# EEMBC EnergyMonitor and ULPBench Operation

1) Create a folder where you want to install all the EnergyMonitor files
2) Extract the two USB driver files EEMBCmonitor_drivers.cat and EEMBCmonitor_drivers.inf from the zip file EEMBCmonitor_drivers.zip
3) Connect USB cable to/from PC and EnergyMonitor board
4) USB driver message will come up (since it's an unrecognized USB device). Click on that and choose option to manually locate USB drivers.
   a. If that message doesn't come up, go to your device manager and locate the devices that say EEMBC Application UART1 and EEMBC Energy Tool V1. Click on each to install the driver.
   b. After starting the driver installation, you'll get a message from Windows security saying it can't verify the publisher of this driver software. It's safe so, click on 'Install this driver software anyway'.
   c. After Windows has successfully updated your driver software, close the update window.
5) Extract the contents of the file ulp_2113.zip to your EnergyMonitor folder.
6) In the ulp_2113 folder, click on bin. Now double click on EnergyMonitor.exe.



   a. If you see a message such as this one: you'll have a few more steps before you're able to run EnergyMonitor
   b. EnergyMonitor, like all programs built with Visual Studio dynamically linked, uses Visual Studio DLLs. This means you'll need to install the Microsoft Visual Redistributable Package for x86.
      i. If your error message shows it is missing file PSVCP110.dll, go to www.microsoft.com/en-us/download/details.aspx?id=30679#. Click on the download and it will pull up an option page like the one below. Click on the VSU_4\vredist_x86.exe and then 'next', which will start the download. Now run

the file vcredist_x86.exe.

Choose the download you want

| File Name | Size |
|---|---|
| VSU_4\vcredist_x64.exe | 6.9 MB |
| VSU_4\vcredist_x86.exe | 6.3 MB |
| VSU4\vcredist_arm.exe | 1.4 MB |

    ii. If your error message shows it is missing file PSVCP100.dll, go to www.microsoft.com/en-us/download/details.aspx?id=5555#. Click 'no thanks and continue to download the x86 package. After downloading, run the file vcredist_x86.exe.

c. You should now be able to start EnergyMonitor as in Step 6.

# Running the EEMBC EnergyMonitor

After completing the steps in the previous section, the EnergyMonitor GUI should be visible, as shown here.

1. In the Configuration Options window, if you see a red light (and you have completed the steps above), close the EnergyMonitor GUI and restart it.
2. The Accumulated Energy window will display a staircase line once you start up the ULPBench (by pushing the 'Run ULPBench' button). You'll also be able to see energy consumption of the device in the History window and the Intermediate Results window.
3. Once the test has completed, the final score will appear in the Benchmark Status window.
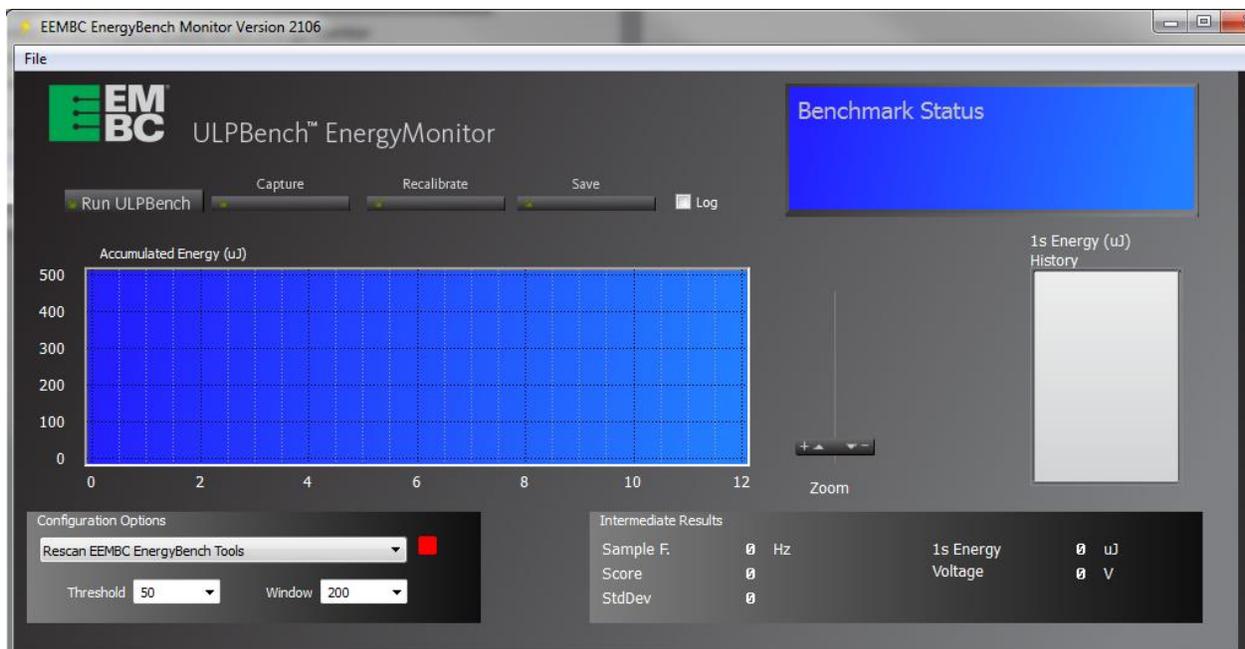
# Connecting the TI MSP-EXP430FR5969 LaunchPad kit

1. Ensure that jumpers from J6 and J11 J13 are disconnected.
2. Ensure J10 is moved to EXTERNAL
3. Insert jumper wires from EEMBC EnergyMonitor tool to the LaunchPad. The blue line shown here connects Vcc on EnergyMonitor to Vcc on the TI board. Likewise for ground to ground.
4. NOTE: This board does not have any indicator LEDs, since LEDs consume energy and would throw off the overall result. The only way that you'll know it's working is by running the EnergyMonitor.