

Tiva™ for C Series Development and Evaluation Kits for IAR Embedded Workbench®

The Tiva for C Series Development and Evaluation Kits provide a low-cost way to start designing with Tiva C Series microcontrollers using IAR System's Embedded Workbench tools. The boards can function as either a complete evaluation target, or with minor modifications as a debugger interface to any external Tiva C Series device.

1 Requirements

- PC with a USB interface, running Microsoft Windows® 2000, Windows XP, Windows 7, or Windows 8 operating systems (OSs).
- Tiva C Series Development Kit Software USB flash drive or the downloaded and extracted kit software (found on www.ti.com/tool/sw-<kit_name>)
- ICDI drivers installed following the instructions in *Stellaris® In-Circuit Debug Interface (ICDI) and Virtual COM Port (SPMU287)*.

2 IAR Embedded Workbench

This quick start guide shows how to install the KickStart™ version of the IAR Systems Embedded Workbench tools, and then how to use it to build and run an example application on your Tiva C Series Evaluation or Development Board.

2.1 Installation

2.1.1 Install Embedded Workbench

1. Insert the Tiva C Series Development Kit Software USB flash drive and click on the index.html. For kits that don't include a USB flash drive, go to the evaluation board software webpage (www.ti.com/tool/sw-<kit_name>).
2. With the Evaluation Kit USB flash drive, click the IAR Logo to start the setup program. If the setup program does not start or if you are using downloaded software, use Windows Explorer to view the files on the USB flash drive or the download directory and double-click the EWARM-KS-CD-n.nn.exe file in the *Tools\IAR* directory.
3. Click the Install Embedded Workbench link to begin the tool installation. You must register with IAR to receive license information (by clicking Get License) before you can install the tools. If you have any questions about installation, follow the instructions detailed in this IAR quick start documentation, which can be accessed by clicking QuickStart Installation Information in the main window of the splash screen.

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2.1.2 Install the TivaWare™ C Series Software Package

A full set of C-based peripheral drivers is provided, covering all peripherals and functionality of the Tiva C Series devices. The TivaWare for C Series package includes various example applications with project files for all major tool vendors that support Tiva C Series, including IAR. To install TivaWare, follow these steps:

1. On the html index of the Development Kit Software USB flash drive, click on the Firmware Development Package. Depending on your web browser, you have the option to run the TivaWare installer or save it to your drive.

NOTE: If you are navigating the USB flash drive using Windows Explorer (or a similar application), go to the *Tools/TivaWare* directory.

2. Run the TivaWare installer. To manually install TivaWare, use the installer, which is a self-extracting .zip file in the *Tools/TivaWare* directory. Use a .zip file extraction utility such as WinZip to manually extract the contents.
3. To view the TivaWare documentation, navigate to the *Tools/TivaWare/docs* directory and click the *Tiva Peripheral Driver Library User's Guide* PDF.

NOTE: For the most recent version of TivaWare, check the www.ti.com/tiva-c website

2.2 Start the Embedded Workbench IDE and Open a Workspace

1. Start the IAR Embedded Workbench IDE by selecting it from the Windows Start Menu. When the IDE loads, it has a blank screen (see [Figure 1](#)).

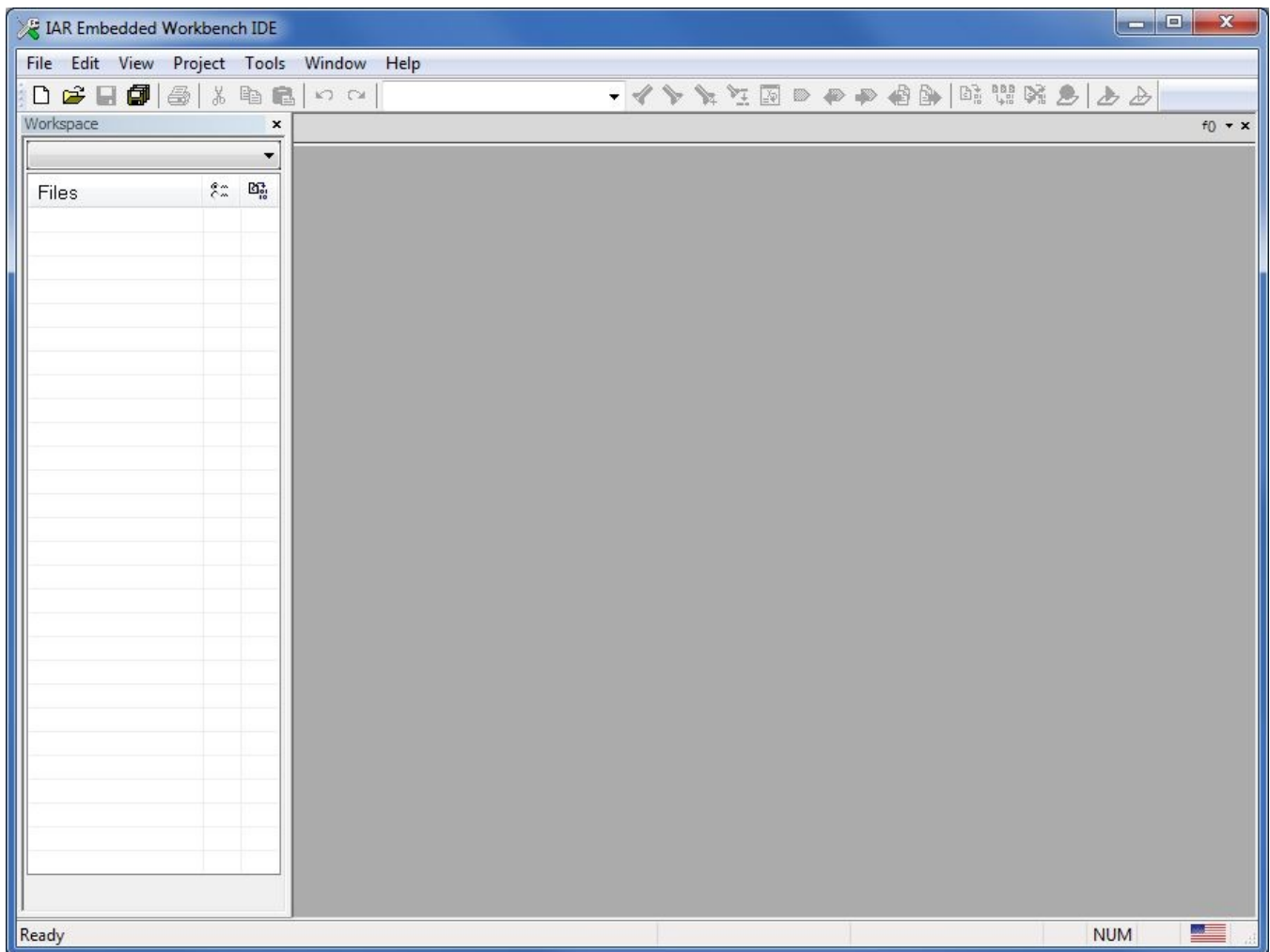


Figure 1.

- Open the workspace file that corresponds to your board by clicking File → Open → Workspace. The workspace file is in the TivaWare tree, which was installed on your PC as part of [Section 2.1.2](#). In the TivaWare tree, the workspace files are in the directory corresponding to your particular board: `ti\TivaWare_C_Series-n.n\examples\boards\{board_name}`.

NOTE: The IAR tools also install TivaWare as part of the default installation, but the version may be older than what is currently available from the website. You can find TivaWare in the IAR tree by looking in: `C:\Program Files\IAR Systems\Embedded Workbench 5.4 Kickstart` in the folder: `arm\examples\TexasInstruments\Tiva\boards\{board_name}`.

Important: For the most recent version of the TivaWare example projects, check www.ti.com/tiva-c for the latest software updates.

2.3 Build the StellarisWare Components and Example Project

Before any of the examples can be built, the TivaWare file must be compiled. To build the library file:

- Right-click the driverlib project and select Make (see [Figure 2](#)).

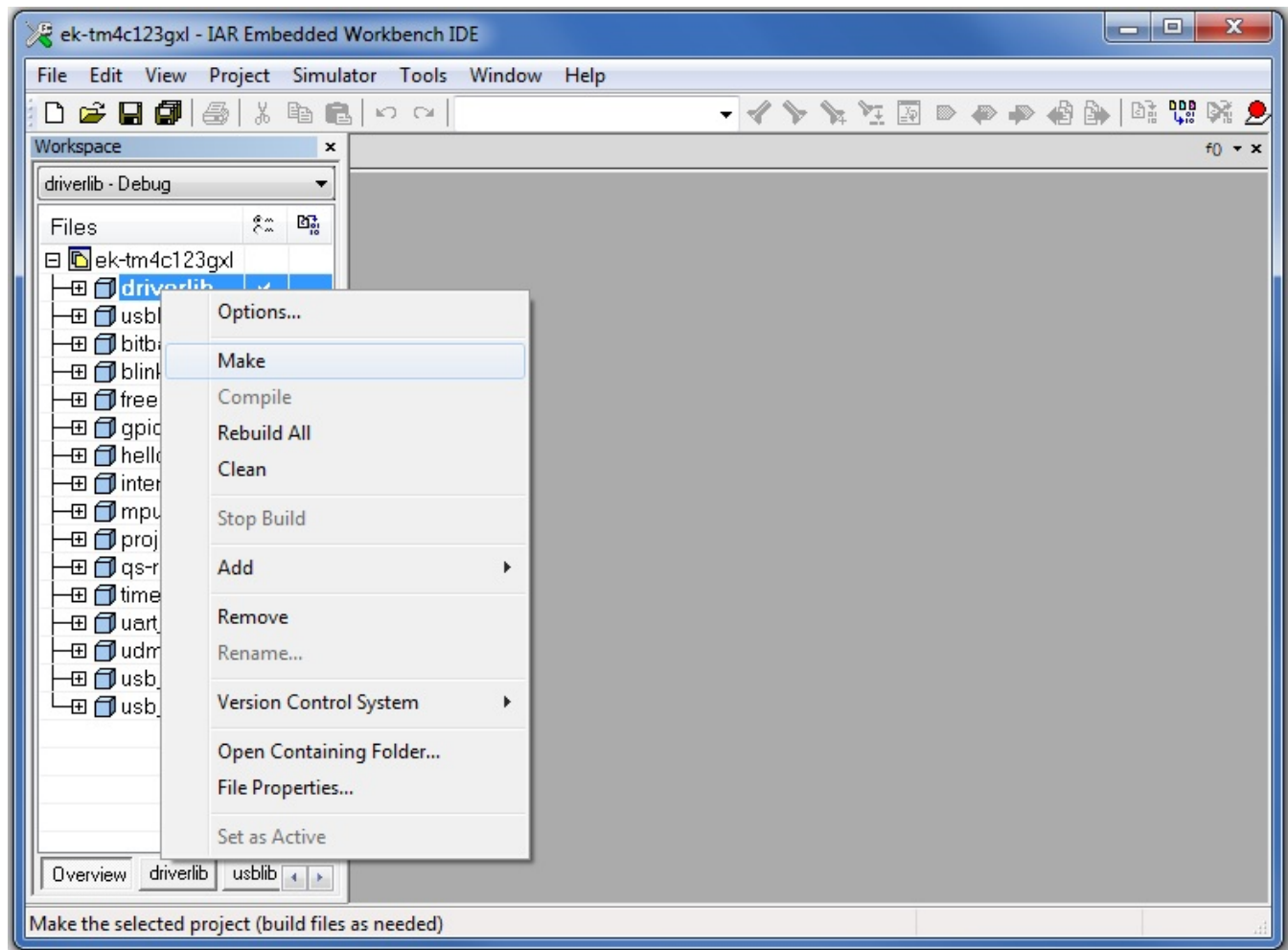


Figure 2.

2. Right-click the Hello example and select Set as Active to make the project the target project for debugging (see [Figure 3](#)).

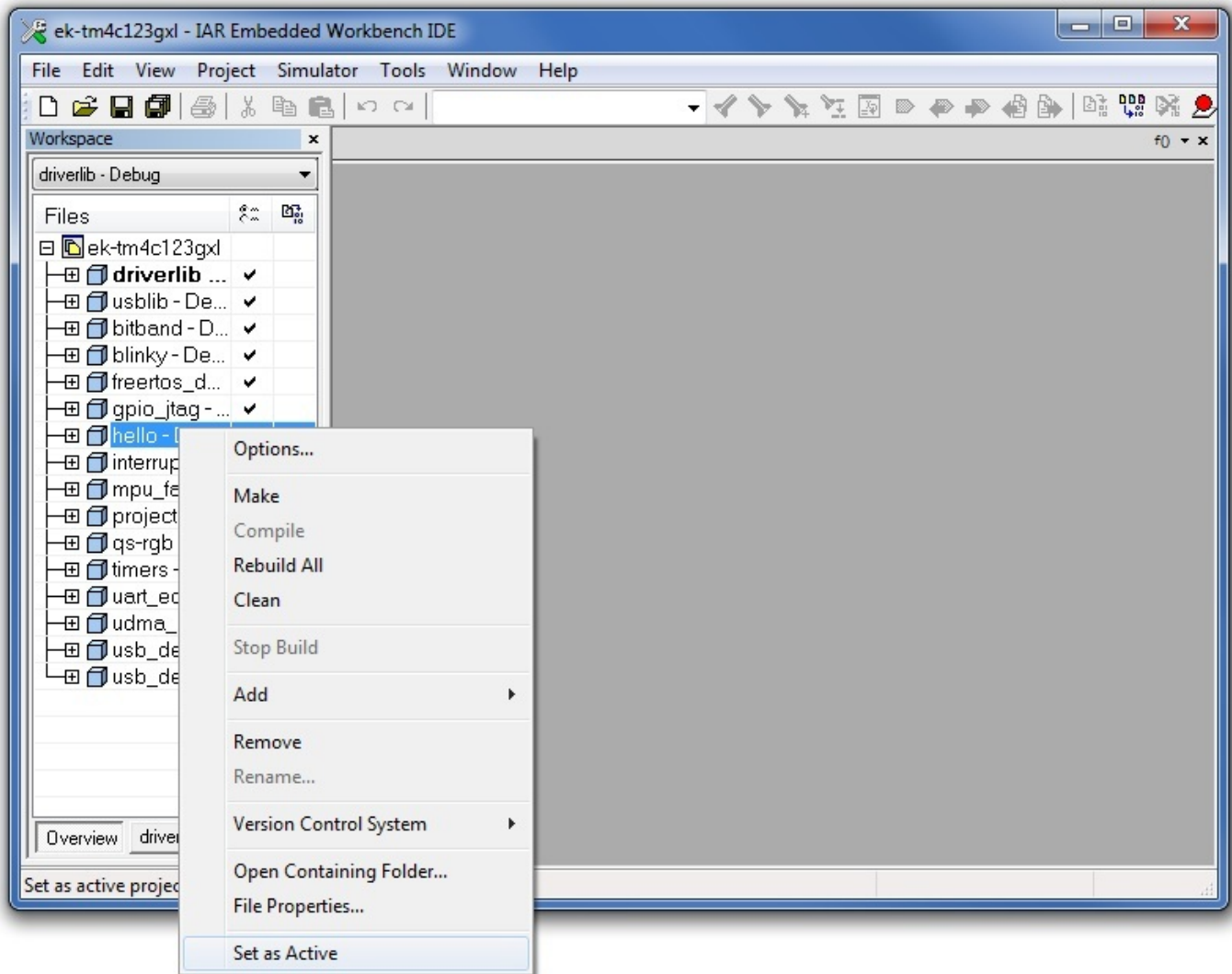


Figure 3.

3. Right-click the hello project again and select Make to build the project.

2.4 Debug a Project

You can debug with either the on-board ICD1 or you can use the IAR I-jet debug probe.

Perform the following steps to debug a project:

1. Select Download and Debug under the Project menu.

NOTE: The debugger downloads and verifies the application and stops execution at the main() function (see [Figure 4](#)).

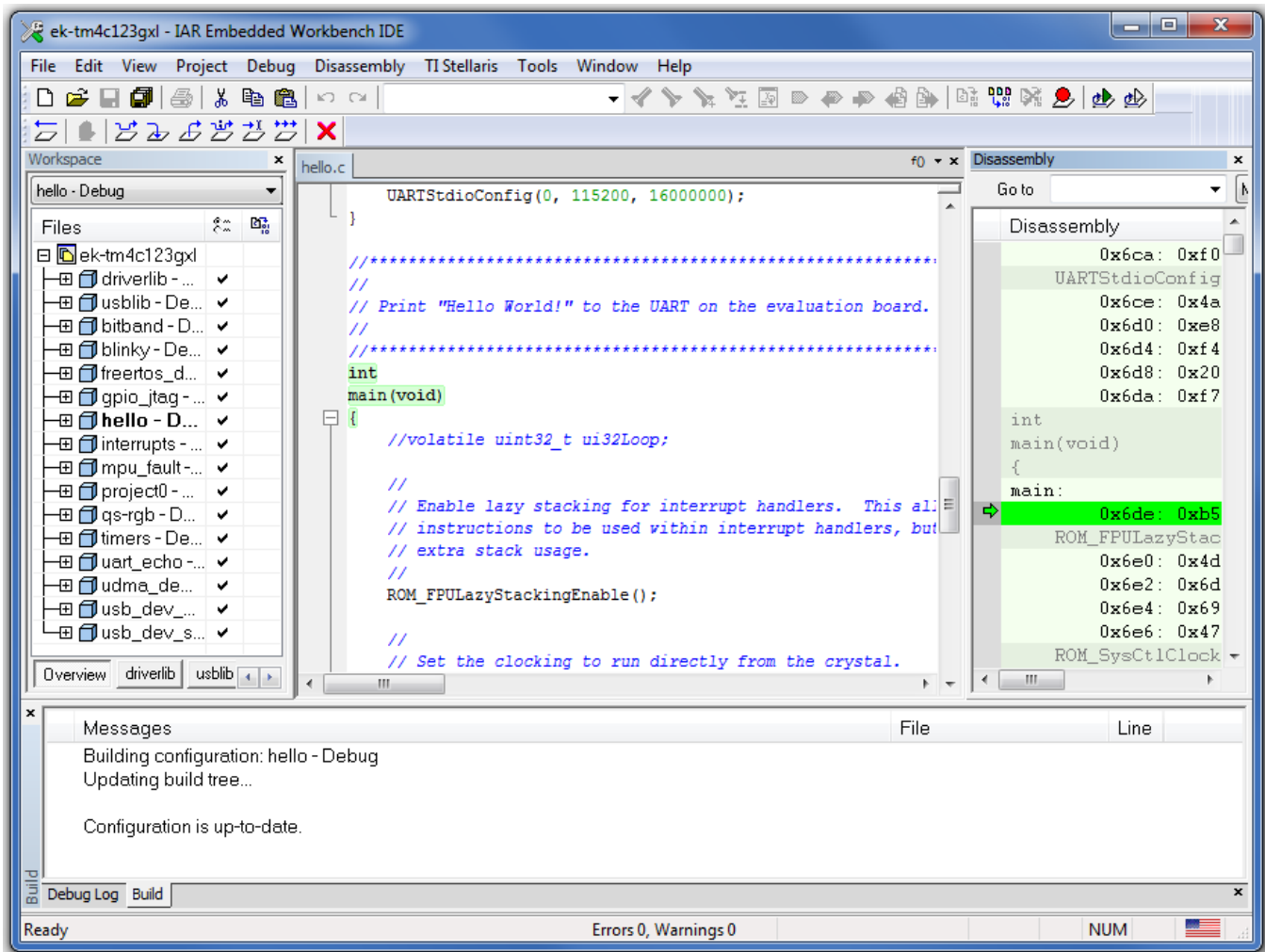


Figure 4.

From here, you can:

- Examine and modify memory.
- Program variables and processor registers.
- Set breakpoints.
- Step through a program.
- Perform other typical debugging activities.

2. Select Go from the Debug menu or click the Go icon to run the program (see Figure 5).

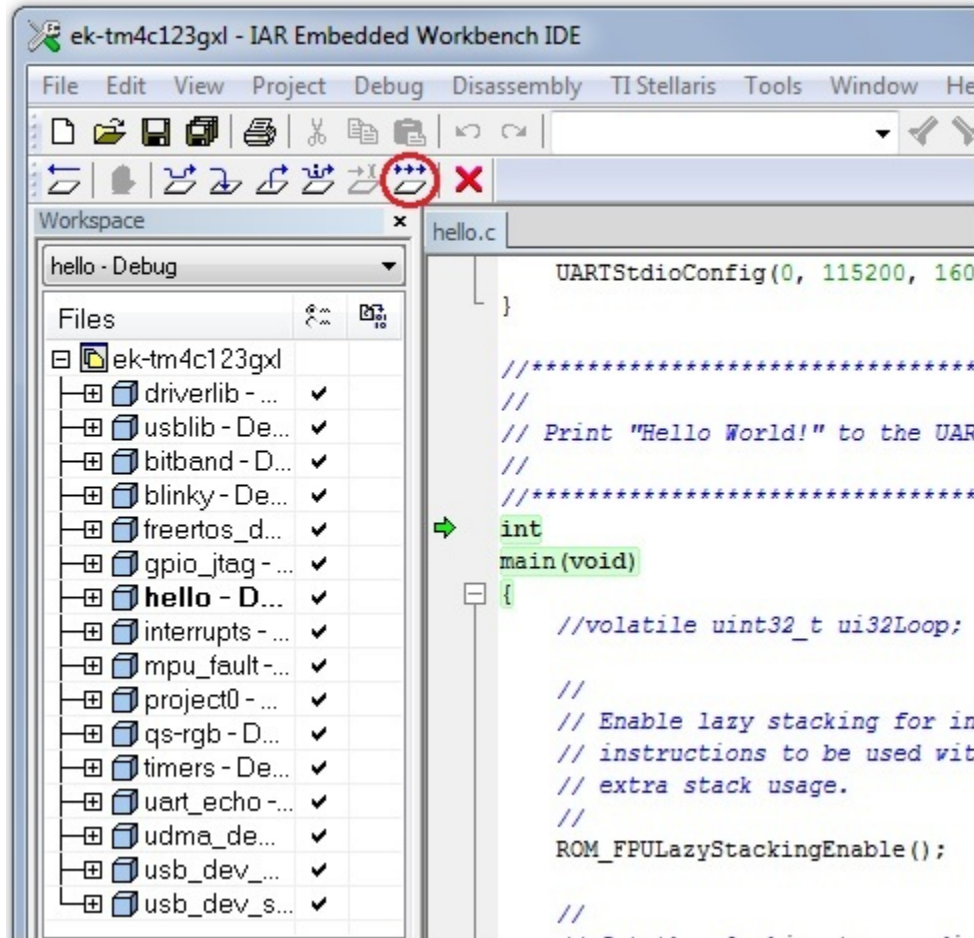


Figure 5.

3. The application runs and the text Hello World! outputs to the PC via the UART or to the display of the evaluation board.

2.5 Build and Run Additional Example Programs

There are several additional example projects listed in the TivaWare workspace. To build another example project:

1. Right-click the project and select Set as Active to make it the target for debugging.
2. Right-click and select Make.

Follow the instructions from Section 2.4 to debug the application. The quick start application that came preloaded on the evaluation board is the qs-xxxxx project listed with the examples.

3 Create a New Project

When you have completed the TivaWare example applications, you may want to create your own project to start development. While you can always start with an existing, simple project, sometimes you may want to create a new project.

Because the IAR environment uses workspaces to manage projects, you can either create a brand new workspace, or add your new project to the existing workspace. For demonstration purposes, you will simply add your new project to the existing workspace.

To add a new project to the workspace perform the following steps:

1. In the Project menu, select Project → Create New Project... (see [Figure 6](#)).

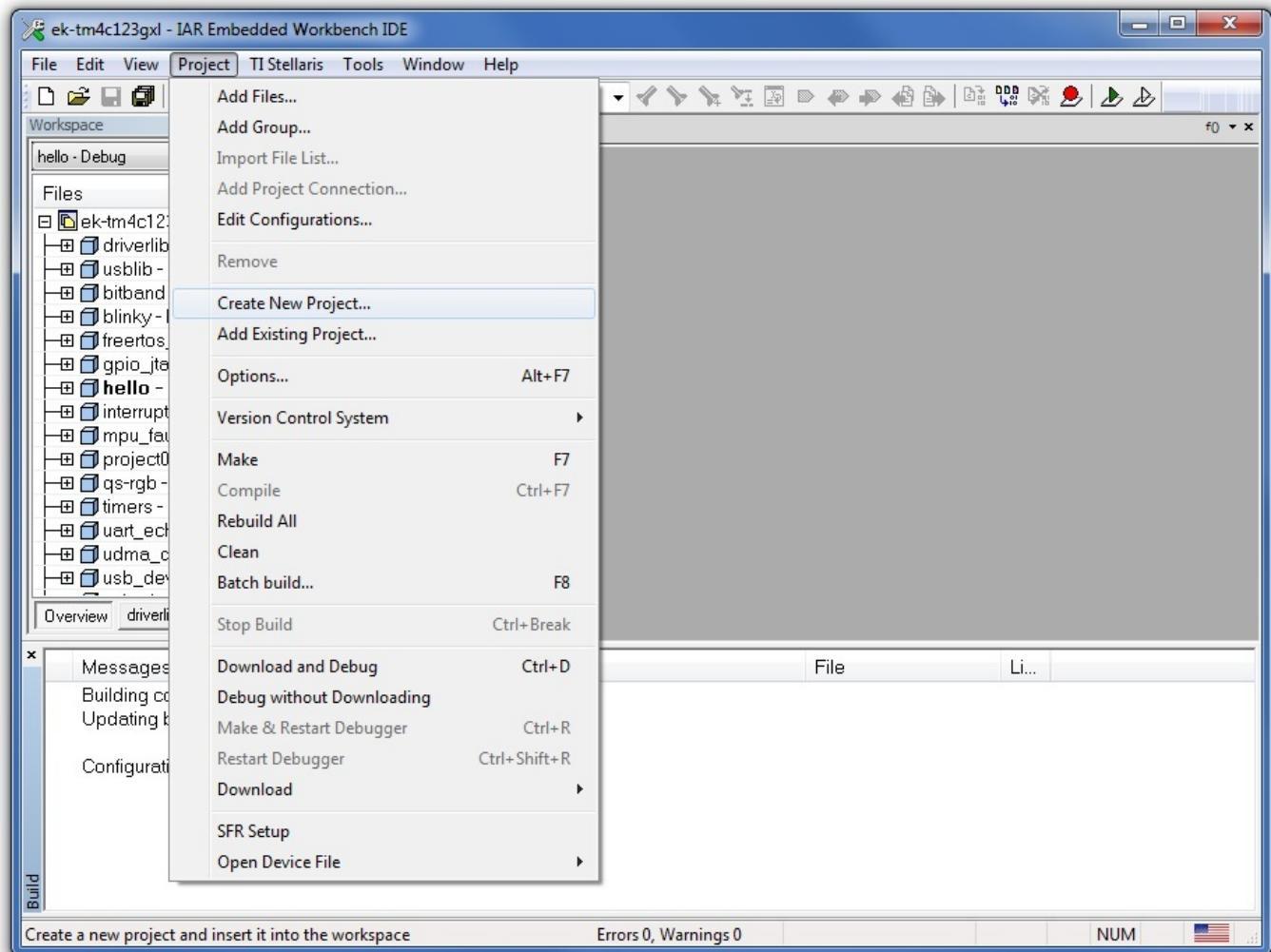


Figure 6.

2. The Create New Project dialog box appears (see [Figure 7](#)). Because you are working with a C source, select the C → main option.

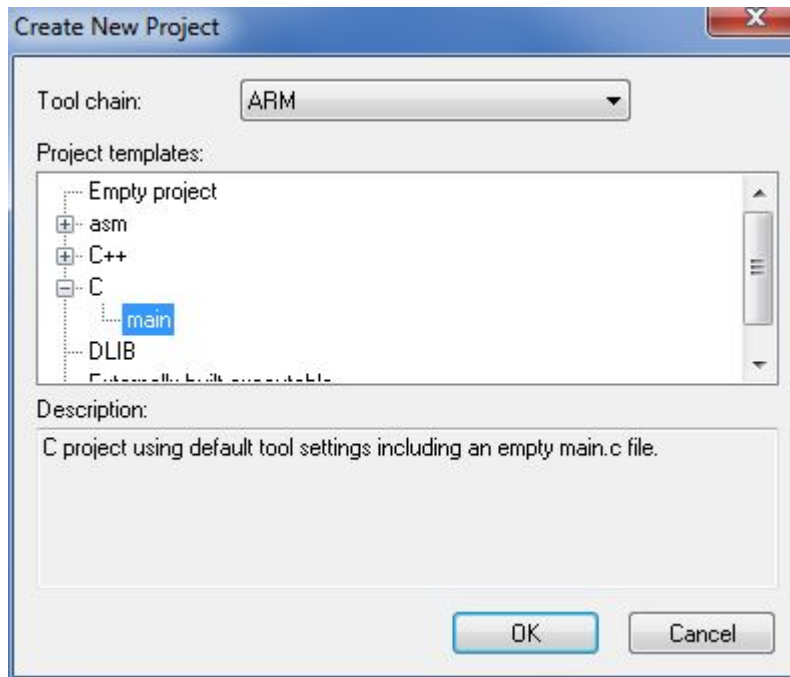
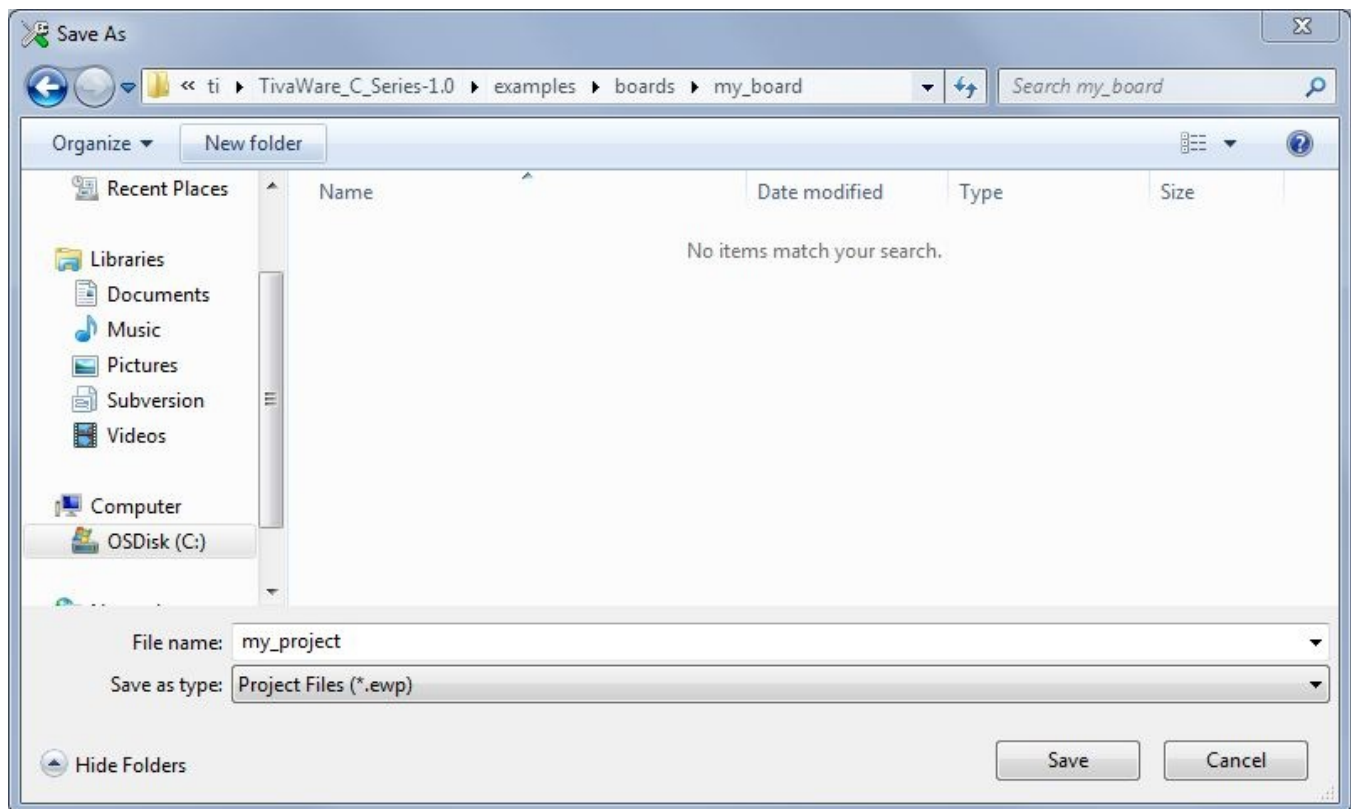


Figure 7.

3. Create the project within the TivaWare tree by either saving it in the existing *TivaWare\boards* directory or creating a new item in the boards directory that corresponds to your specific board or development.
4. If you create a new item, then create a new directory called *my_board* in *ti\TivaWare_C_Series-n.lexamples\boards*, and create a new project called *my_project*.

The TivaWare tree now appears as: *C:\ti\TivaWare_C_Series-n.lexamples\boards\my_board\my_project* (see [Figure 8](#)).


Figure 8.

This process creates the basic project as well as adds a simple main.c file. This new project, however, is still missing startup code (required for Cortex™-M4).

To obtain startup code, the easiest thing to do is:

1. Copy a startup_ewarm.c file from one of the other TivaWare examples. Copy the file from the Hello project (*ti\TivaWare_C_Series-n.n\examples\boards\{board_name}\hello*).
2. Place the file in the new *my_project* directory.
Now the startup code must be added to the project.
3. Right-click the project and select Add → Add Files... (see [Figure 9](#)). This takes you to the project directory.
4. Select the startup_ewarm.c file.

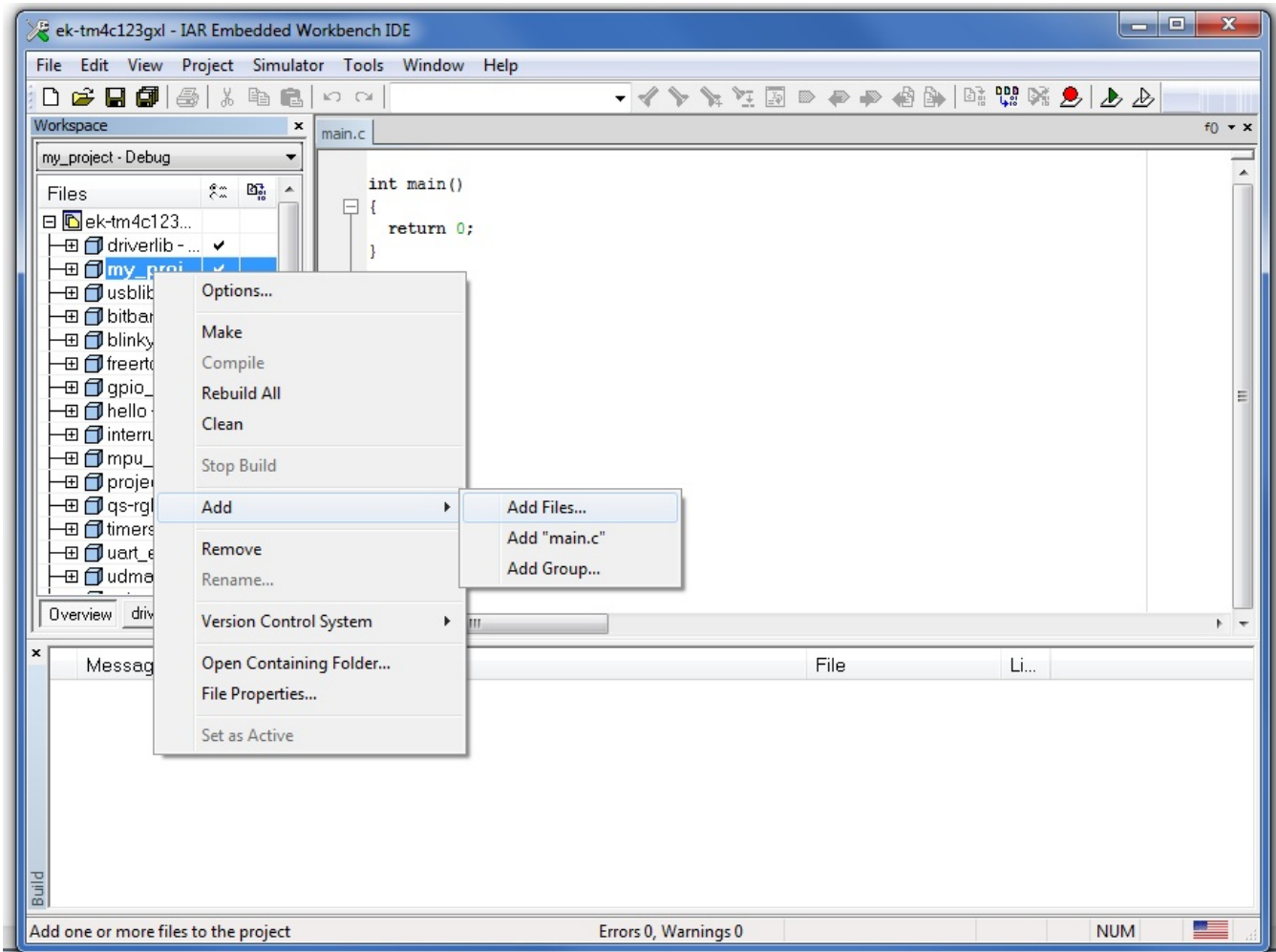


Figure 9.

Before compiling and debugging the project, a few settings must be adjusted in the project options. In addition to setting the processor core, TivaWare hooks and the debug and flash programmer must be configured.

3.1 Set the Target

First, set the target of the project to a Tiva C Series device.

1. In the project options, select the project and either go to the project menu and select Options, or right-click the project and select Options.
2. Select the device that most closely fits your board (see [Figure 10](#)).

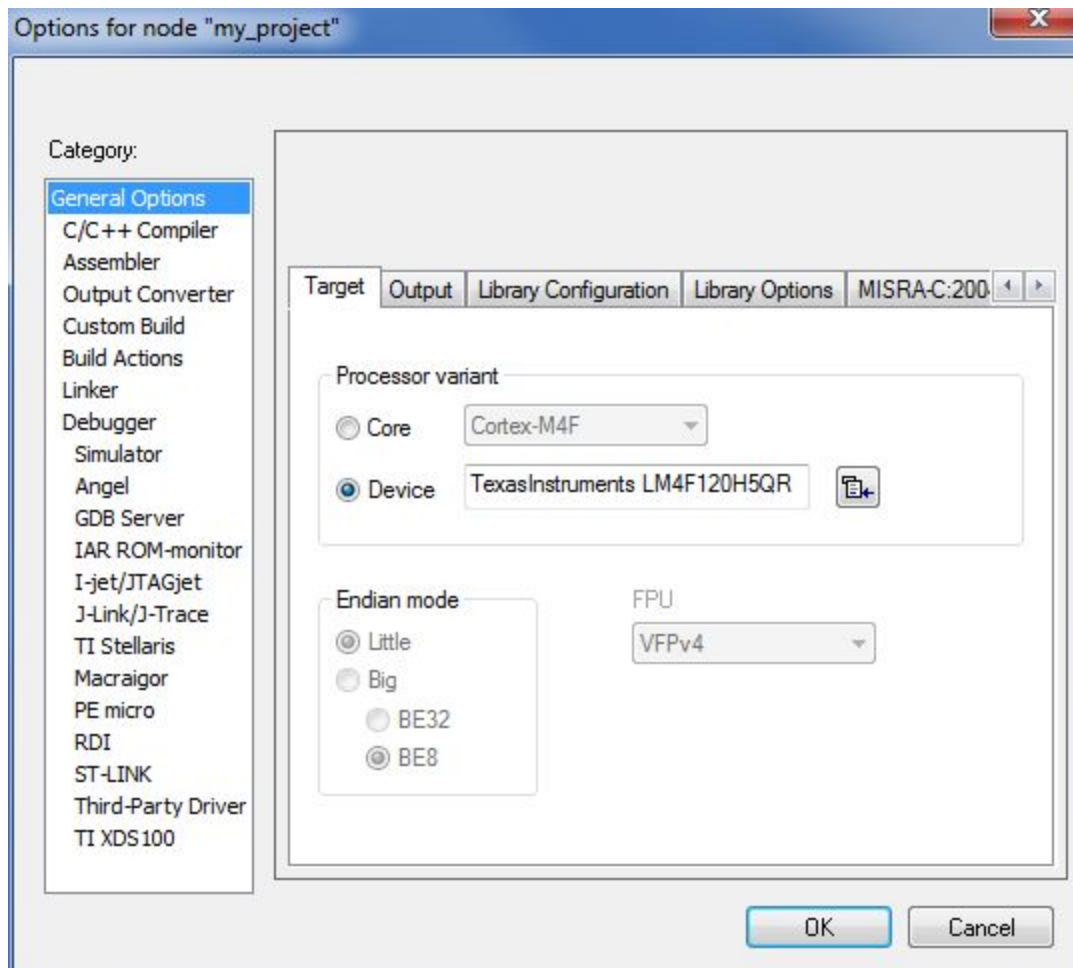


Figure 10.

3.2 Add TivaWare Hooks

Next, add the driverlib.a file to your project:

1. Follow the same File → Add procedure described in [Section 3.1](#). The location of the file is: `C:\ti\TivaWare_C_Series-1.0\driverlib\ewarm\Exe.`

NOTE: The file browser must search for library file types, so change the Files of type drop-down from Source Files to Library/Object Files or All Files.

To make sure that you have the appropriate pointers to the TivaWare source and header files, you must include paths to the project settings. It is also a good practice to add defines for the compiler (*ewarm*) and the part number (see [Figure 11](#)). This configuration is used in TivaWare to compile the IAR-specific sections correctly.

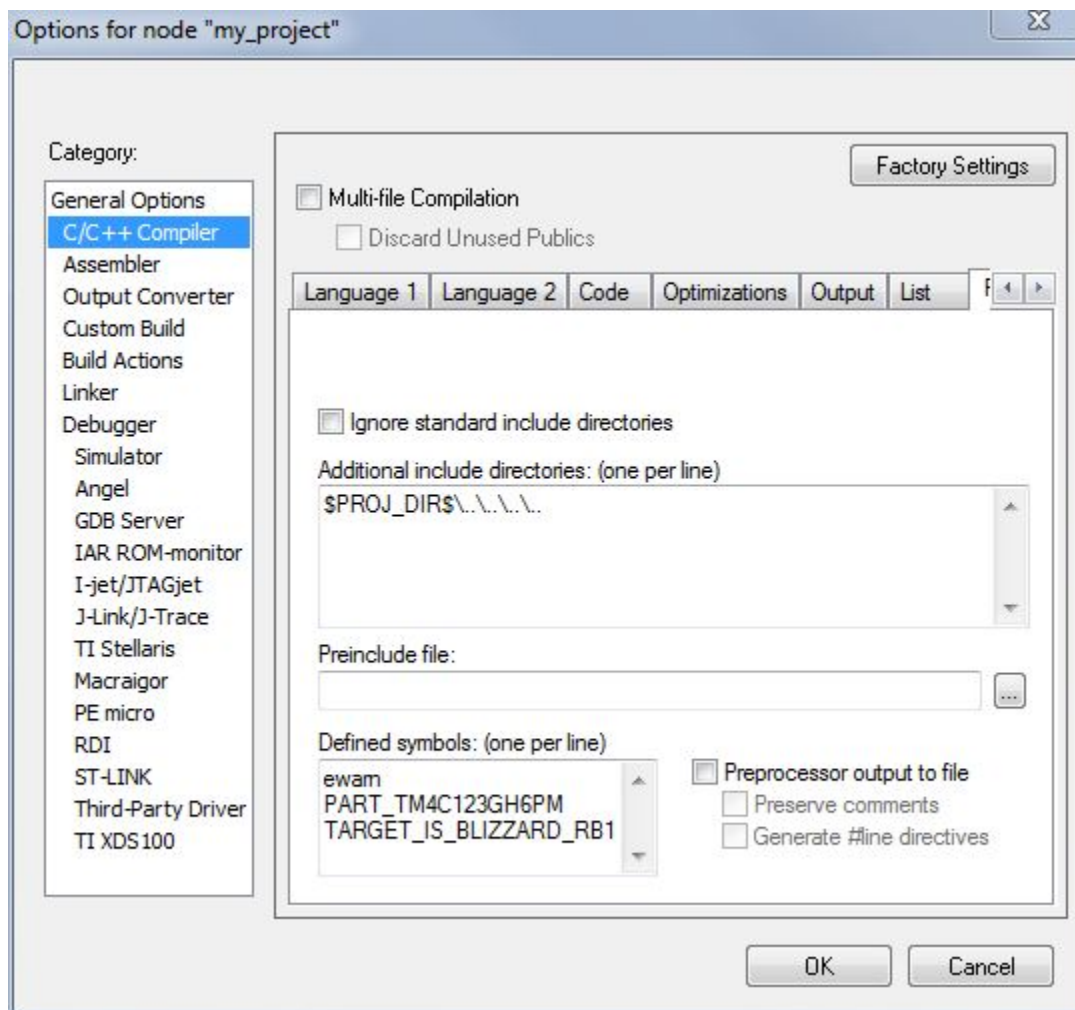


Figure 11.

3.3 Set up the Debugger and Flash Programmer

The last thing to do is configure the debugger and flash programmer.

1. In the project options, select the Debugger item and choose the TI Stellaris option from the driver drop-down menu (see [Figure 12](#)).

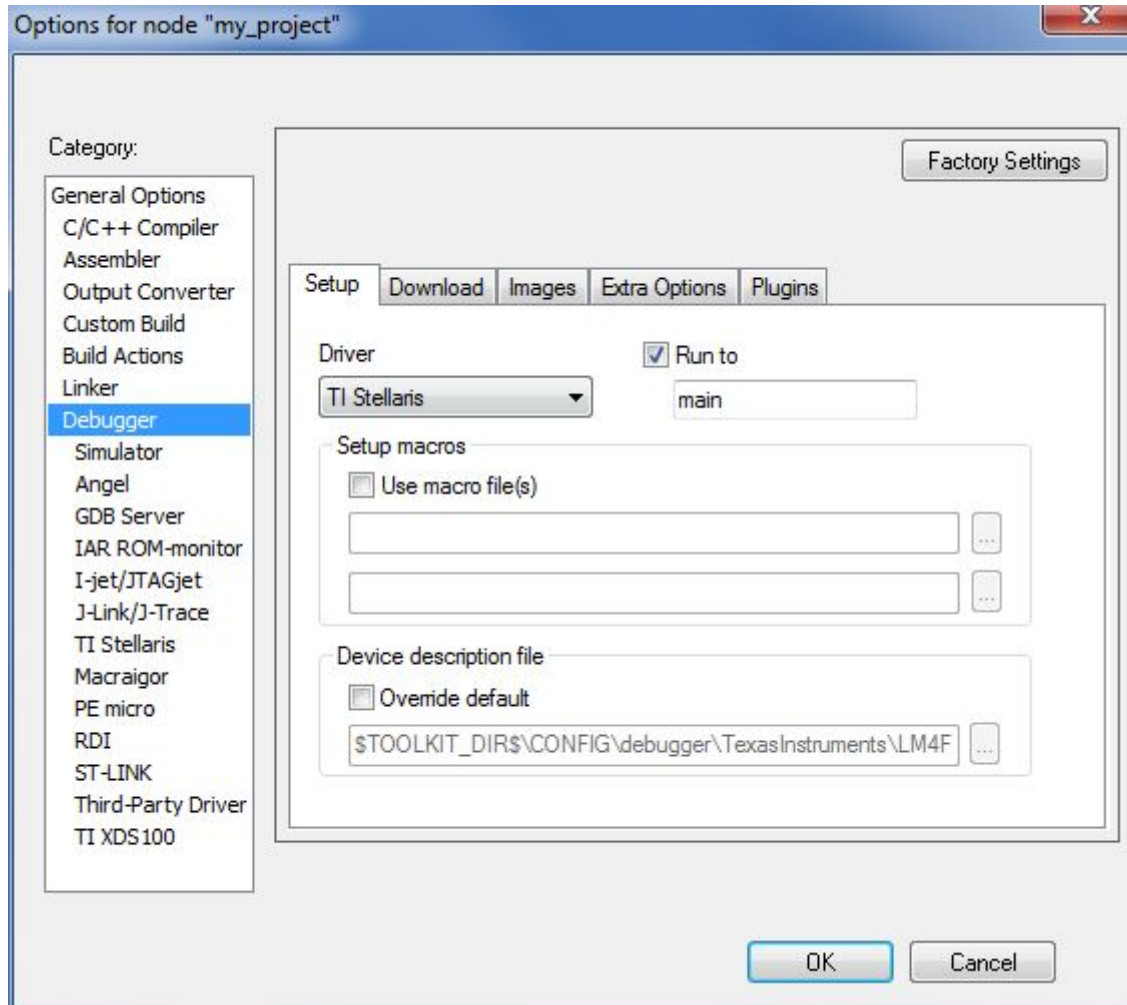


Figure 12.

2. Under the Download tab, check the Verify download and Use flash loader(s) options (see [Figure 13](#)).

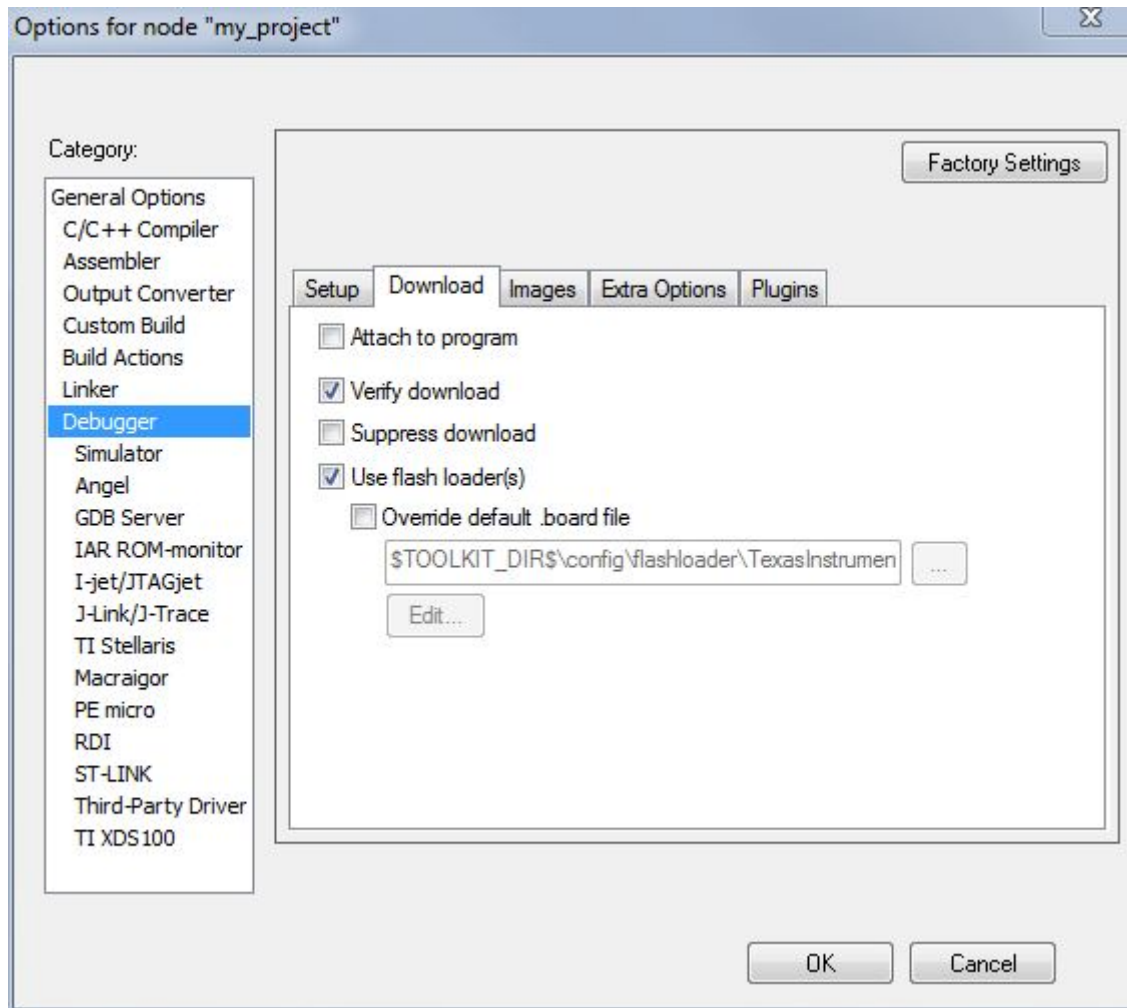


Figure 13.

With these settings complete, you can download and debug your simple application. You can add your own code or calls to TivaWare drivers (assuming you include the correct header files). The best way to make sure everything is correct is to review some of the examples in the TivaWare package.

4 Conclusion

You have now installed the IAR Embedded Workbench IDE and used it to build, load, and run an example application on your Tiva C Series Evaluation Board. You have also learned how to create a new project. From here, you can experiment with the debugger or create your own application or use the Hello program as an example.

5 References

The following references are included on the Tiva C Series Development Kit Software USB flash drive and are also available for download at www.ti.com/tiva-c:

- *Tiva C Series Evaluation Kit User's Manual*.
- TivaWare for C Series Software, Order Number SW-TM4C (<http://www.ti.com/tool/sw-tm4c>)
- *TivaWare Peripheral Driver Library User's Guide*, Order Number SW-DRL-UG (literature [SPMU298](http://www.ti.com/lit/ug/SPMU298)).

In addition, the following website may be useful: IAR website at <http://www.iar.com>

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