



**THE DATASHEET OF  
EKT-LM3S9B90**



# QUICKSTART – IAR TOOLS

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## Stellaris® Development and Evaluation Kits for IAR Embedded Workbench®

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

### Requirements

- You have a PC with a USB interface, running Microsoft® Windows 2000, XP, or Vista
- You have the Stellaris Evaluation Kit Documentation and Software CD or the standalone IAR CD found in the Development Kit



**CAUTION:** There is a known electrical issue with the FT2232 device that is used in the on-board In Circuit Debug Interface (ICDI). Some USB hubs can cause the device to misbehave, with symptoms ranging from failed enumeration to corrupt data transfers. If you experience trouble when using the on-board ICDI, try connecting the USB cable directly to one of the USB ports on your PC or laptop.

## IAR Embedded Workbench®

This quickstart shows you how to install the KickStart™ version of the IAR Systems Embedded Workbench tools, and how to use it to build and run an example application on your Stellaris Evaluation Board.

### ***Step 1: Install Embedded Workbench***

1. Insert the Evaluation Kit Documentation and Software CD or the standalone IAR CD into the CD-ROM drive of your computer. If Autoplay is enabled on your PC, the index.htm file opens automatically in your default web browser. If not, use Windows Explorer to open it manually.
2. With the Evaluation Kit CD, click on the Tools button and then the IAR Logo to start the setup program. If the setup program does not start, use Windows Explorer to view the files on the CD and double-click the EWARM-KS-CD-n.nn.exe file located in the Tools\IAR\ directory.

With the standalone CD, follow the installer dialog.

3. Click on the “Install Embedded Workbench” link to begin the tool installation. You must register with IAR to receive license information (by clicking on “Get License”) before you can install the tools. If you have any questions about installation, follow the instructions detailed in the IAR quickstart documentation, which can be accessed by clicking “QuickStart Installation Information” in the main window of the splash screen.

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## **Step 2: Install the StellarisWare® Package**

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

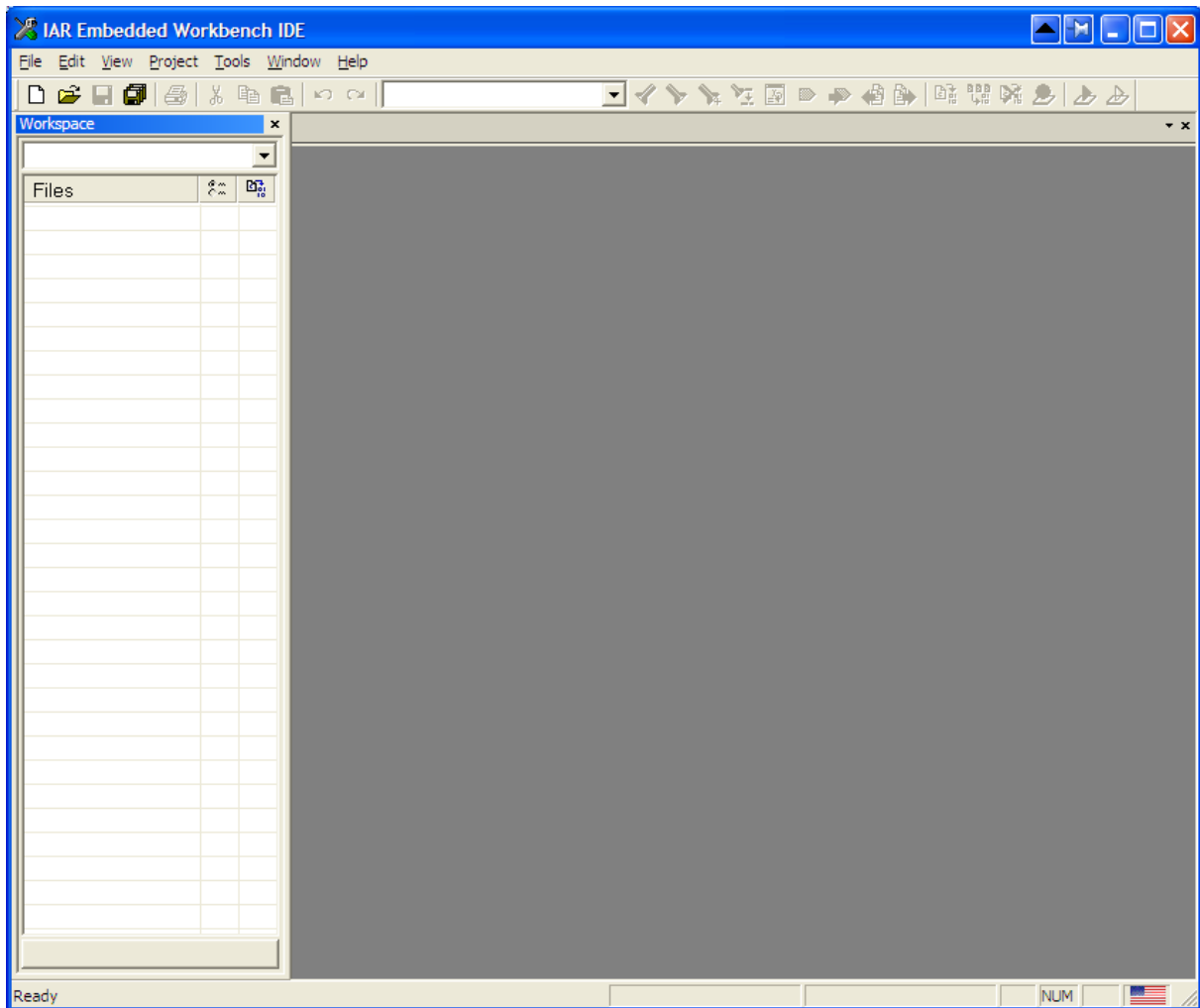
1. Navigate to the *Tools* tab on the Evaluation Kit Documentation and Software CD, or the *Software* tab on the Development Kit Documentation and Software CD.  
**NOTE:** If you are navigating the CD using Windows Explorer (or a similar application), go to the Tools/ StellarisWare directory.
2. Click on the 'Install' link next in the StellarisWare section (under Tools) of the CD and run the StellarisWare installer. If you prefer to manually install StellarisWare, the installer is a self-extracting zip file that is located in the Tools/StellarisWare directory. You can use a zip file extraction utility such as WinZip to manually extract the contents.
3. To view the StellarisWare documentation, navigate to the installation directory and click on the *Stellaris Peripheral Driver Library User's Guide* PDF.

## **Step 3: 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 will have a blank screen that looks like this:

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2. Open the workspace file that corresponds to your board by clicking File>Open>Workspace. The workspace file is located in the StellarisWare tree, which was installed on your PC as part of Step 2. In the StellarisWare tree, the workspace files are located in the directory corresponding to your particular board:

```
StellarisWare\boards\{board_name}
```

The IAR tools also install StellarisWare as part of the default installation, but the version may be older than what is currently available from the web site. You can find StellarisWare in the IAR tree by looking in:

```
C:\Program Files\IAR Systems\Embedded Workbench 5.4 Kickstart
```

in the folder:

```
arm\examples\Luminary\Stellaris\boards\{board_name}
```

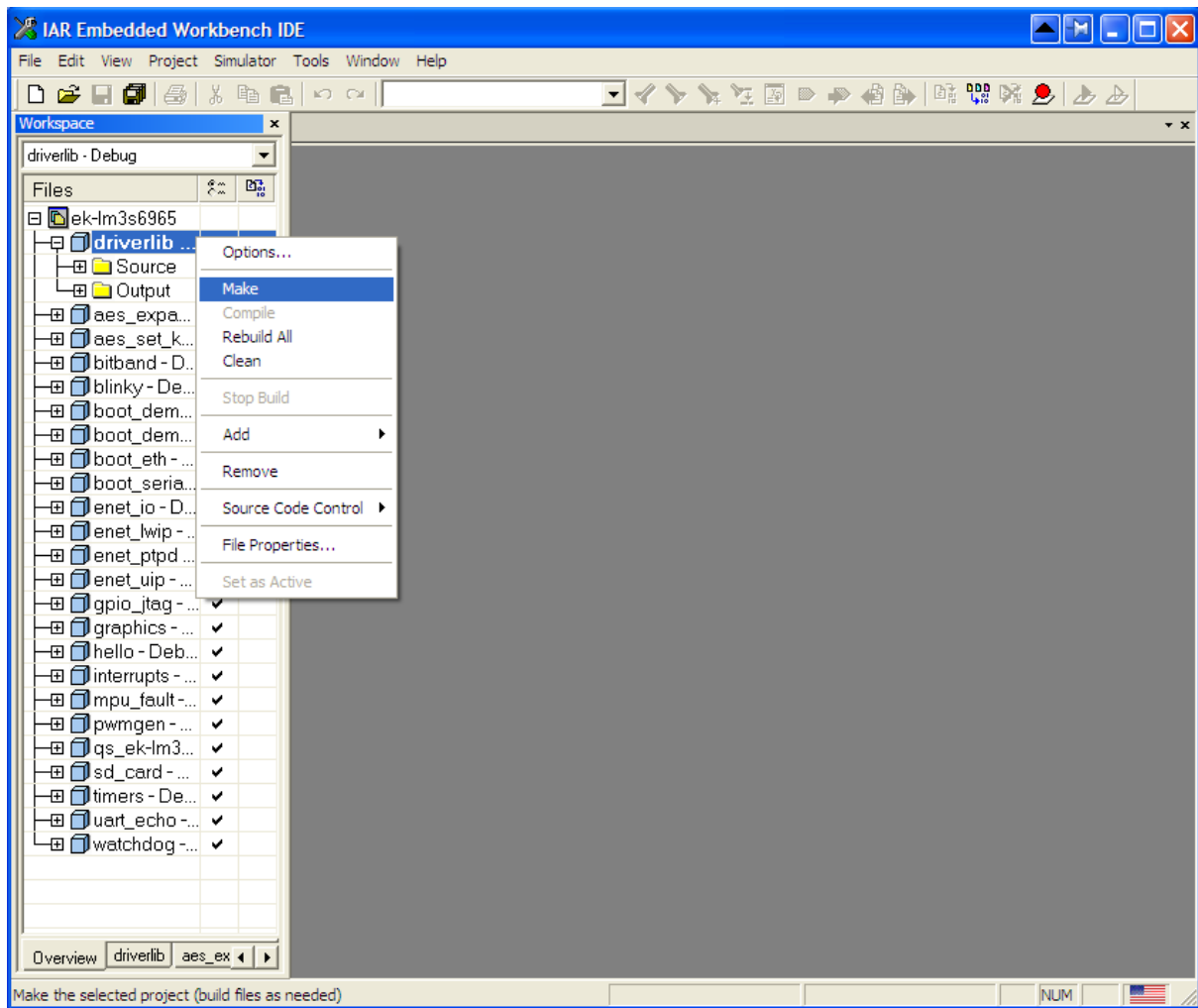
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**Important:** For the most recent version of the StellarisWare package, use the standalone version found on the Evaluation Kit Documentation and Software CD or check [www.ti.com/stellaris](http://www.ti.com/stellaris) for the latest software updates.

## **Step 4: Build the StellarisWare Components and Example Project**

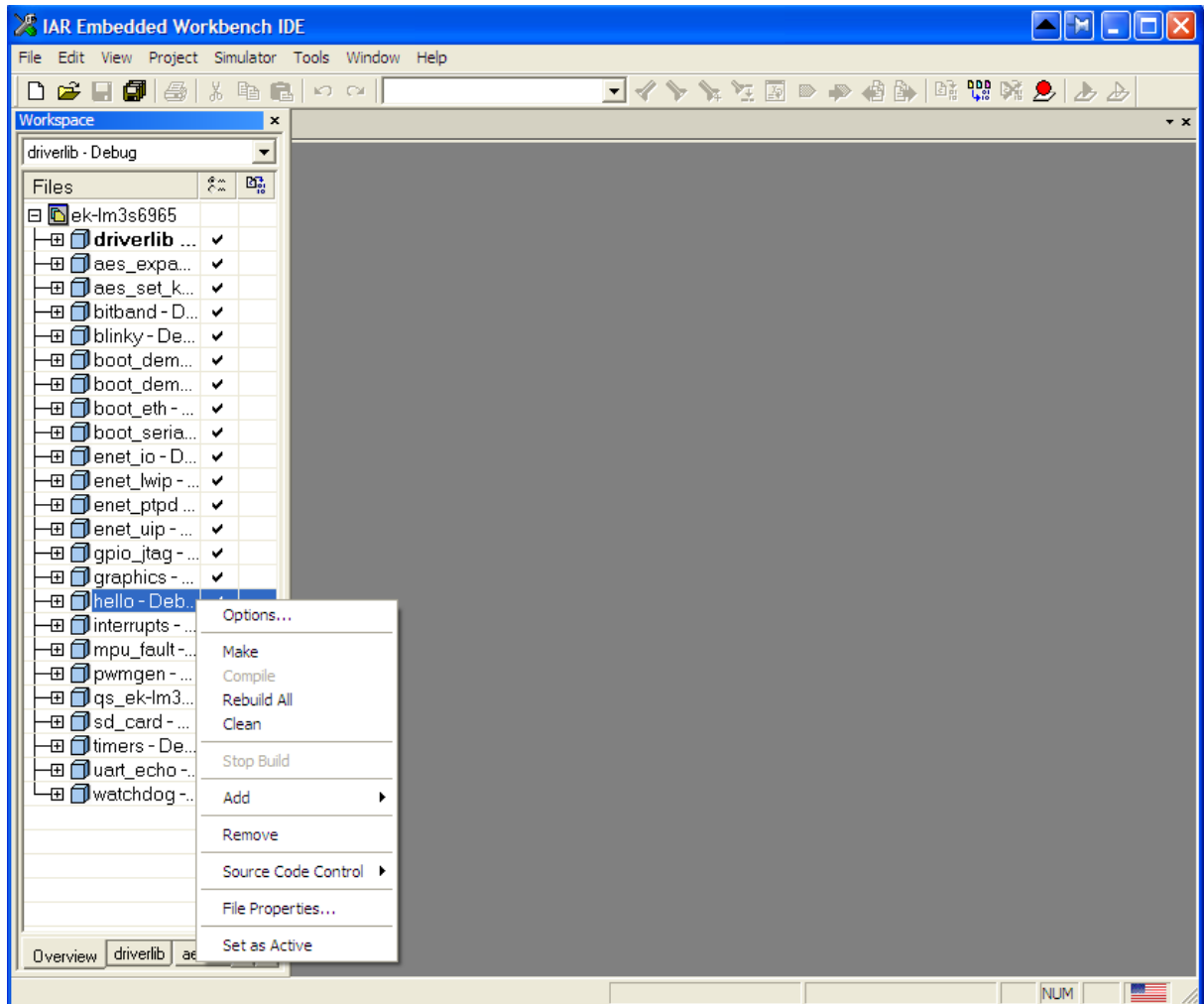
1. Before any of the examples can be built, the StellarisWare file must be compiled. To build the library file, right-click on the driverlib project and select “Make.”



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2. Right-click the Hello example and select “Set as Active” to make the project the target project for debugging.



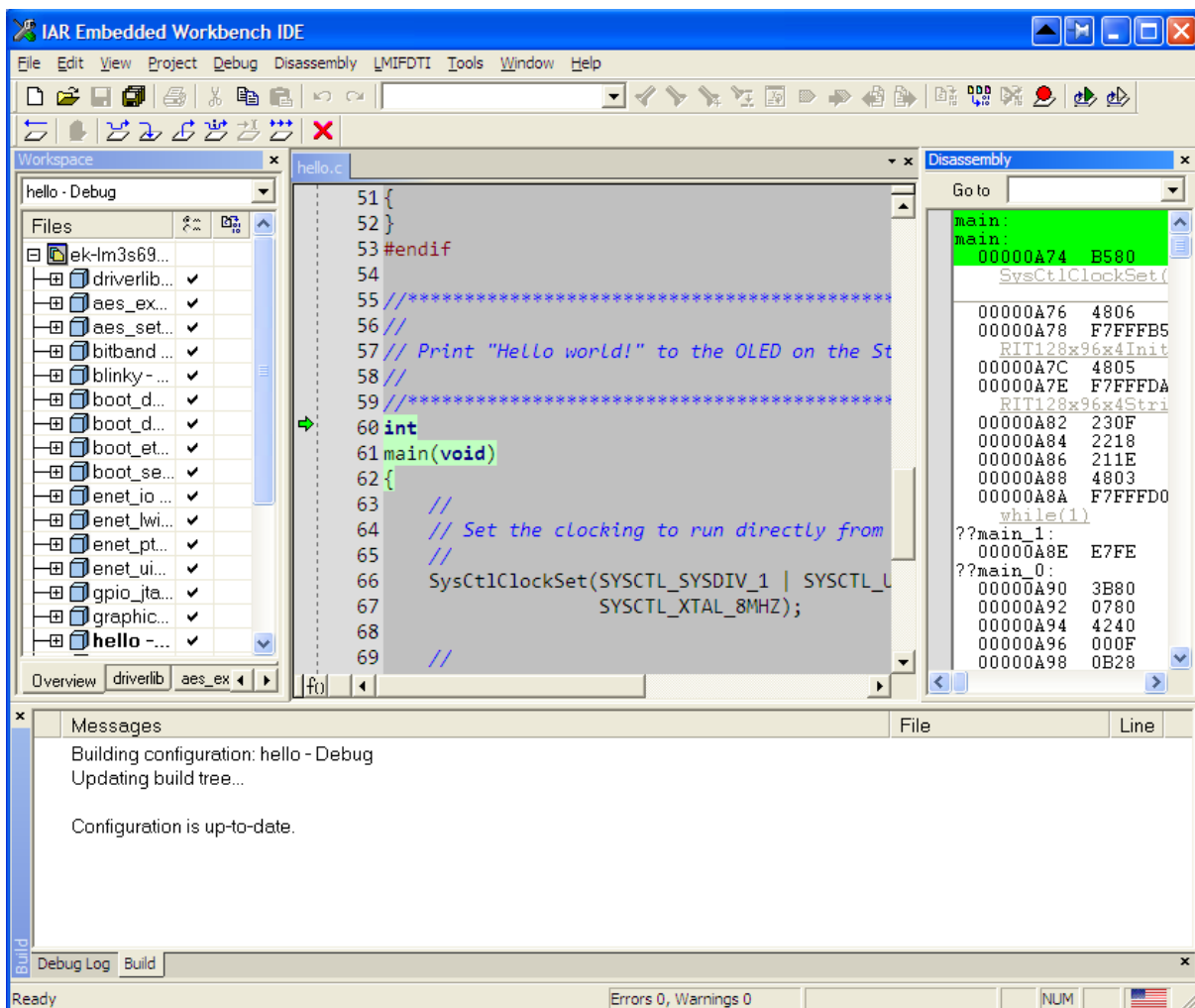
3. Now, right-click on the Hello project once more and select “Make” to build the project.

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## Step 5: Debugging a Project

**Important:** The FTDI driver interface included in the kit is slower than a standard J-Link interface and is intended to be used for tool evaluation. Upgrading to a J-Link for your custom design allows for much faster download speeds. The J-Link *cannot* be used with the EKI-LM3S811, but is compatible with all other evaluation boards.

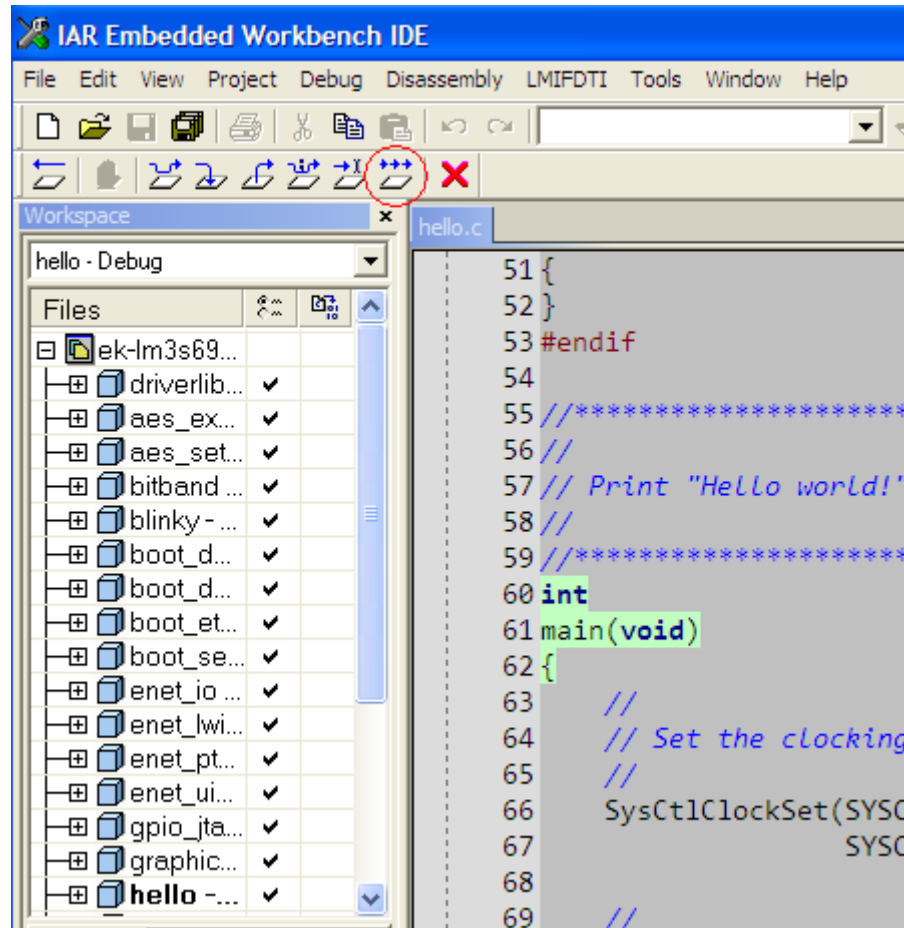
1. Begin a debug session by selecting “Download and Debug” under the Project menu. You see the debugger download and verify the application, and stop execution at the main() function.



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2. From here, you can examine and modify memory, program variables and processor registers, set breakpoints, step, and perform other typical debugging activities. To run the program, select “Go” from the Debug menu or click on the “Go” button (icon).



3. The application starts running, and you should see the text “Hello World!” output to the display of the evaluation board.

## **Step 6: Build and Run Additional Example Programs**

There are several additional example projects listed in the StellarisWare workspace. If you would like to build another example project, right-click the project and select “Set as Active” to make it the target for debugging. Then, right-click and select “Make”. Follow the instructions from Step 5 to debug the application. The quickstart application that came preloaded on the evaluation board is the qs\_ev-lm3sxxxx project listed with the examples.

## **Creating a New Project**

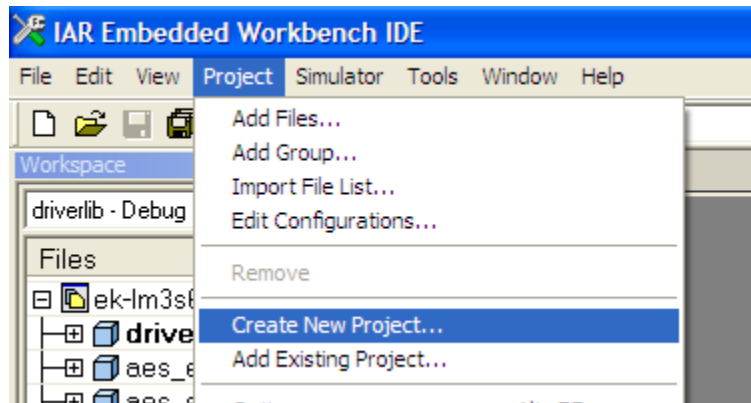
Once you have gone through the StellarisWare example applications, you may want to create your own project to start development. While you can always start with an existing, simple project, sometimes you may want to start fresh.

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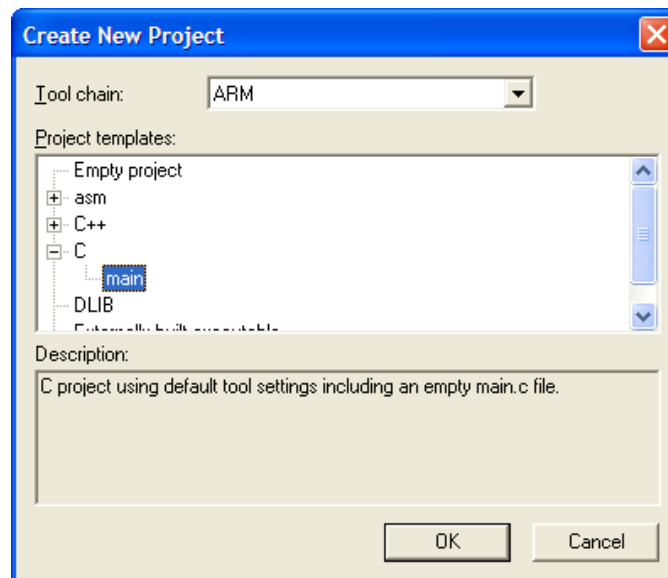
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Because the IAR environment uses workspaces to manage projects, you can either create a brand new workspace, or add your new project to the existing workspace. For demonstration purposes, you'll simply add your new project to the existing workspace.

To add a new project to the workspace, select Project > Create New Project...



You will then see a dialog box asking you what type of project you would like to create. Because you're working with a C source, select the C > main option.

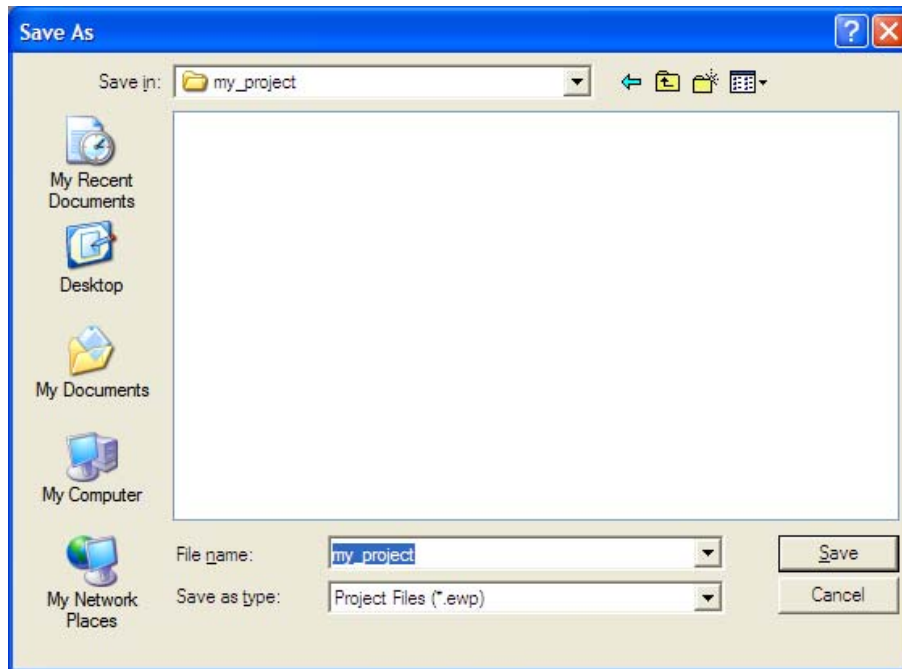


Because you're adding a project to the existing workspace, you will create the project within the StellarisWare tree. You can put it in either the existing StellarisWare\boards directory or create a new item in the boards directory that corresponds to either your specific board or development. In this case, you'll create a new directory called "my\_board" in StellarisWare boards, and create a new project called "my\_project". The StellarisWare tree now looks like:

```
C:\StellarisWare\boards\my_board\my_project
```

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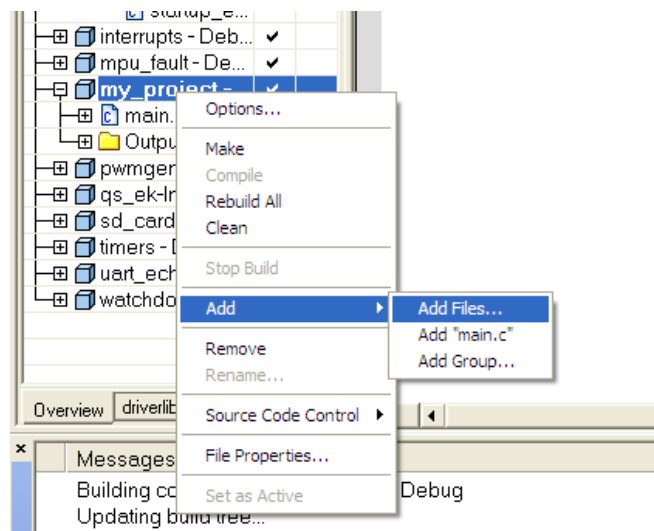
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This process creates the basic project as well as adds a simple main.c file. The project is still missing startup code (required for Cortex-M3).

For startup code, the easiest thing to do is copy a startup\_ewarm.c files from one of the other StellarisWare examples. In this case, we'll copy the file from the Hello project (StellarisWare\boards\{board\_name}\hello) and place it in the new my\_project directory.

Now the startup code must be added to the project. Right click on the project and select Add > Add Files... It should take you to the project directory, and because the startup\_ewarm.c file is already there (you just copied it), simply select it.

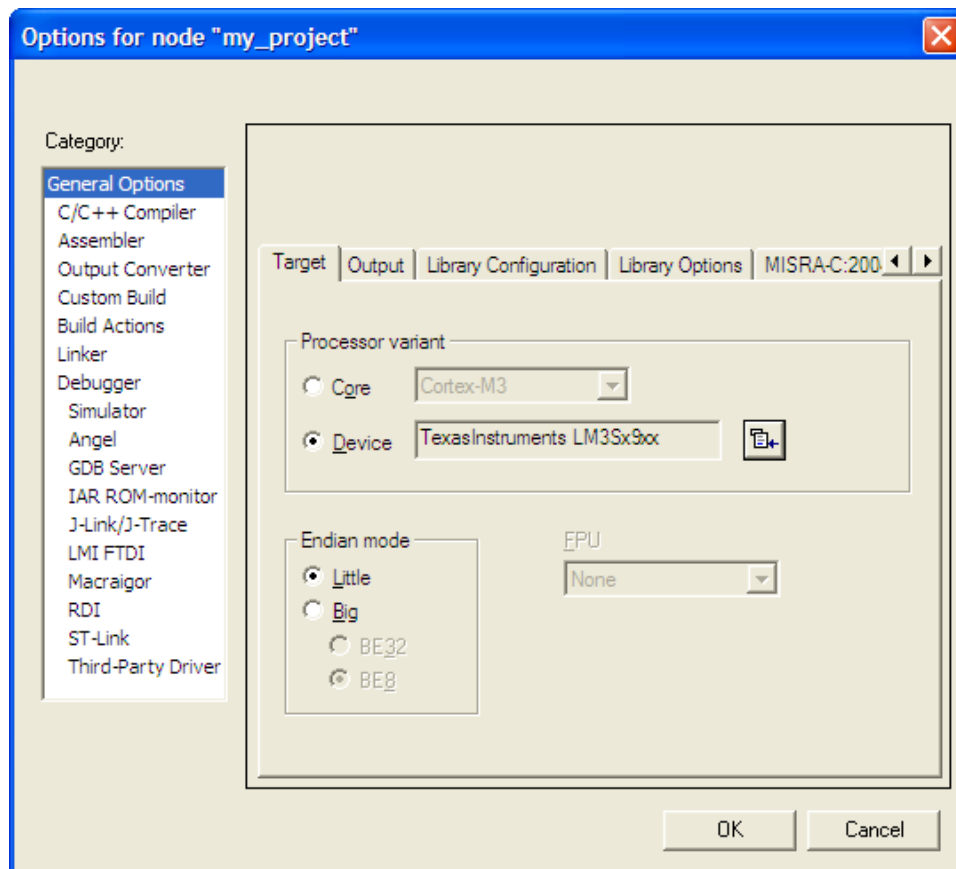


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Before compiling and debugging the project, a few settings must be adjusted in the project options. In addition to setting the processor core, StellarisWare hooks and the debug/flash programmer must be configured.

## **Setting the Target:**

The first thing to do is tell the project that you're using a Stellaris device. In the project options (select the project and either go to the project menu and select Options, or right click and select Options). Select the device that closest fits what you're using.



## **Adding StellarisWare Hooks:**

The first step is to add the driverlib.a file to your project. To do this, you'll follow the same file>add procedure described above. The location of the file is:

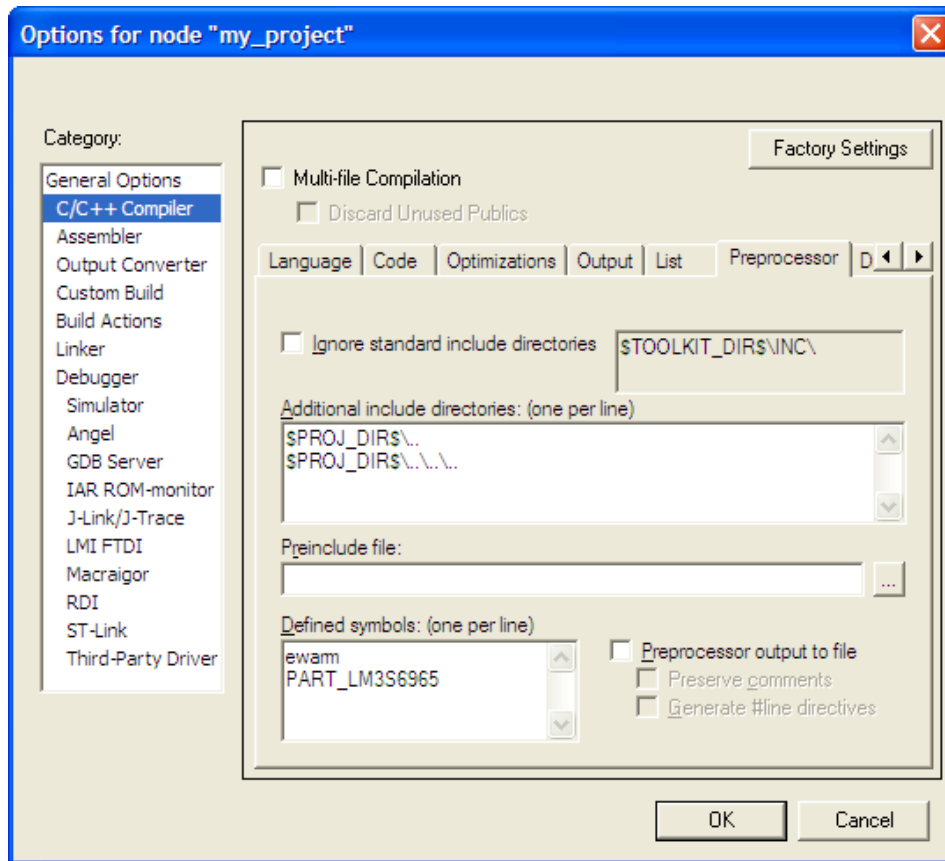
```
C:\StellarisWare\driverlib\ewarm\Exe
```

Note, you must tell the file browser to look 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 StellarisWare source and header files, you must add some include paths to the project settings. It's also a good idea to add

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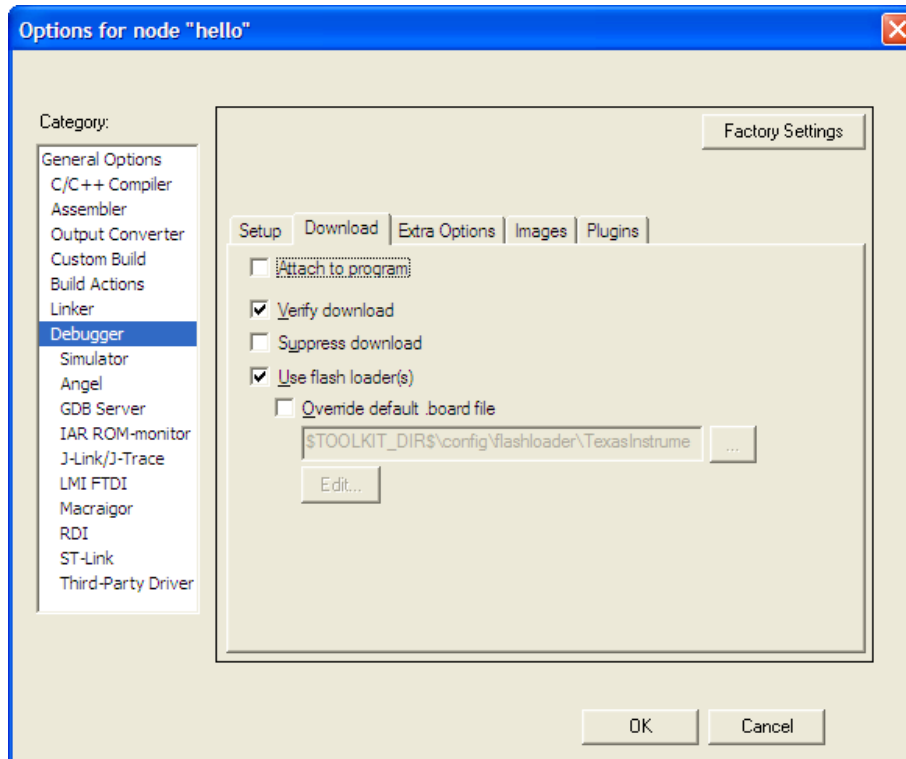
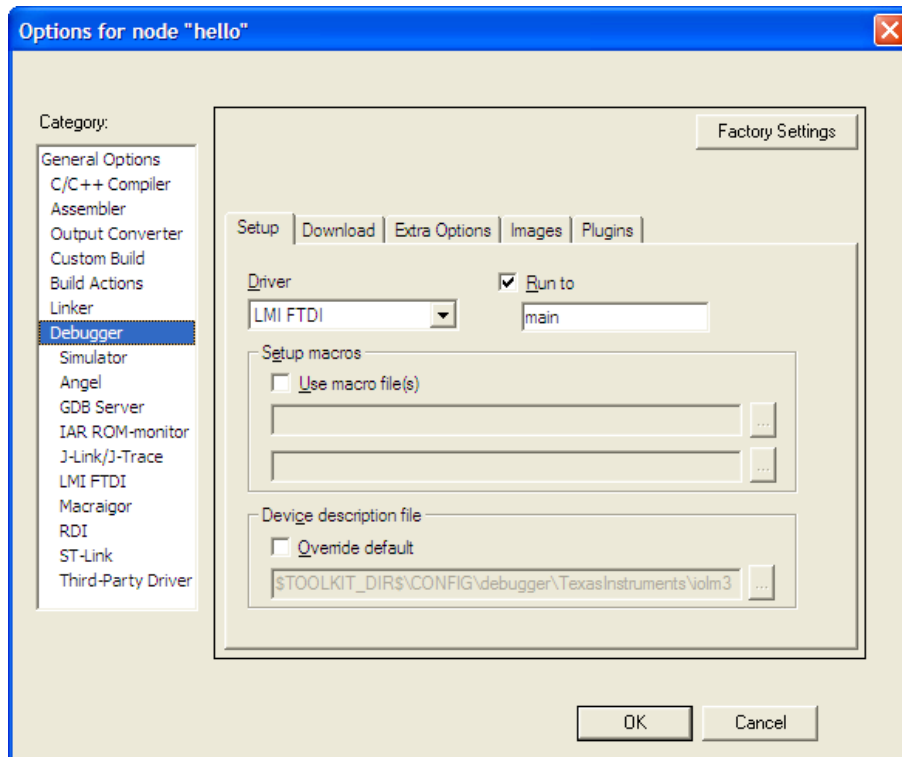
some defines for the compiler (“ewarm”) and the part number. This configuration is used in StellarisWare to compile the IAR-specific sections correctly.



## **Setting up the Debugger and Flash Programmer:**

The last thing to do is configure the debugger and flash programmer. In the project options, select the Debugger item and choose the “LMI FTDI” option from the driver drop-down menu. Under the Download tab, select “Verify download” and “Use flash loader(s).”

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With these settings all complete, you can download and debug your simple application. From here you can start adding your own code or calls to StellarisWare drivers (assuming you include the correct header files). The best way to make sure you've done everything correctly is to go over some of the examples that we provide in the StellarisWare package.

## **Conclusion**

You have now installed the IAR Embedded Workbench IDE and used it to build, load, and run an example application on your Stellaris Evaluation Board. You have also learned how to create a new project from scratch. From here, you can experiment with the debugger or start creating your own application from the ground up, or using the Hello program as an example.

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## References

The following references are included on the Stellaris Evaluation Kit Documentation and Software CD and are also available for download at [www.ti.com/stellaris](http://www.ti.com/stellaris):

- *Stellaris Evaluation Kit User's Manual*
- StellarisWare Software, Order Number SW-LM3S
- *StellarisWare Peripheral Driver Library User's Guide*, Order Number SW-DRL-UG

In addition, the following website may be useful:

- IAR website at <http://www.iar.com>

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Texas Instruments  
108 Wild Basin Rd., Suite 350  
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RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>	Space, Avionics & Defense	<a href="http://www.ti.com/space-avionics-defense">www.ti.com/space-avionics-defense</a>
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