Embedded Systems with ARM Cortex-M Microcontrollers in Assembly Language and C ISBN 0982692633

Project Creation in µVision IDE

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Summary

This tutorial takes the following the kits as an example of creating a project in Keil IDE for assembly programs.

- Discovery kit with STM32L152RCT6 MCU (Cortex-M3)
- Discovery kit with STM32L476VG MCU (Cortex-M4 with FPU and DSP)

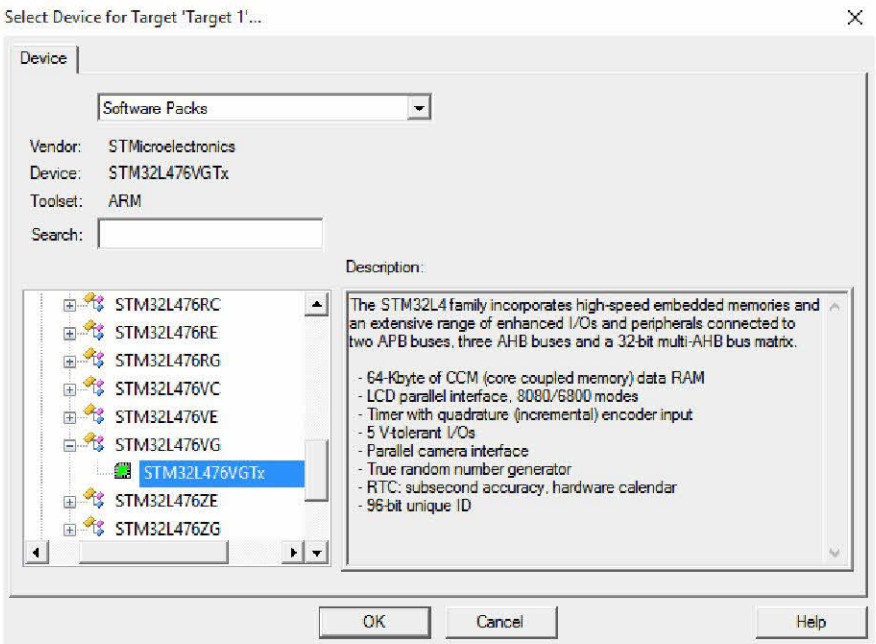
Note that the project does not use the default startup files provided by Keil. You need to download a modified version of ***startup_stm32l1xx_md.s*** or ***startup_stm32l476xx.s*** from the book website: http://web.eece.maine.edu/~zhu/book/lab.php.

Identifying Target Processor

Kit	Processor	Core	Flash	RAM
STM32L1 Discovery Kit	STM32L152RBT6	Cortex-M3	128 KB	16 KB
STM32L1 Discovery Kit	STM32L152RCT6	Cortex-M3	256 KB	32 KB
STM32L4 Discovery Kit	STM32L476VG	Cortex-M4 (DSP + FPU)	1 MB	128 KB

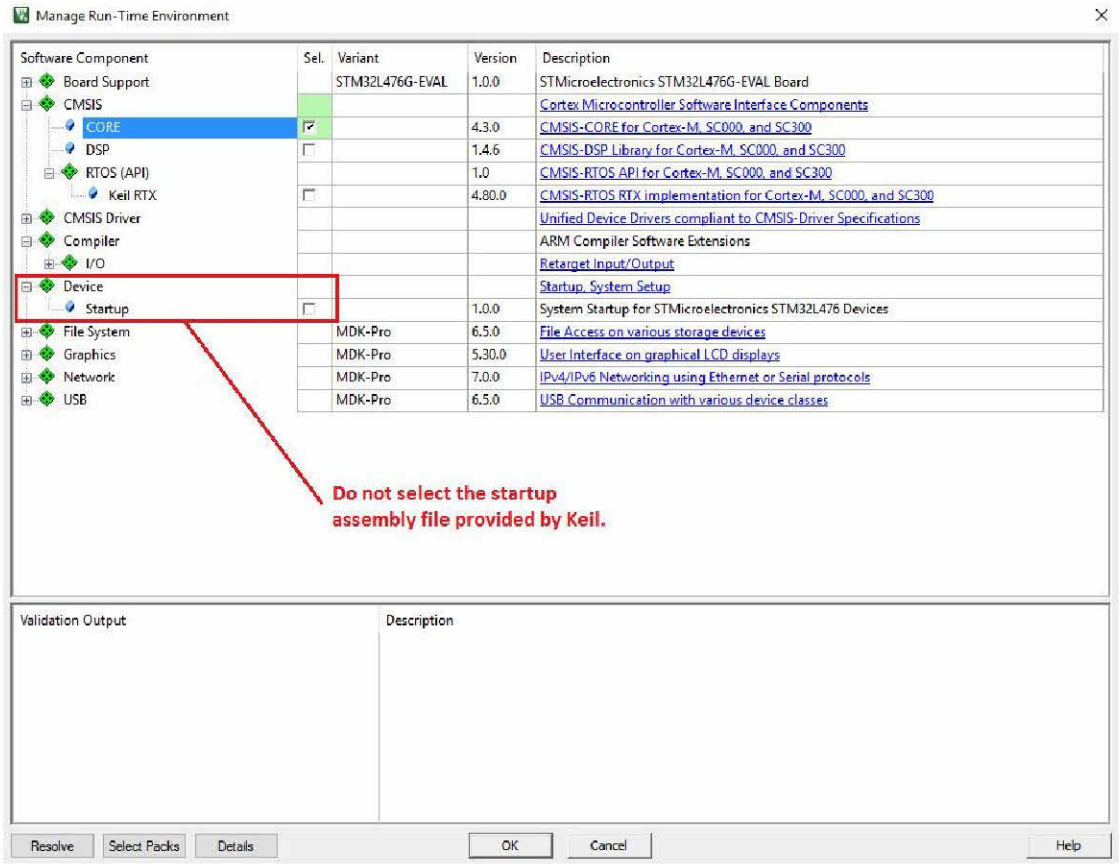
Steps to create a new project in Keil

1. From the menu **Project** → **New µVision Project**
2. Give the project a name and select its storage directory. In this tutorial, the project is named as "lab".
3. If you use the STM32L1 Discovery Kit, select the device **STM32L1 Series**, and then select **STM32L152RC** or STM32L152RB as the CPU. If you use the STM32L4 Discovery Kit, select the device **STM32L4 Series**, and then select **STM32L4476VGTx**.



If did not see the targeted processor in the list, click the "**Pack Installer**" button and install the component **Keil::STM32L1xx_DFP** or **Keil::STM32L4xx_DFP**.

4. Select **CMSIS Core** only. Do NOT select "Device Startup". Instead, you should use the one provided by the course website.



5. If you are **STM32L1 discovery kit**, add the following source code files into the project. Right click the "**Source Group**" and select "Add Existing Files to Group." You can download the following source codes from the textbook website and adds into the project if you are creating an assembly-based project.

   - **startup_stm32l1xx_md**.s
   - **core_cm3_constant**.s
   - **stm32l1xx_constants**.s
   - **stm32l1xx_tim_constants**.s
   - **main**.s

   If you use **STM32L4 discovery kit**, add the following source code files into the assembly-based project.

   - **core_cm4_constants.s**
   - **stm32l476xx_constants.s**
   - **startup_stm32l476xx.s**
   - **main.s**

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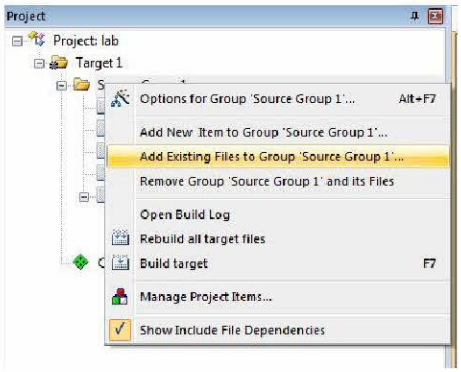
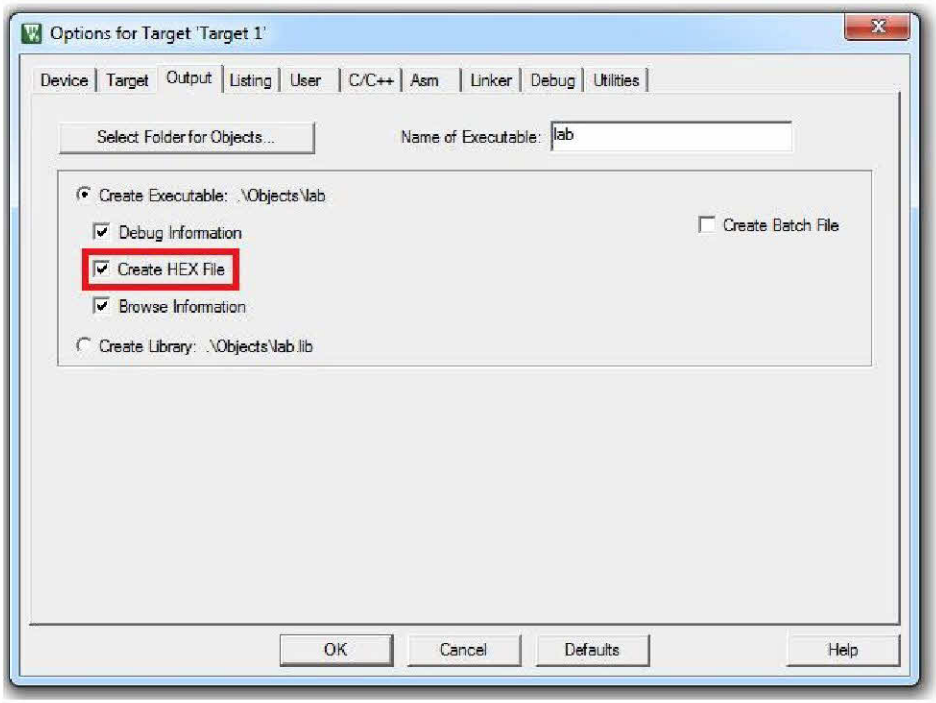
If you are creating a C project, then you should include the following:

- **startup_stm32l1xx_md**.s or **startup_stm32l476xx.s**
- **main.c**.



6. Set Project Properties

From the menu, click **Project** ⟶ **Option for Target**, Go to the **Output** page, select "**Create HEX file**"



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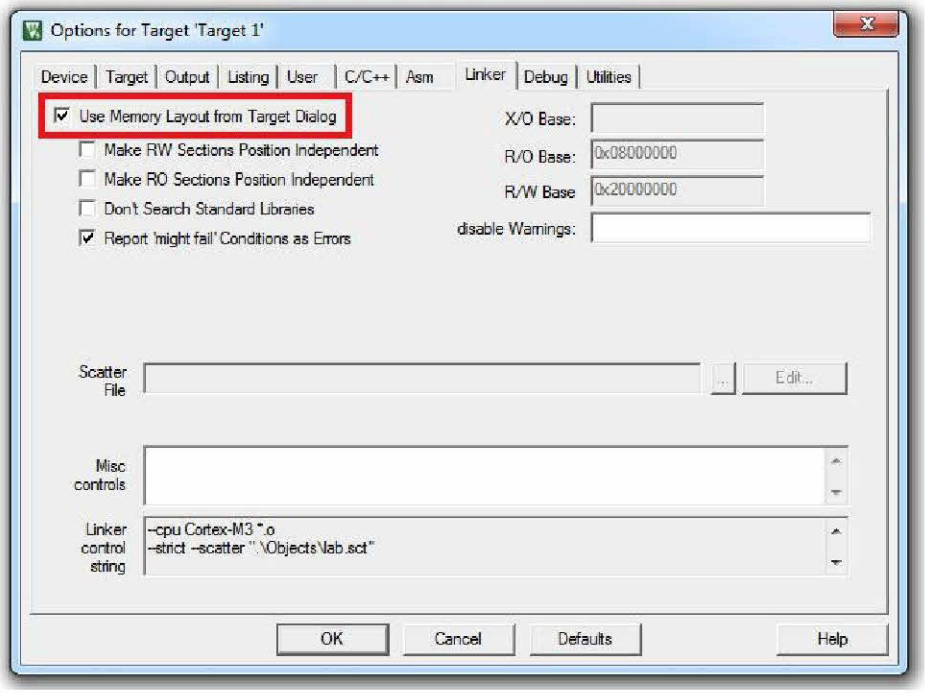
Go to the **Linker** page, select "**Use Memory Layout from Target Dialog**"



Go to the **Debug** page, select "**ST-Link Debugger**"

Click "**Settings**" and select "**SW**" (Serial Wire) as the port.

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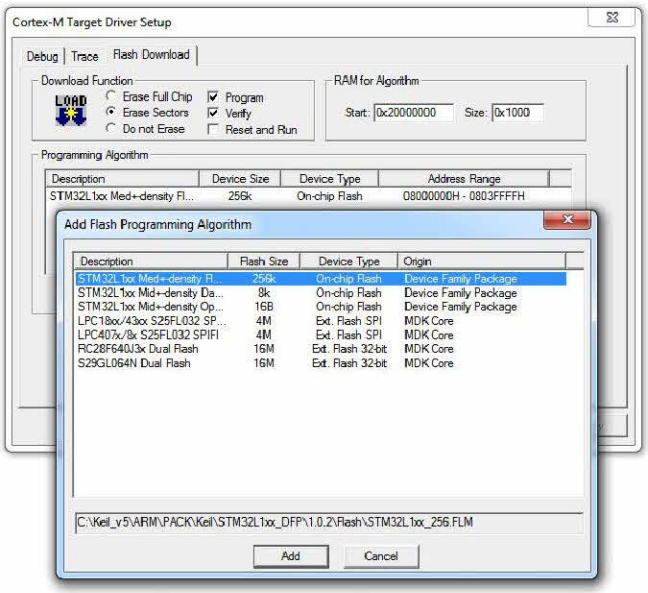
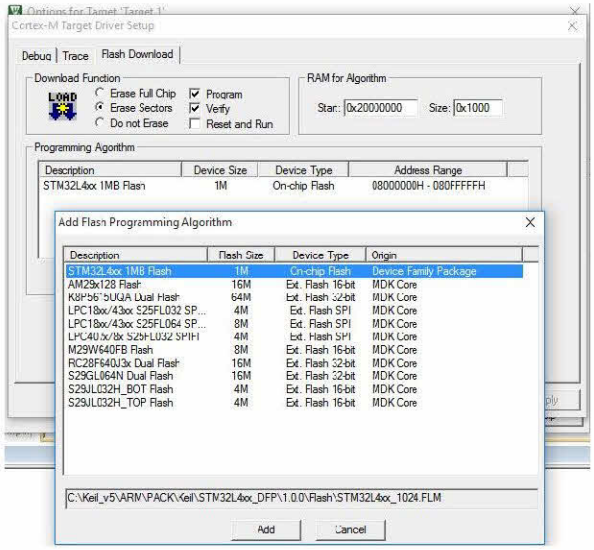
Go to the **Flash Download** page, and verity that **STM32L1xx On-chip Flash** is selected in the Programming Algorithm. If not, click "Add" and select STM32L1xx On-chip flash in the popped dialog.



STM32L1 Discovery Kit



STM32L4 Discovery Kit

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7. Compile and run your project

Build the program:

You can ignore the following warning when the linking stage:

.\Objects\lab.sct(8): warning: **L6314W: No section matches pattern *(InRoot$$Sections)**.

Connect your discovery kit to the computer and download the program to the STM32L processor.