5.1 (2019-03-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
5.5.0 (2019-03-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
5.4.0 (2018-08-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
5.3.0 (2018-02-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
5.2.0 (2017-11-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
5.1.1 (2017-09-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
5.1.0 (2017-08-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
5.0.1 (2017-02-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
5.0.0 (2016-11-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
4.5.0 (2015-10-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)
4.4.0 (2015-09-...	Install	CMSIS (Cortex Microcontroller Software Interface Standard)

Selecting the 'install' button initiates the install that can take a minute or two to complete. Close the pack installer when finished.

Testing the IDE

In this section you will download and build a small programme that ensures the download and pack installation is successful. You do not need the STM32Discovery board plugged into your computer at this stage.

From the learn server, download the .zip file named WSC355 Lab 1.zip. Extract the files to a working directory.

The extracted zip files contain a uVision project file (WSC055 Lab1.uvprojx). This is a basic programme that already has various settings and configurations for the STM32F3Discovery board. You could set this up yourselves but requires a few more specific stages to configure.

Try building the programme (F7). This compiles the C code into assembly language ready to download to the device. A message in the Build Output window at the bottom of the IDE should state something like:

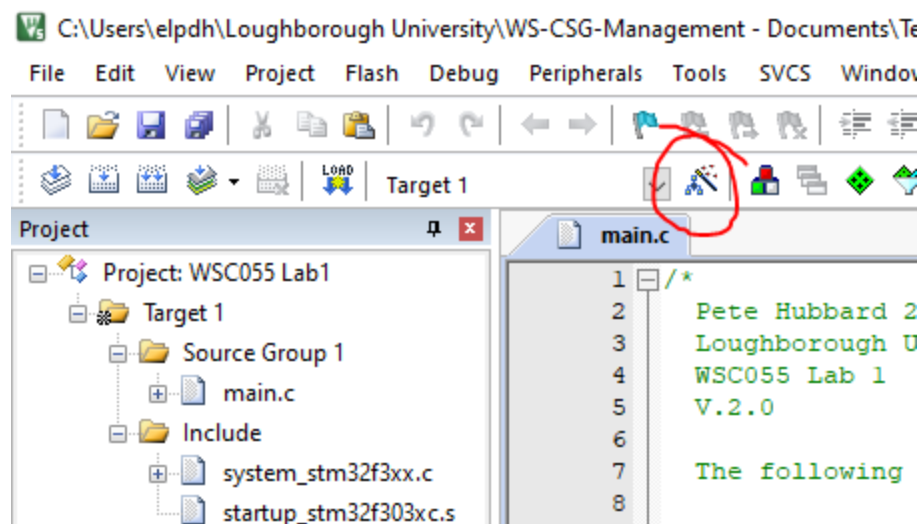
```
Program Size: Code=572 RO-data=408 RW-data=0 ZI-data=1632  
".\Objects\WSC055 Lab1.axf" - 0 Error(s), 0 Warning(s).  
Build Time Elapsed: 00:00:03
```

You are now set up ready to begin the labs.

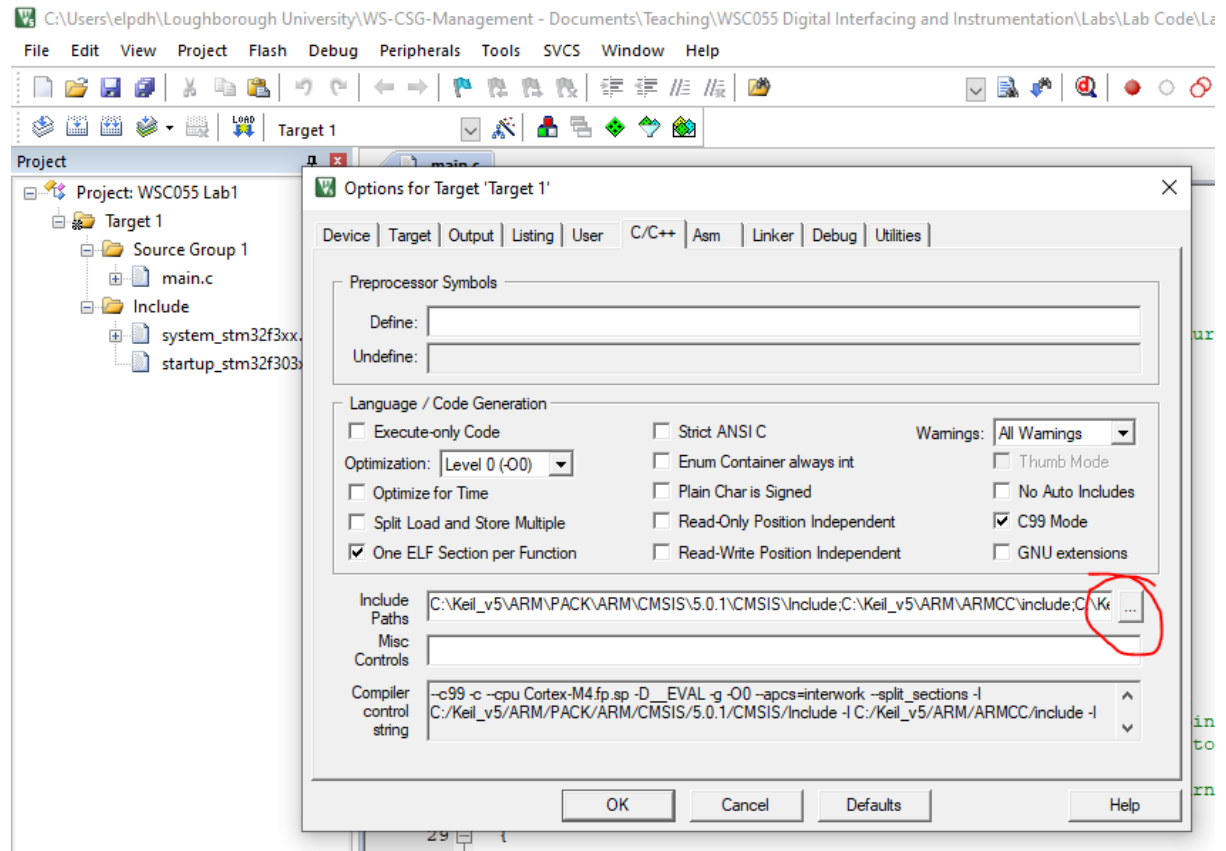
If the Build Fails:

If the build fails, a likely problem is the links between the compiler and the packs you have just downloaded. This is often indicated by a message 'cannot open source file' in the Build Output. You can check and correct this by the following method:

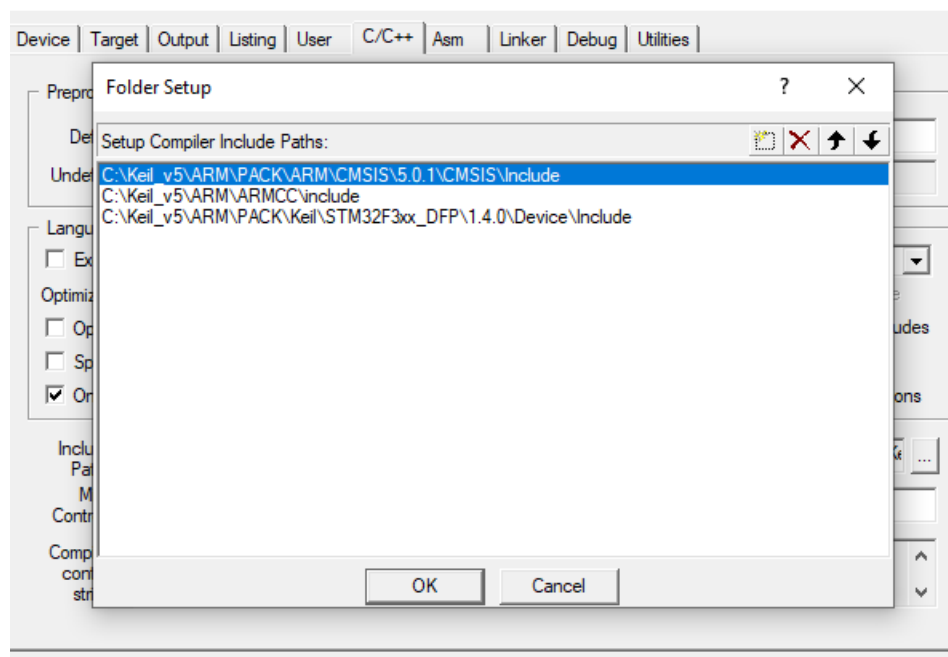
Click on the 'options for target' button:



Open the C/C++ tab and click on the button next to the 'include paths' box:



This will open the following window:



Find the equivalent paths in your directory structure and add them accordingly.