MSP-EXP432P401R LaunchPad Programming Guide

The purpose of this guide is to explain all the requirements to program the MSP-EXP432P401R LaunchPads. Students should have a LaunchPad from a previous class. You should not need a LaunchPad to complete the code in this lab, but it may be helpful to verify proper operation using your board or a friend's board.

LaunchPads are readily available for purchase from Mouser Electronics for $20.70 (part # 595-MSP-EXP432P401R). It is possible to place an order for pickup at Mouser's Mansfield location (8am-5pm, M-F). To place the order, call (800) 346-6873 at least one hour before you intend to pick up the board. Orders can be placed from 7am to 8pm. Shipping is also available for $7.99 (this is a flat rate so order with friends) and takes two business days (the 1-5 days UPS ground option may be faster since Mouser is located so close).

The remainder of this guide will focus on installing Energia IDE, configuring Energia to work with the LaunchPad, and running a simple program. Once you have successfully run a program on the LaunchPad, the Energia website has very useful information regarding programming the board. Also, Energia IDE is based on the Arduino IDE. **Since Arduino is very popular, searching the internet for Arduino examples will have lots of helpful results. All Arduino code works in Energia IDE with minimal modification.**

1 - Installing Energia IDE

Note: *Even if you already have Energia installed, it is highly recommended that you update to the latest version.*

1. First, navigate your web browser to https://energia.nu/download/.

2. Locate the and click the appropriate download link for your operating system.

Energia 1.8.7E21 (10/17/2018)

Mac OS X: Signed Binary release version 1.8.7E21 (10/17/2018).

Download here: energia-1.8.7E21-macosx-signed.zip

Windows: Binary release version 1.8.7E21 (10/17/2018).

Download here: energia-1.8.7E21-windows.zip

Linux 64-bit: Binary release version 1.8.7E21 (10/17/2018).
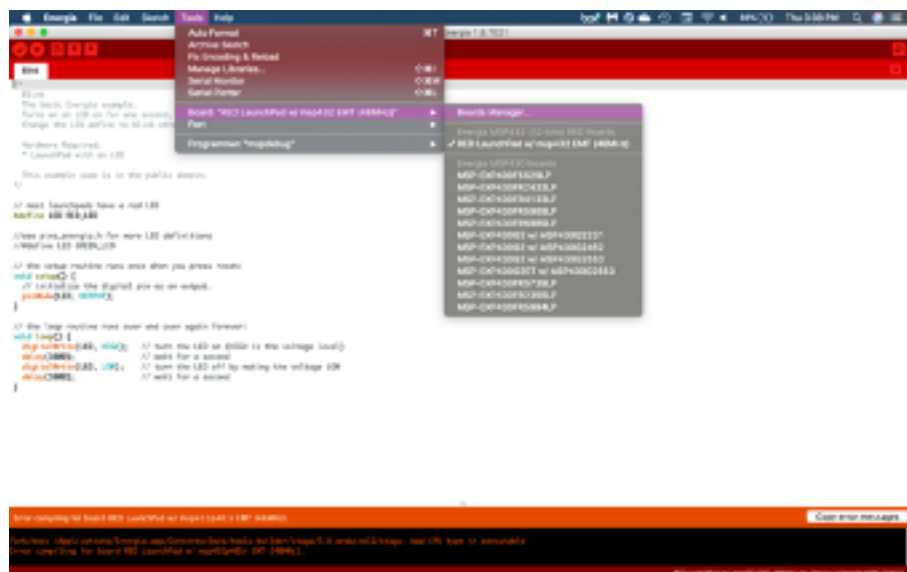
Download here: energia-1.8.7E21-linux64.tar.xz

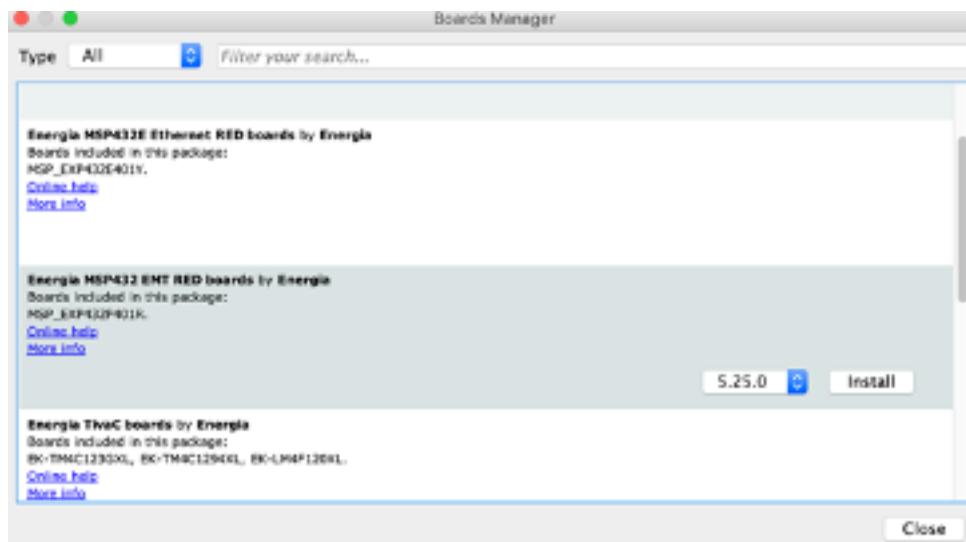(a) On MacOS, there is a single application downloaded. This is the IDE.

(b) On Windows, a zip file is downloaded. Extract the zip file and Energia will be inside the extracted folder.

3. You may move the Energia Application/Folder to your Applications/Programs folders but this is not required.

4. If you are using MacOS, continue to part 2.

5. On Windows, you need to install additional drivers from here.

   (a) **Disconnect the LaunchPad from your computer**.

   (b) Unzip the downloaded zip file.

   (c) **Move unzipped folder to your desktop** (you may experience an error if you do not)

   (d) Open the appropriate installer (most likely the 64-bit version).

   (e) Follow the installer instructions.

   (f) Connect the LaunchPad and it should be recognized.

   (g) If you have issues on Windows 8 or 10, try following this guide.

2 - Configuring Energia to Work with the LaunchPad

1. Open Energia IDE

2. From the menu bar, select **Tools → Board → Board Manager**.

3. Scroll down until you see "Energia MSP432 EMT RED Boards by Energia"

4. Click Install and install the board support packages (this will take a while)

5. In the menu bar, select **Tools → Board → RED LaunchPad w/ msp432p401r EMT (48MHz)**

6. Select the appropriate COM port.

    (a) On Windows, select **Tools → Port → COM#**. The port number will differ by system but is usually above 2.

    (b) On MacOS, select **Tools → Port → /dev/ttyUSB0**.

7. Energia is now configured to run on your system!

3 - Run a Simple Program

1. In the menu bar, select to **File → Examples → 01.Basics → Blink**.

2. You will see an Energia Sketch which will cause the LED on the LaunchPad to blink.

3. Click the **Verify** button (looks like a circle with a check mark inside of it). This will check the code for errors and compile it.

4. Click the **Upload** button. This loads your program onto the LaunchPad.

5. Once this step is complete the LED on your board should be flashing.

6. Congratulations, you have successfully programmed the LaunchPad!

4 - Helpful Resources

- The Energia website has helpful guides at https://energia.nu/guide/

- The Energia website also has documentation here which explains all the functions needed to control input and output of the board as well as helpful math and manipulation functions.

- Below is the pinout of the launchpad. Use these numbers when selecting pins to use for input and output. **DO NOT USE THE FOLLOWING PINS: 3, 4, 7, 9, 10, 14-16, 18**. This could cause the board to break. Notice that there is a built in RGB led, red LED, and two push buttons. These are accessible with pins 73-78 (shown below).