

CG2271 Real Time Operating Systems

Lab 1 – Installing and Using MCUXpresso

(Ungraded)

1. Introduction

MCUXpresso is a microntroller integrated development environment (IDE) made specifically for the NXP series of microcontrollers, like the ARM Cortex M0+ based MCXC444 that we are using for our labs.

Note: MCUXpresso comes in an Eclipse version and a Visual Studio version. Following these instructions will install the Eclipse version and all the labs will assume that you are using this version. If you use the Visual Studio version there may be differences in the user interface that you need to figure out.

2. Obtaining and Installing MCUXpresso

- a. Go to <https://www.nxp.com/webapp/swlicensing/sso/downloadSoftware.sp?catid=MCUXPRESSO> to for the MCUXpresso download page.
- b. Log in to your NXP Account. Create an account if you don't have one. After logging in you should see a screen like this:

Product Information

MCUXpresso IDE

Select a version. To access older versions, click on the " Previous " tab

<input type="button" value="Current"/>	<input type="button" value="Previous"/>
Version 25.6	Description MCUXpresso IDE

Click on MCUXpresso IDE. Read through the Terms and Conditions and click “I Agree”.

From here, choose the correct version for your particular computer to download the installer.

Product Download

MCUXpresso IDE

Files	License Keys	Notes	Download Help
Show All Files			
			4 Files
+ File Description	File Size	File Name	
+ mcuxpressoide-25.6.136.x86_64	1.3 GB	mcuxpressoide-25.6.136.x86_64.deb.bin	
+ MCUXpressoIDE_25.6.136	1 GB	MCUXpressoIDE_25.6.136.exe	
+ MCUXpressoIDE_25.6.136.aarch64	1.1 GB	MCUXpressoIDE_25.6.136.aarch64.pkg	
+ MCUXpressoIDE_25.6.136.x86-64	1.1 GB	MCUXpressoIDE_25.6.136.x86-64.pkg	

Follow the installation instructions for your particular installer. **MCUXpresso will install additional software and drivers that it needs to run properly. Please allow it to install those software. If you do not do this, you may not be able to perform critical tasks like flashing code to the FRDM-MCXC444 board.**

- c. Start up MCUXpresso if it does not start automatically. It will display this initial startup dialog:



- d. Click on “Download and Install SDKs”. This will bring you to this page:

The screenshot shows the MCUXpresso SDKs interface. On the left, there's a sidebar with the NXP logo and text: "MCUXpresso Software and Tools", "UNIFIED SUITE OF TOOLS FOR EASY DEVELOPMENT WITH IAR IDE", and "LEARN MORE >". The main area has tabs for "Boards" and "Processors". Under "Boards", a list of boards is shown with columns: Board, SDK, Version, Package, Flash, RAM, and Status. One board, "frdmmxc444", is highlighted with a red box. To the right of the table is a "Filter" section with a search input field "Filter: type to filter MCU selection" and several checkboxes for filtering by cores (All Cores, Cortex-M0+, Cortex-M33, Cortex-M4, Cortex-M7), external flash, and keywords (Alexa IoT Service (AIS), Alibaba Clk, Amazon Web Service (AWS), Amazon com). There are also "Hide Installed", "Show latest", and "Hide board images" checkboxes.

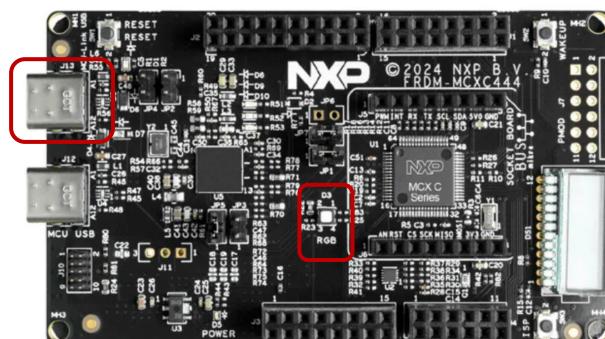
- e. On the top right corner in the “Filter” box (circled above), type in MCXC444.
This will narrow down our choices of boards to the FRDM-MCXC444.

This screenshot shows the same interface as the previous one, but the "frdmmxc444" board is now highlighted with a red box. At the bottom of the interface, there are three buttons: "Install and Create Project", "Install and Import Examples", and a large "Install" button which is also highlighted with a red box. To the right of the "Install" button is a "Uninstall" button.

Click on frdmmxc444 and click Install at the bottom centre of the dialog to install the SDK for this board. MCUXpresso will install the required SDK for you.

3. Testing your FRDM-MCXC444 Board

To test your **new** FRDM-MCXC444 board, connect power to the J13 MCU-Link USB-C connector circled below. This power can come from your laptop, USB-C wall wart, powerbank, etc.

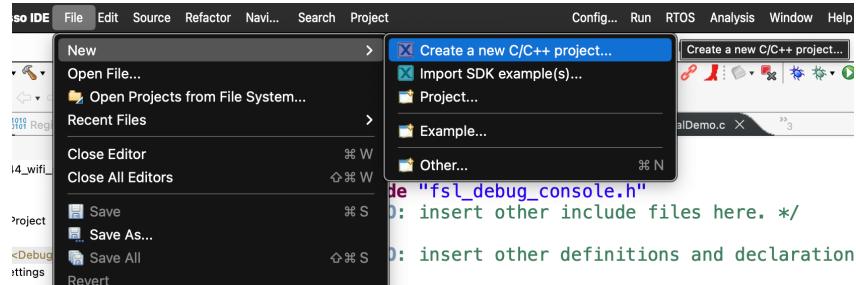


If all goes well you should see a red LED (also circled above) blinking.

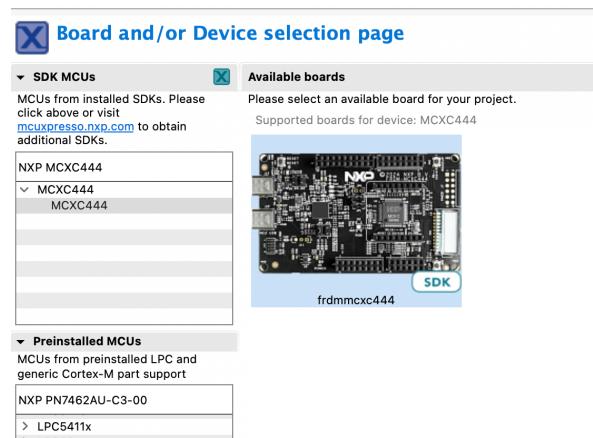
4. Uploading your First MCXC444 Programme

a. Create the Project

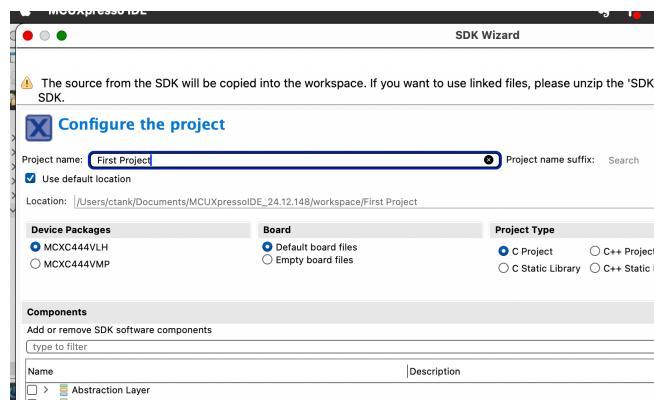
From your MCUXpresso editor screen, click File->New->Create C/C++ Project:



Select MCXC444 from the list of SDK MCUs, and the frdmmxc444 board from the list of available boards:

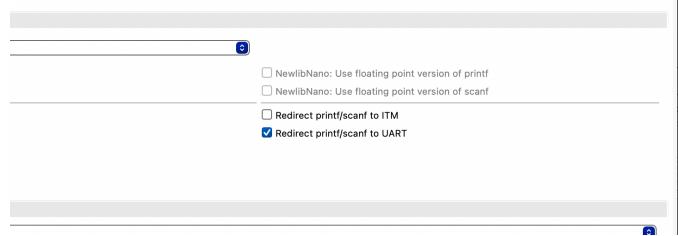


Click Next. Now under Project Name, enter “First Project”, and ensure that under “Device Packages”, you have selected MCXC444VLH. We can keep all other defaults. **DO NOT CLICK FINISH!!**

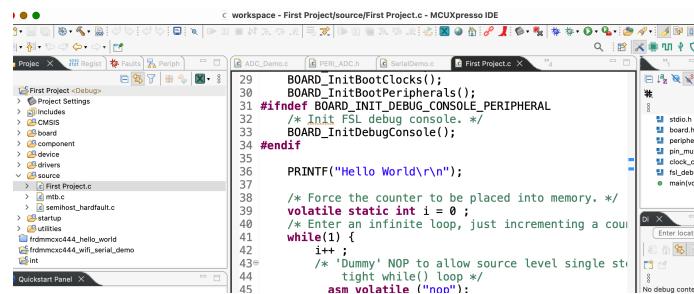


Click Next to bring us to the next screen.

On the next screen, at the middle right of the screen two options: Redirect printf/scanf to ITM, and Redirect printf/scanf to UART. Ensure that the second option is selected, as shown below



Click “Finish” and the new project will be created for you.



b. Debugging Your Project

The FRDM-MCXC444 board and MCUXpresso very conveniently allow debug printing using PRINTF statements, to the serial port on your laptop.

- The PRINTF statement takes a while to appear (and may sometimes require more than 1 PRINT before it appears. For this reason, locate the PRINTF statement, and duplicate it 3 more times so that your code now looks like this:

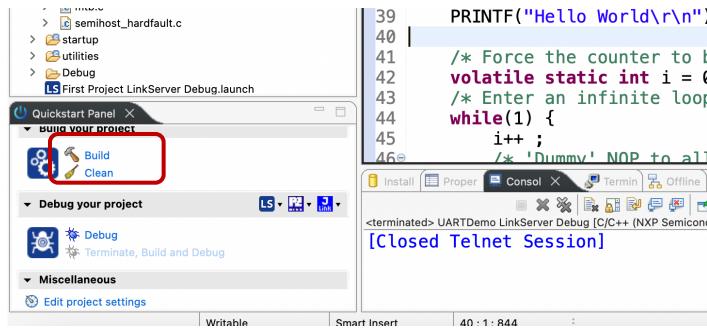
```
BOARD_InitDebugConsole();
#endif

PRINTF("Hello World\r\n");
PRINTF("Hello World\r\n");
PRINTF("Hello World\r\n");
PRINTF("Hello World\r\n");

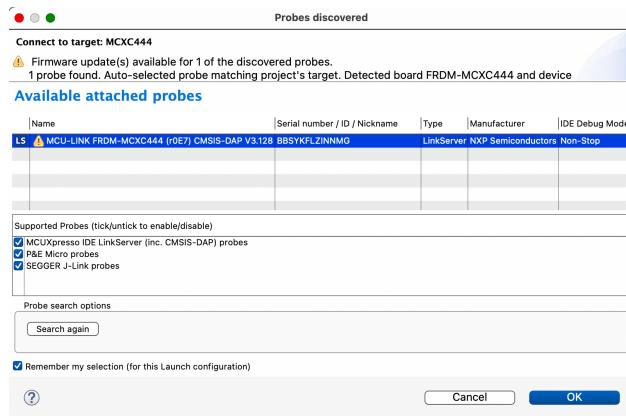
/* Force the counter to be placed into
volatile static int i = 0 ;
/* Enter an infinite loop, just incrementing a counter */
...L11-11...
```

- To start debugging, go to the Quickstart Panel at the bottom left of the MCUXpresso screen:

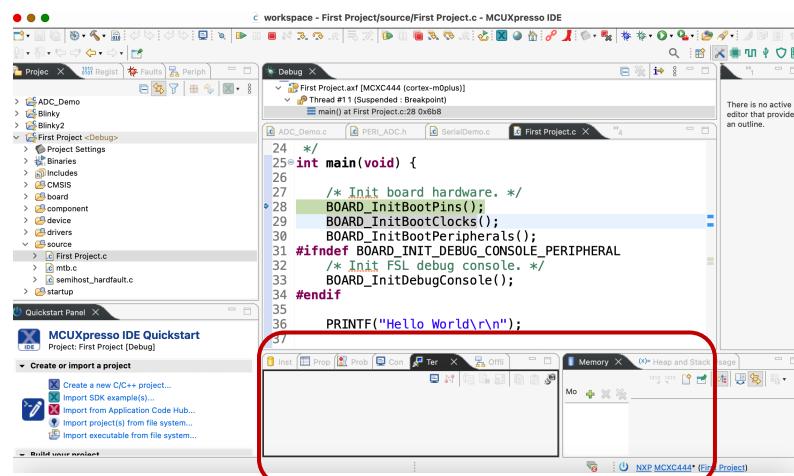
- Click “Build” to compile your source code. Scroll through the code (or look at the Errors panel) to find compilation errors and fix them.



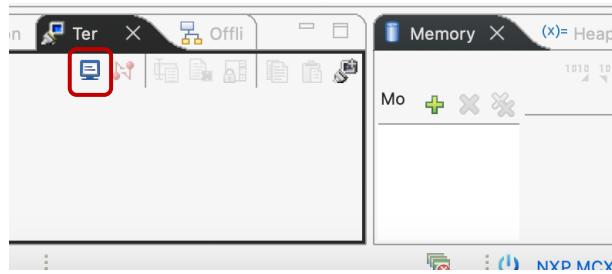
- Now click “Debug” to start debugging. MCUXpresso may pop up a dialog asking you to select a probe. Probes are software modules that let you communicate with the board. MCUXpresso will present a list of probes that you can use. If you have more than one, choose the MCU-Link probe (CMSIS-DAP):



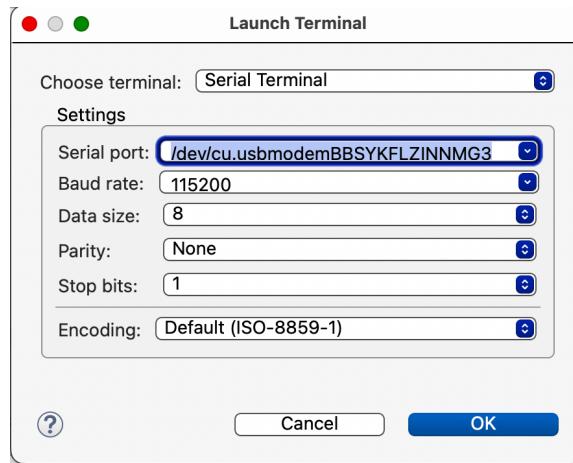
Click OK. Your Debug session has now started. At the bottom of the screen you should see a small series of debugging windows:



Click on the tab that says “Terminal” (It may show only part of the tab’s title. Mouse-over to see the full title”), then click on the “Open Terminal” icon.



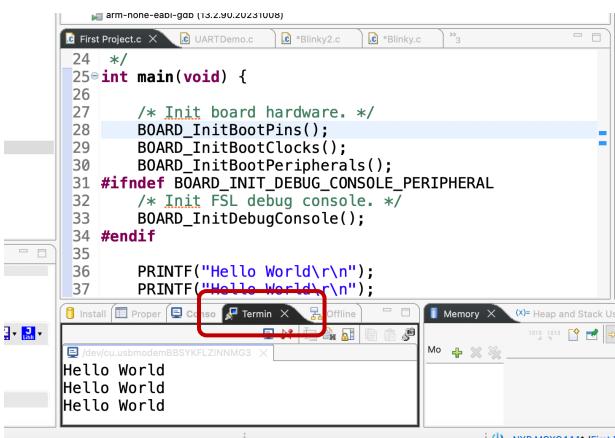
You will get the following popup:



Ensure that under “Choose terminal”, you select “Serial Terminal”. Under “Serial port”, choose the port that corresponds to your MCXC444 board (To figure out which port this is, close this popup, disconnect the board, then reopen it and see which port has disappeared).

The example shown above is on MacOS. On Windows you will see something like “COM9”. You can leave the other values at their default, then click OK.

Ensure that Terminal is selected at the bottom of your screen:



From the Run menu you have the usual debugger options – Resume, Step into, Step over, etc. You can explore these options on your own.

For now click Run->Resume. You should see “Hello World” appear four times in the Terminal box. (Note: May take a while). Again ensure that the Terminal tab is selected.