UM0986
User manual

Developing your STM32VLDISCOVERY application using the MDK-ARM software

Introduction

This document provides an introduction on how to use the MDK-ARM™ software development toolchain (version 4.11 and later) with the STM32VLDiscovery board.

It provides novice users of the MDK-ARM tool-chain with some guidelines to build and run the sample program provided with this document. This should provide them with the skills required to create and build their own applications.

The DISCOVER project, referenced in this document, corresponds to the demo Flashed into the STM32VLDISCOVERY board during production. The project is available within the STM32VLDISCOVERY firmware package available at http://www.st.com/stm32vldiscovery.

Although this application note cannot show all the topics relevant to the MDK-ARM tool, it demonstrates the first basic steps necessary to get started with the compiler/debugger.

Contents

1 About MDK-ARM toolchain

The MDK-ARM is a window-based software development platform that combines a robust and modern editor with a project manager and make facility tool. It integrates all the tools needed to develop embedded applications including C/C++ compiler, macro assembler, linker/locator, and an AXF file generator. MDK-ARM helps expedite the development process of embedded applications by providing the following:

- Full-featured source code editor.
- Device Database® for configuring the development tool.
- Project manager for creating and maintaining your projects.
- Integrated Make Utility for assembling, compiling, and linking your embedded applications.
- Dialogs for all development environment settings.
- True integrated source-level and assembler-level debugger with high-speed CPU and peripheral simulator.
- Advanced GDI interface for software debugging on target hardware and for connecting to a Keil™ ULINK™ Debug adapter.
- Flash programming utility for downloading the application program into Flash ROM.
- Links to manuals, on-line help, device datasheets, and user guides.

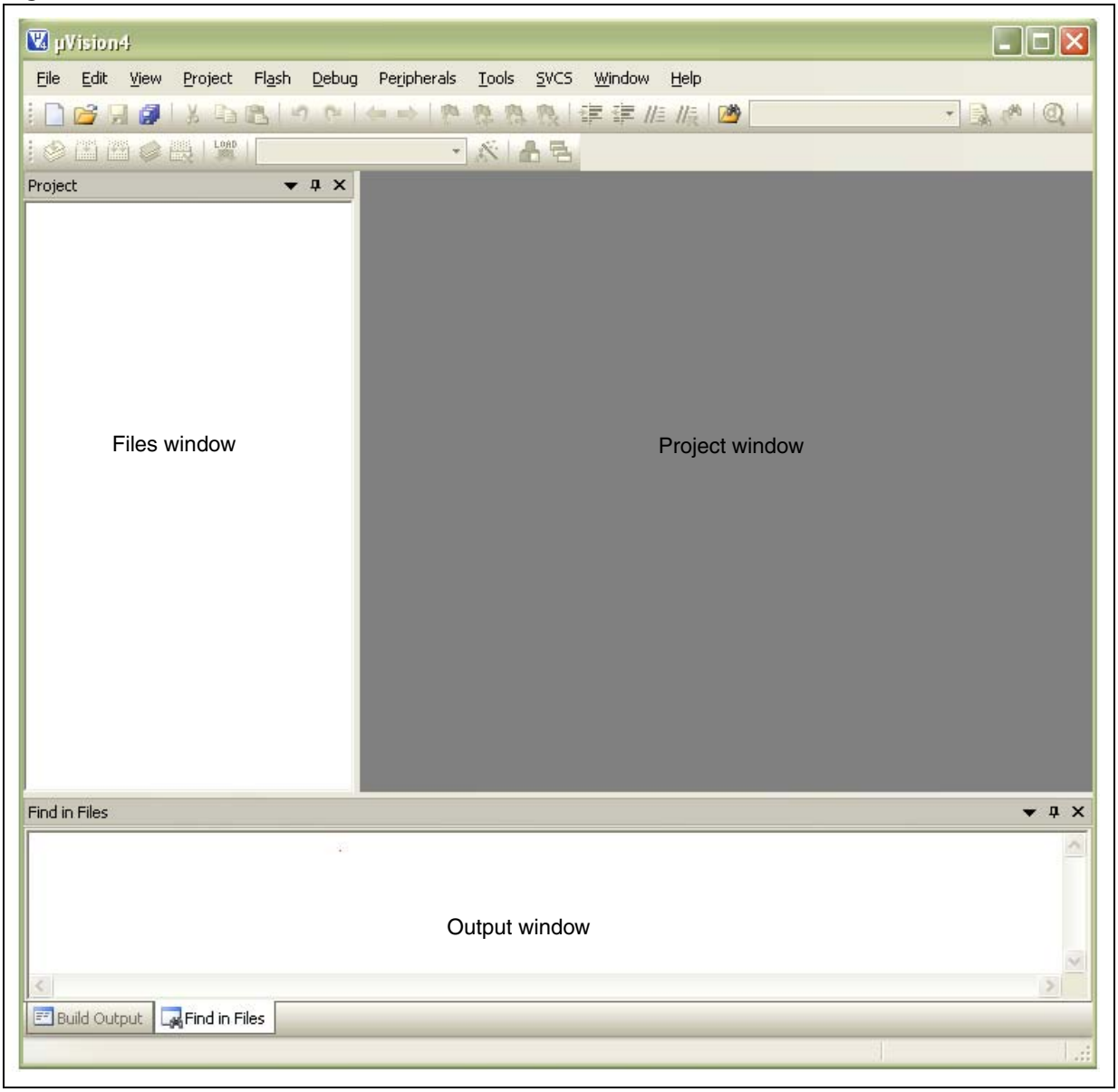
Note: For generic descriptions, please refer to the Getting Started Guide of uVision4 available from Keil web site at the following link: http://www.keil.com/product/brochures/uv4.pdf

2 Starting an existing MDK-ARM project

Installing the MDK-ARM toolchain (using the default settings) results in the toolchain being installed in *C:\Keil* on the PC's local hard disk. The installer creates a start menu uVision4 shortcut.

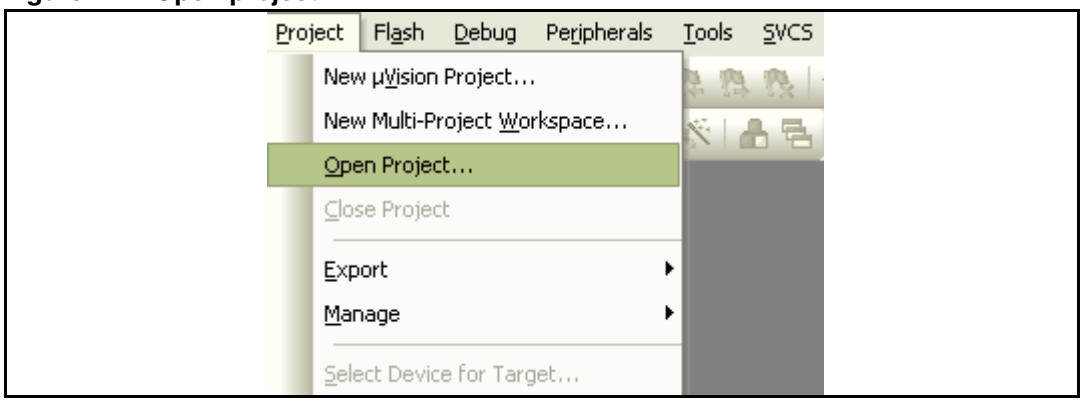
1. Open uVision4™ from the Start menu. *Figure 1* shows the names of the windows referred to in this document.

Figure 1. MDK-ARM windows



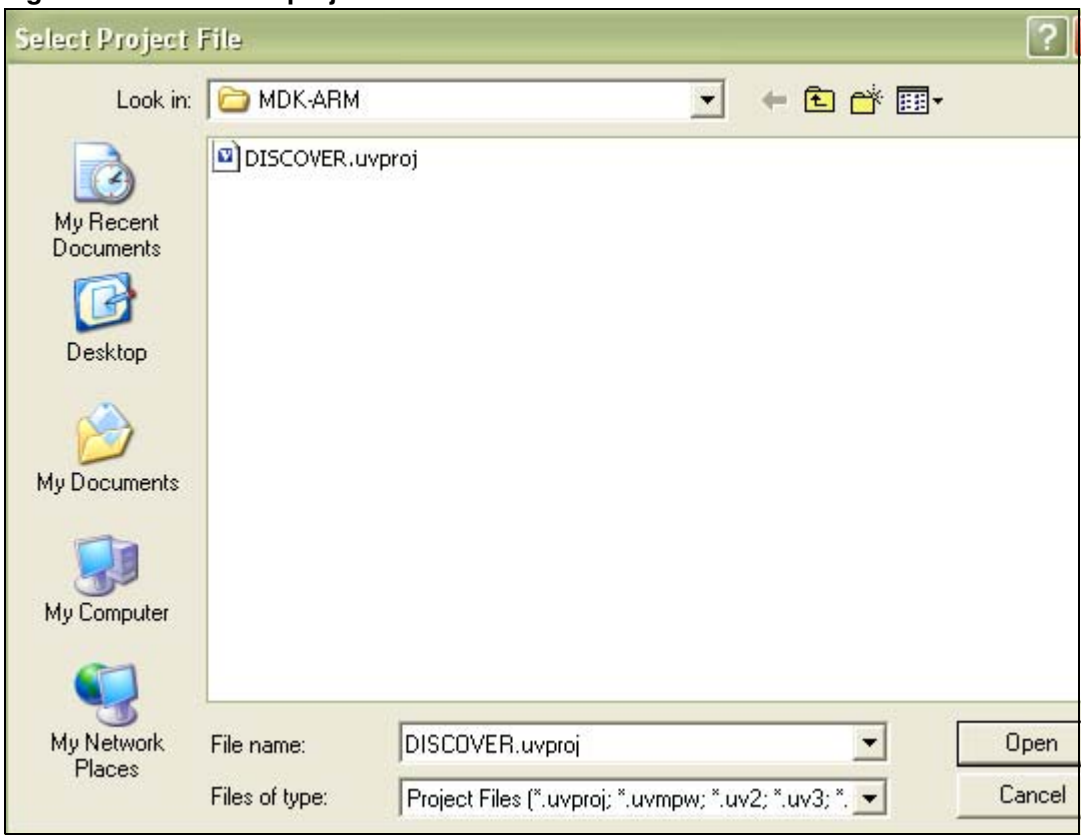
2. Select **Open Project...** from the Project menu.

Figure 2. Open project



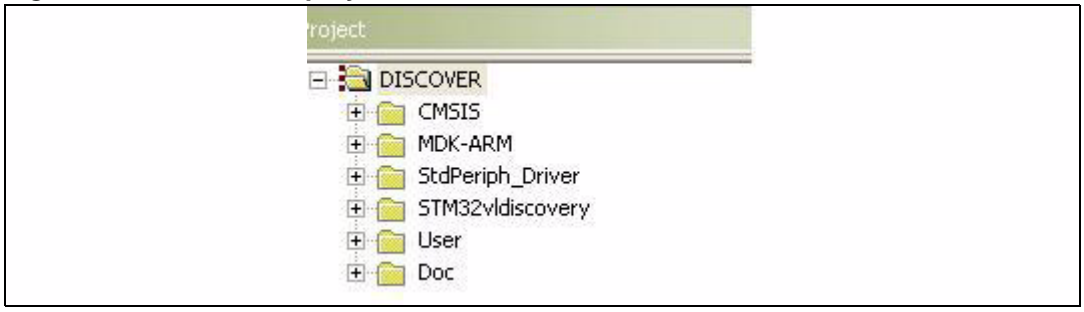
3. Using the **Select Project File** dialog box, browse and find the *DISCOVER.uvproj*

Figure 3. Select the project



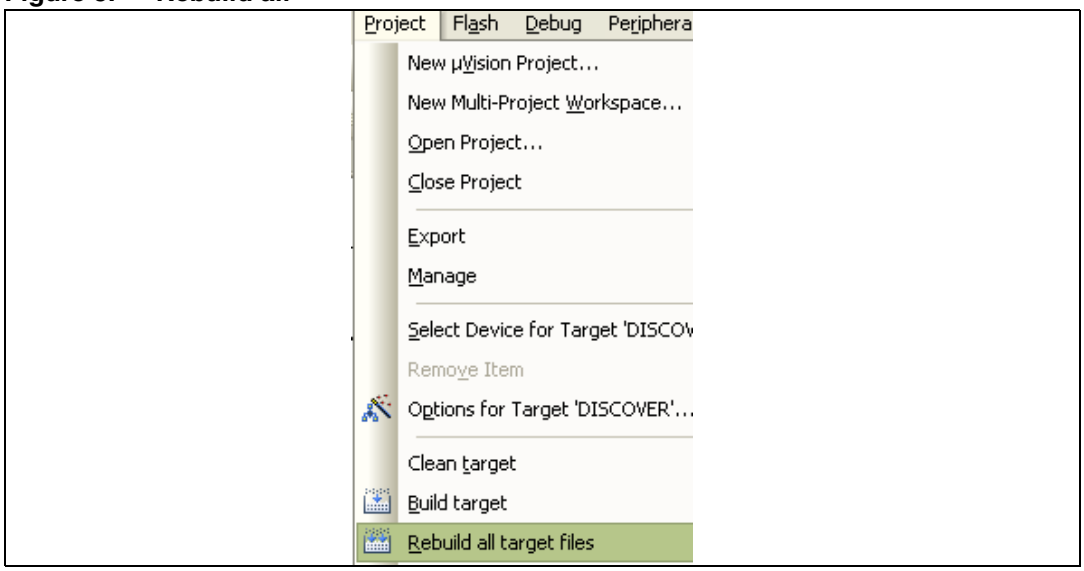
4. Double- click this file to launch it within the Project window.

Figure 4. Launch the project



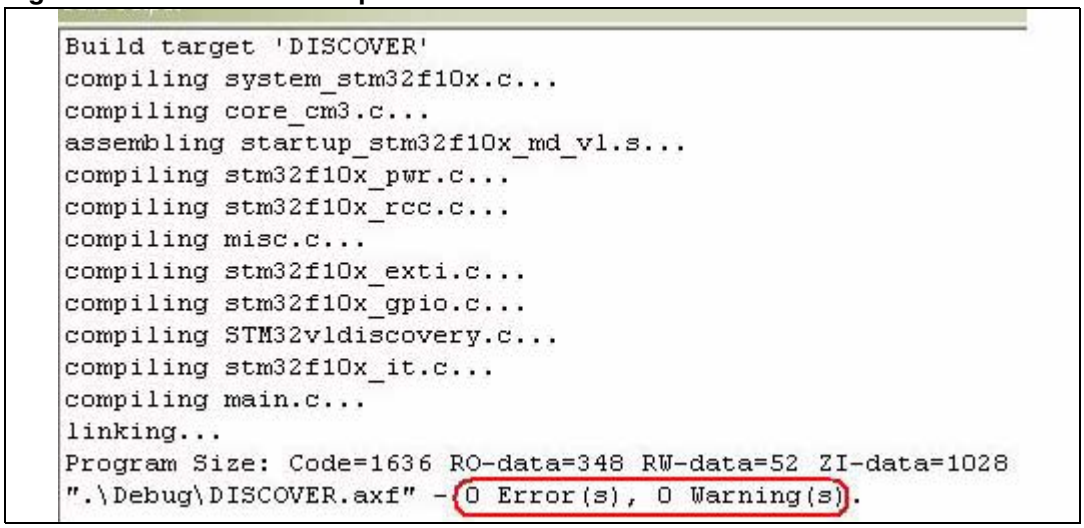
5. Select **Rebuild all target Files** from the Project menu

Figure 5. Rebuild all



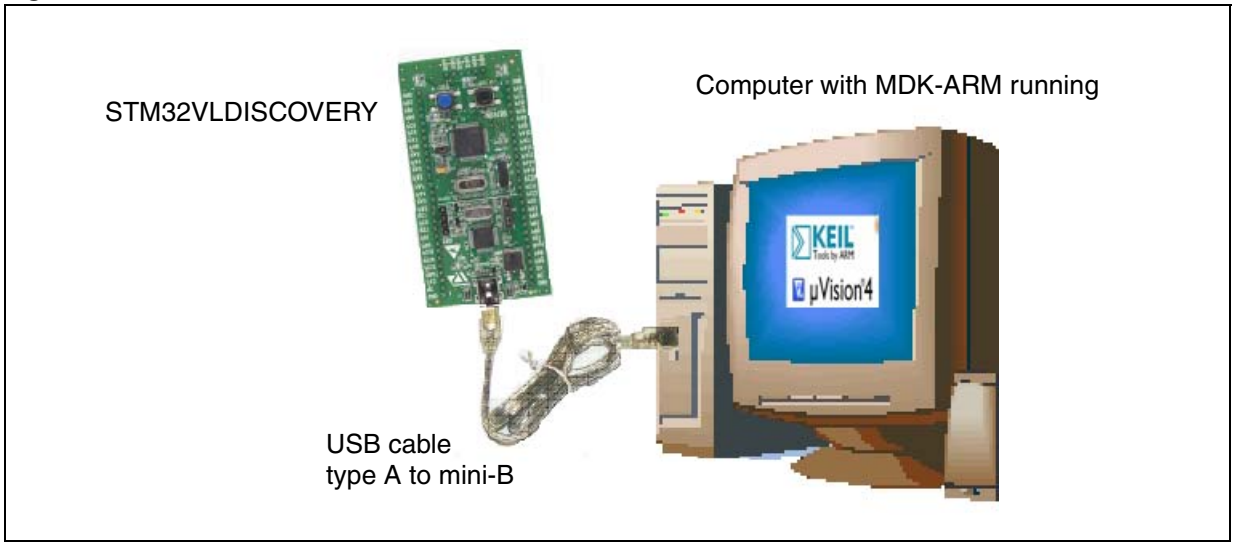
6. Your project is successfully compiled.

Figure 6. Successful compile



7. Before running your application, you should establish the connection with the STM32VLDiscovery board as shown in *Figure 7*.

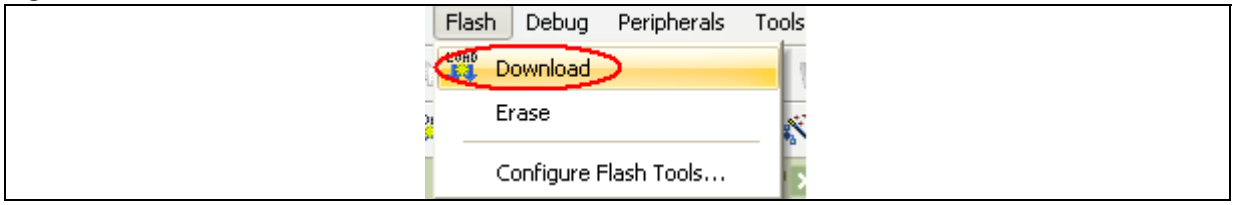
Figure 7. Hardware environment



Note: For more details on how to establish your hardware environment you can refer to the UM0919 User Manual: STM32VLDiscovery available at www.st.com/stm32-discovery.

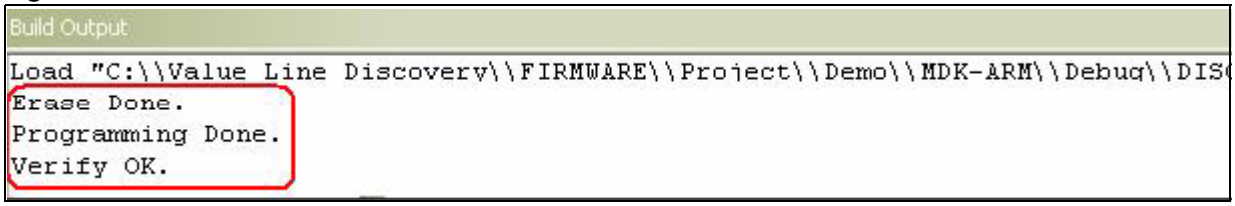
8. Select **Download** from the Flash menu

Figure 8. Flash download window



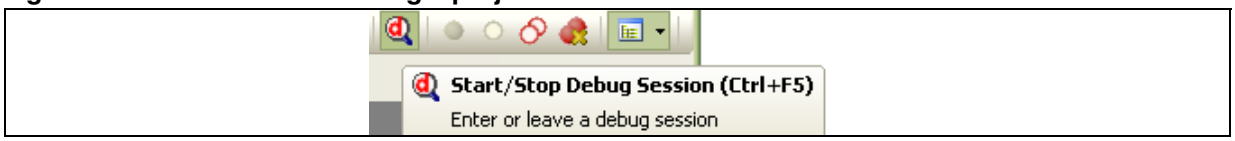
9. Your project is successfully programmed and verified.

Figure 9. Console window



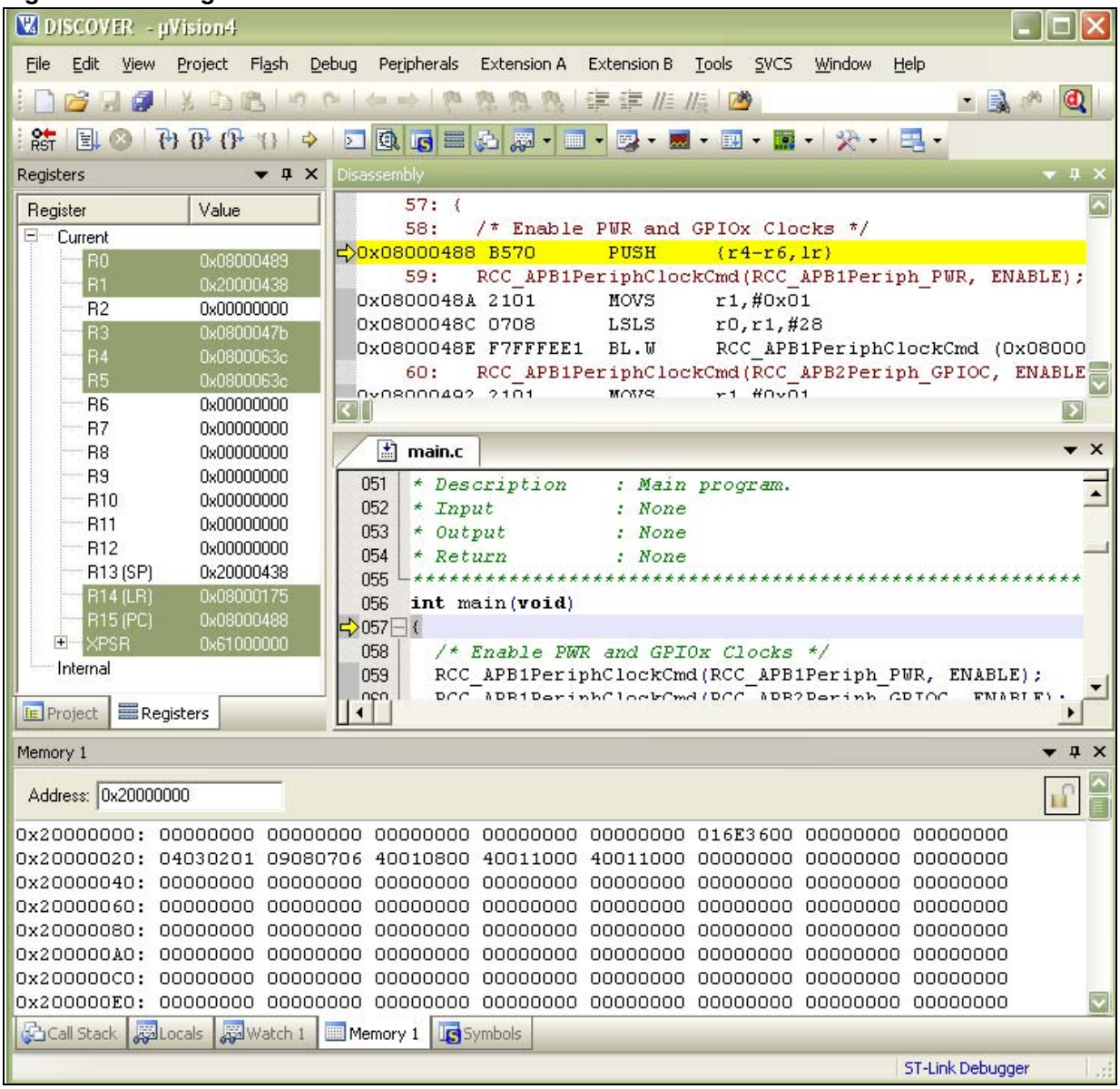
10. Click the magnifying glass to program the Flash and begin debugging.

Figure 10. Download and debug a project.



11. The debugger interface supplied by MDK-ARM allows for source code debugging at C and assembly levels, breakpoint setting, individual variables monitoring and watching during the code execution.

Figure 11. Debug screens



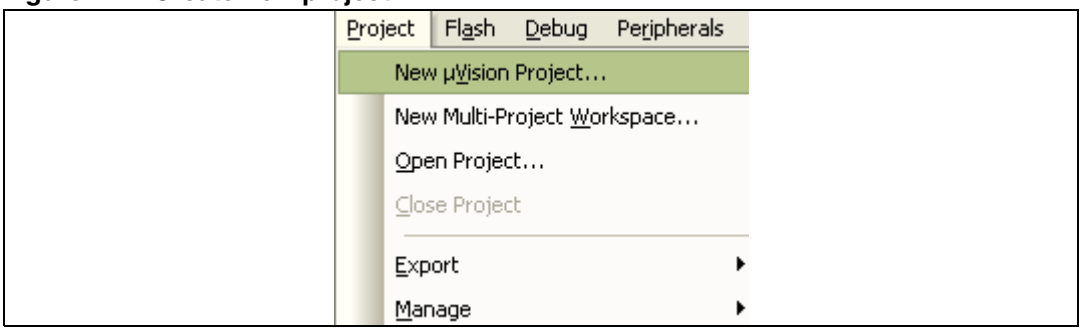
If everything is working correctly, LED3 should be blinking. Every time the user button is pressed, the LED3 blinking frequency changes and LED4 turns on.

3 Creating your first application

3.1 Source file management

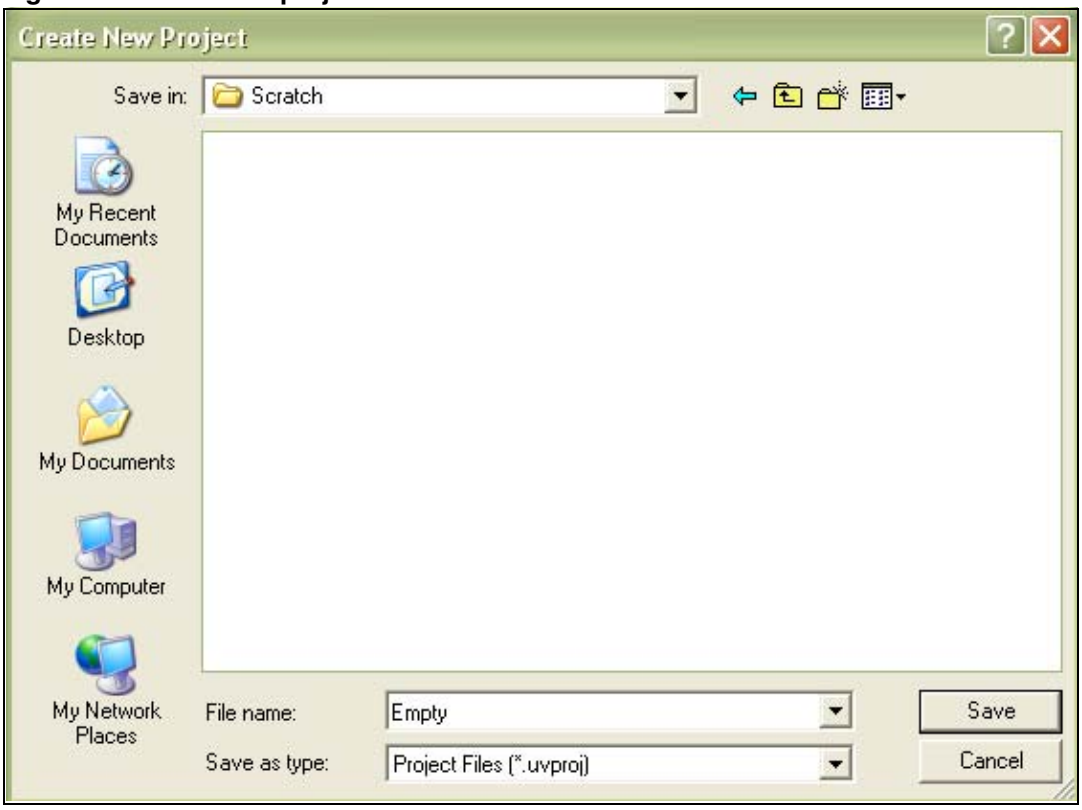
1. Select **New µvision Project** from the Project menu.

Figure 12. Create new project



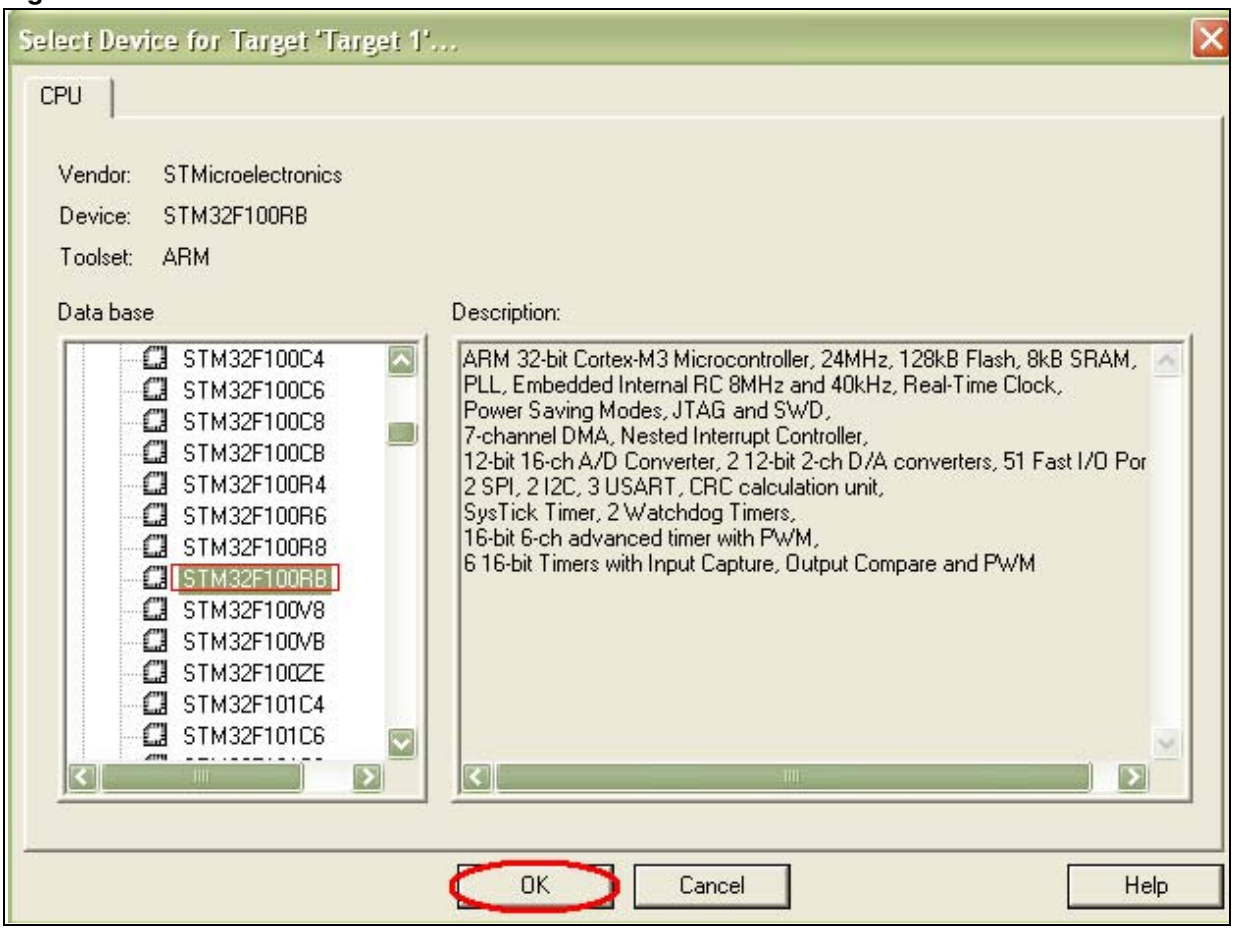
2. Name the project 'Empty.uvproj', click on **Save**.

Figure 13. Name the project



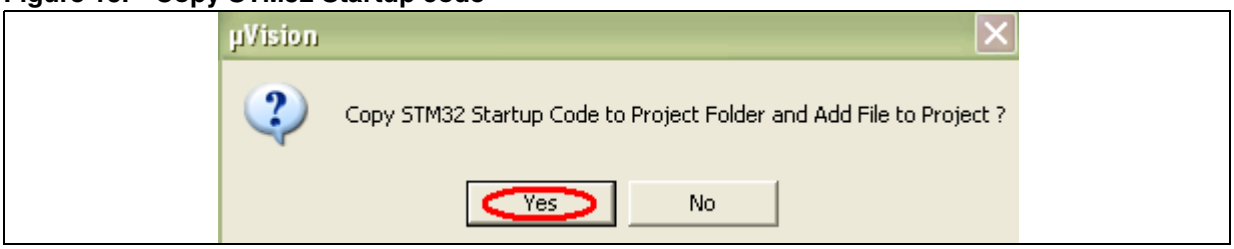
3. The device window will be displayed. Select the part you will be testing with (the STMicroelectronics part mounted on the STM32VLDiscovery board).
   a) Double-click on the STMicroelectronics.
   b) Scroll down and select the STM32F100RB Part.
   c) Click **OK**.

Figure 14. Select test device



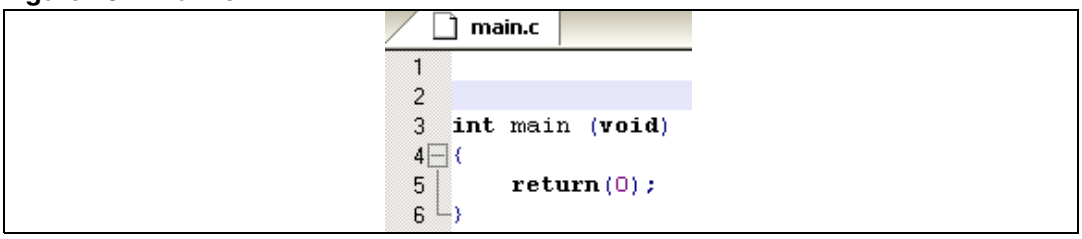
4. The “Copy STM32 Startup Code” message is prompted. Select **Yes**.

Figure 15. Copy STM32 Startup code



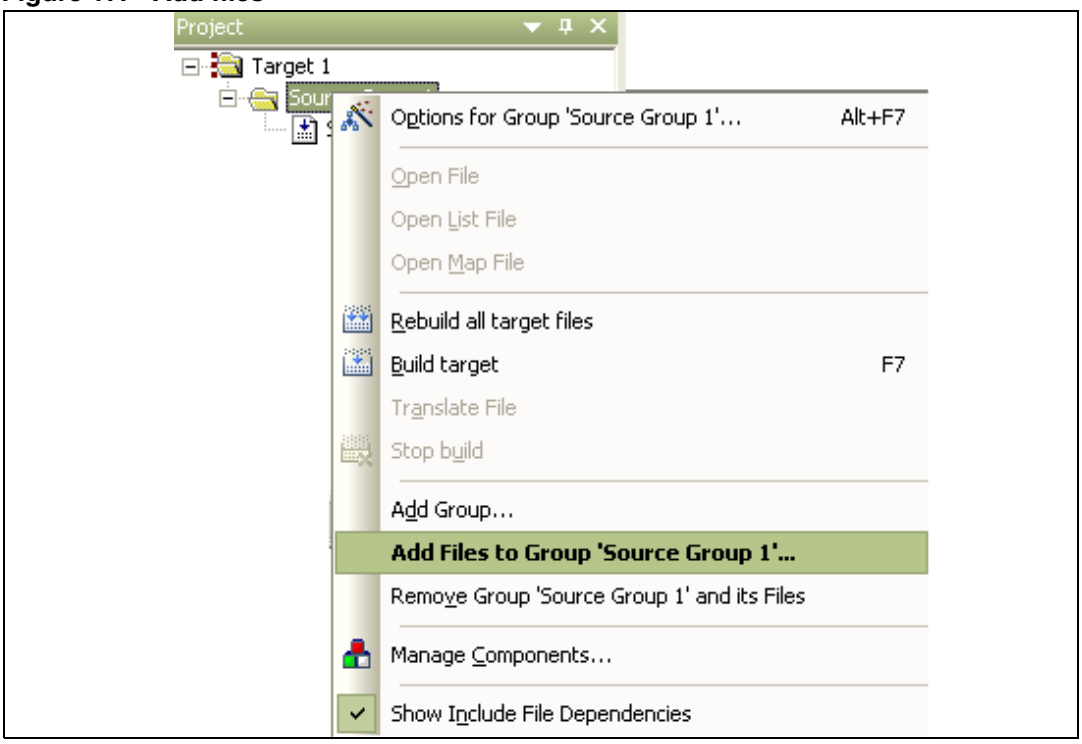
5. You may create a new source file with the menu **File – New**. This opens an empty editor window where you can enter your source code. µVision4 enables the C color syntax highlighting when you save your file with the dialog **File – Save As…** under a filename with the extension ***.c** . We save our example file under the name **main.c**.

Figure 16. main.c



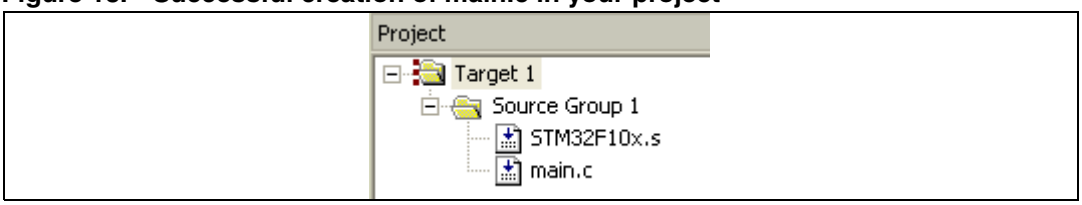
6. Once you have created your source file you can add this file to your project. MDK-ARM offers several ways to add source files to a project. For example, you can select the file group in the **Project Window – Files** page and click with the right mouse key to open a local menu. The option **Add Files** opens the standard files dialog. Select the file **main.c** you have just created.

Figure 17. Add files



7. Your main source file is successfully added to your project.

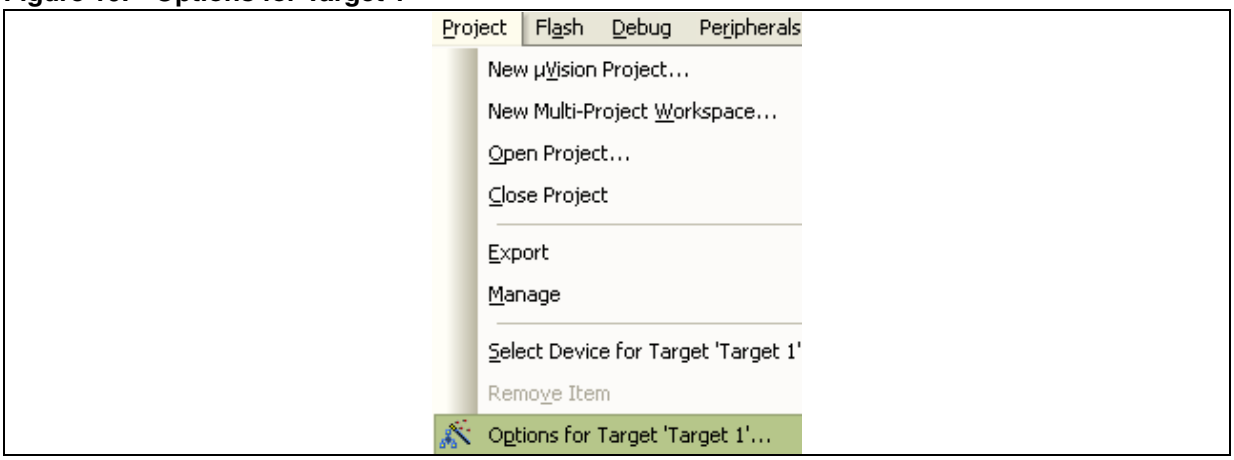
Figure 18. Successful creation of main.c in your project



3.2 Project options configuration

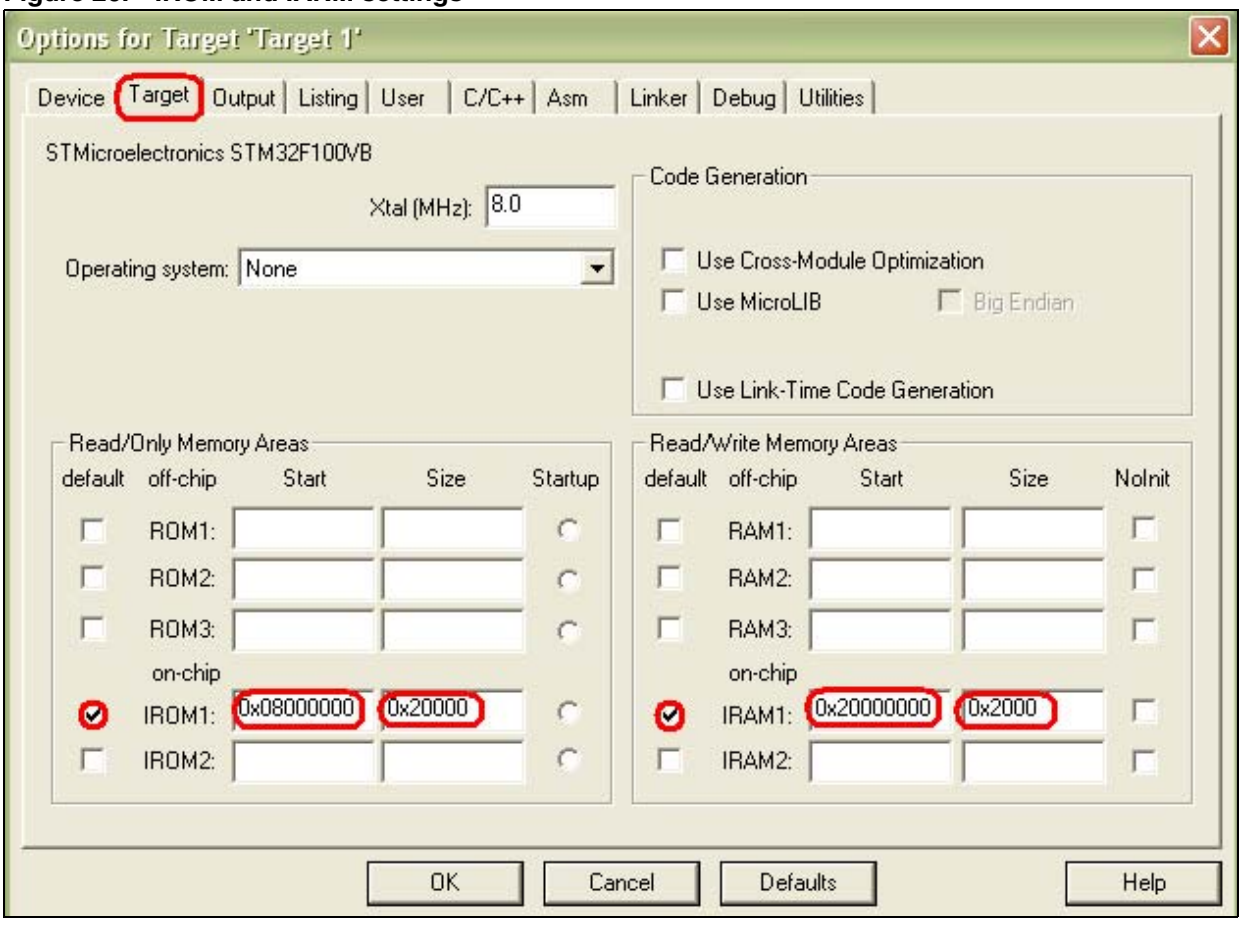
1. Click on **Target 1** in Project menu.
2. Click on Project menu and select **Options for Target 1**.

Figure 19. Options for Target 1



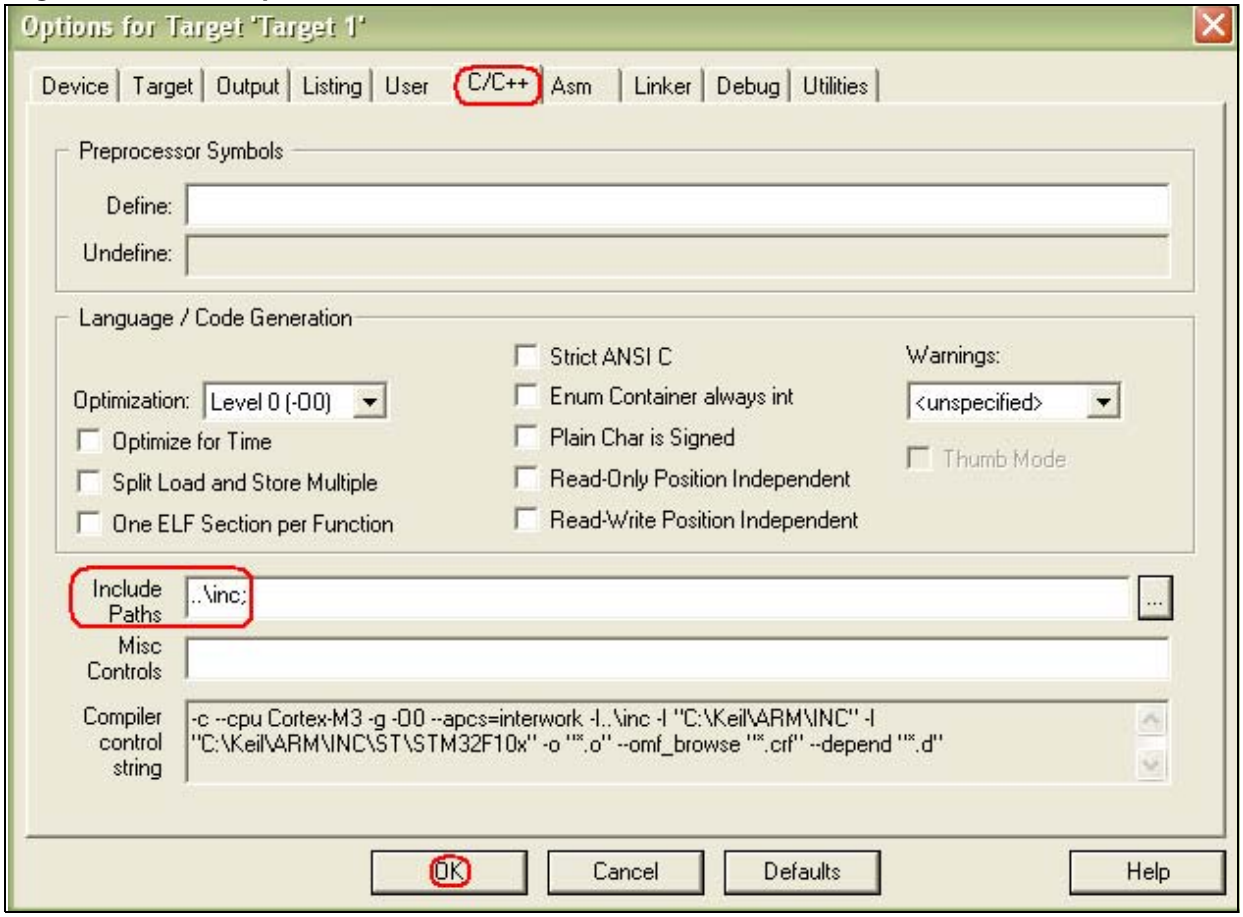
3. Select **Target** tab. The IROM1 and IARM1 start and size are automatically set according to the chosen device, just verify the settings and correct them if necessary.

Figure 20. IROM and IARM settings



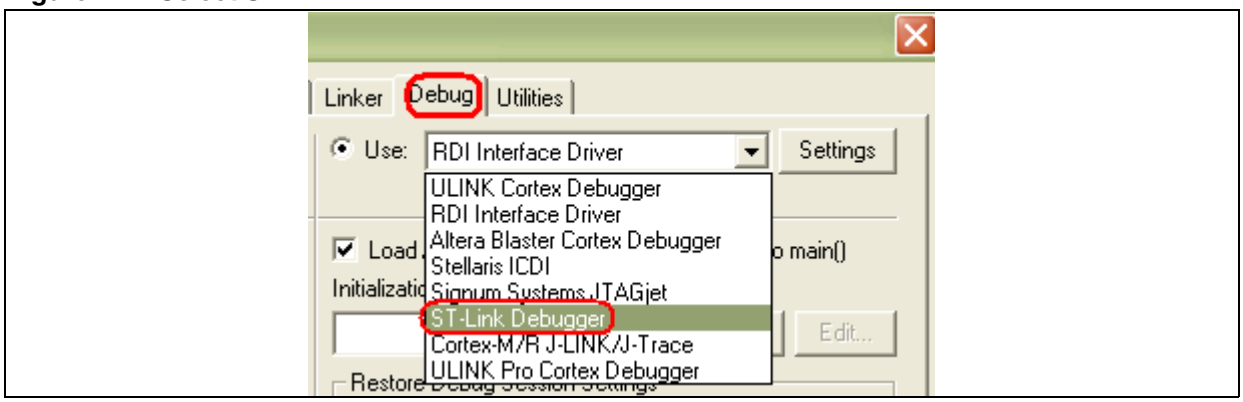
4. If your source files include header files, you should specify their paths in the project settings as shown in *Figure 21*.

Figure 21. Include paths



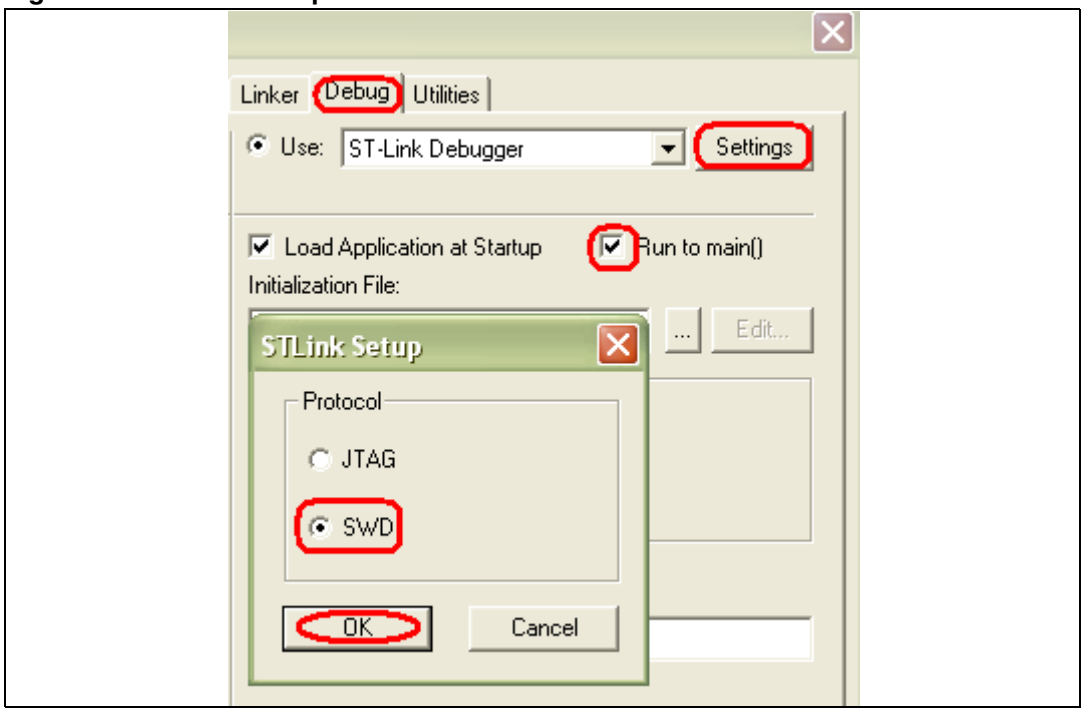
5. Select **Debug** tab.
   a) Click on **Use** check box.
   b) Choose **ST-Link Debugger**.

Figure 22. Select ST-Link



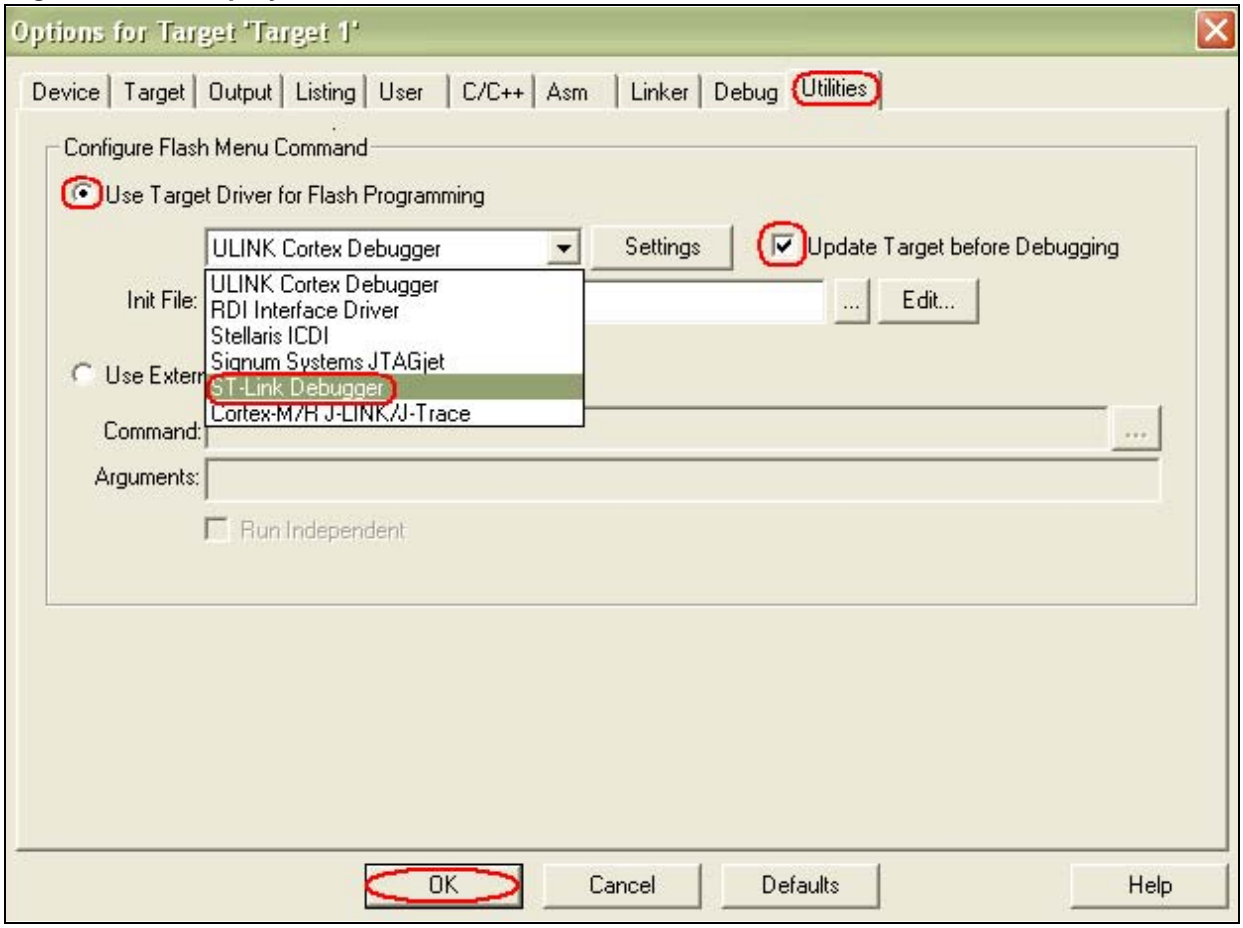
6. Click on **Settings** button.
   a) Choose the **SWD** as connection protocol in the STLink setup window.
   b) Click on **OK** button.
   c) Click on **Run to main()** check box

Figure 23. Select SWD protocol



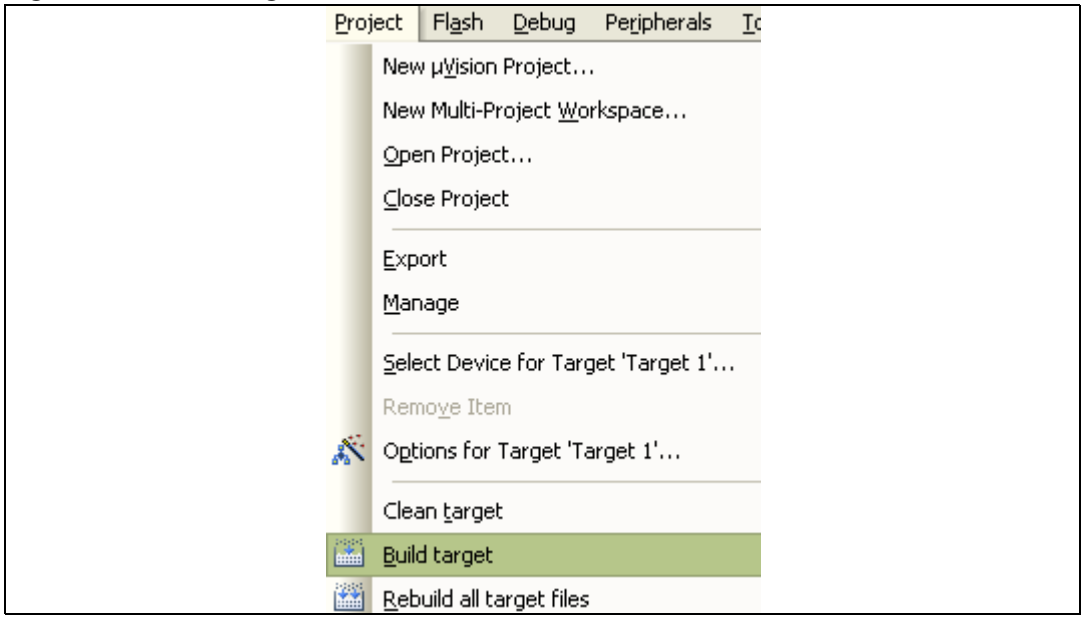
7. Select **Utilities** tab.
   a) Click on **Use Target Driver for Flash Programming**.
   b) Choose **ST-Link Debugger**.
   c) Veify that **Update Target befor Debugging** option is checked.
   d) Click **OK** to save your settings.

Figure 24. Save project



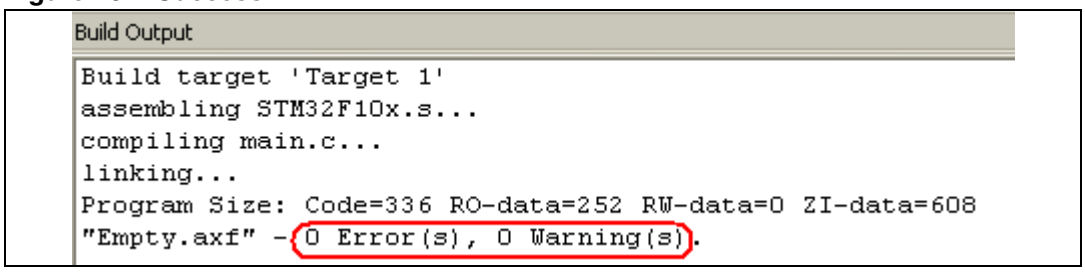
8. Click on Project menu and select **Build target**.

Figure 25. Build target files



9. In the Build window it should report '0 Errors (s), 0 Warnings'.

Figure 26. Success



10. Before running your application, you should establish the connection with the STM32VLDiscovery board as shown in *Figure 7*.
11. Click the magnifying glass to program the Flash and begin debugging.

Figure 27. Start/Stop debug session

12. Now you can start debugging your application.

4 Revision history

Table 1. Document revision history

Date	Revision	Changes
09-Sep-2010	1	Initial release.

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