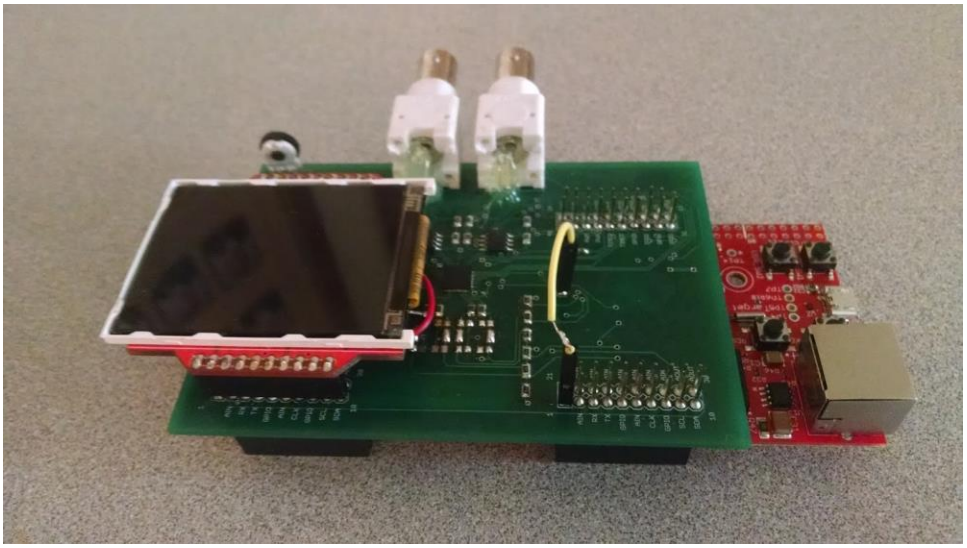

TI BoosterPack Oscilloscope

User Manual 1.0

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Purpose

The purpose of this user manual is to help you get started setting up and getting familiar with the project. This assumes that you have the board already constructed from the board files on GitHub using the BOM also on GitHub. This will also include how to improve upon this project and traverse the files on GitHub .

Table of Contents

1.0 Hardware Set-Up

To set up the hardware you need three things:

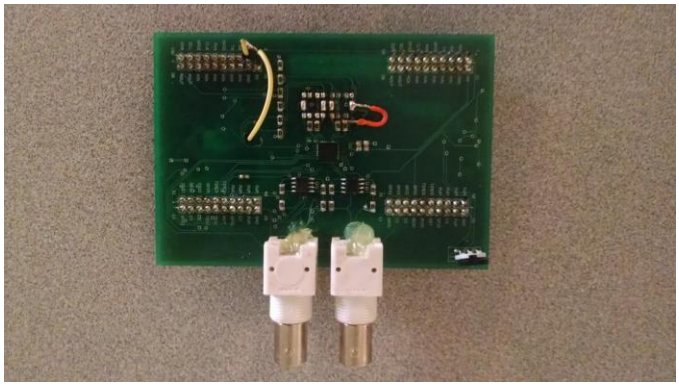
- 2.2" Color LCD BoosterPack Kit by RobG
- A Fabricated and Populated Oscilloscope PCB
- Tiva C Connected LaunchPad

1.1 Color LCD Modifications

To make use of the EPI interface a small modification had to be made to the LCD BoosterPack hardware. You have to make sure neither jumper is soldered on the D/C pin, and then attach a wire to the middle pad and connect it to pad JP5. A picture showing this is below.

1.2 Oscilloscope Board Jumper and Passive Filter

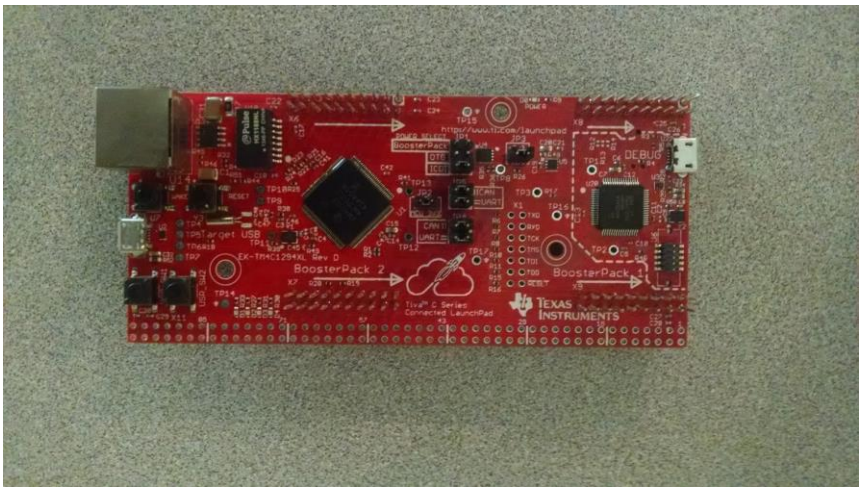
For the purposes of debugging a pin was left exposed on the ADC for this first revision. Next revisions should connect this pin to the standard LDD for the ADC. (Connect VDRV to VDD in the EAGLE files). This jumper is necessary to power the ADC. A typical female-to-female jumper was used. A picture showing it is seen below. (The Yellow Wire). Also leave passive filter disconnected and solder the cap connections so the signal can continue through. More explanation in TODO.



*Note - Orange Wire is there because of mistake while soldering

1.3 Tiva C Connected LaunchPad

No modifications should be needed. Make sure jumpers are connected like below.



Once all hardware is setup, you can attach all of the pieces as seen on the first page.

2.0 Software Setup

Four things are needed for the software setup.

- Energia w/ Tiva C Drivers
- Senior_Project_Main.ino (on GitHub under Software Code)
- Screen_ILI9340_Library.cpp/h

Minimal Setup is needed. First download Energia and put the screen driver and header files in the following path. (Note: The drivers are edited from the original online to account for the one pin being moved across the board.)

..\energia-0101E0013\hardware\lm4f\libraries\

Then open Senior_Project_Main.ino and select Tiva C tm4c129 as the board, Finally compile and run.

3.0 Usage of the Scope

1. To use the scope you can use any BNC connector or 1x probe. However 10x probes did not work when tested with the system. Connect probes up like a typical scope. For this revision you can only trigger of one channel. (BNC away from Screen).
2. Only signals from +/- 1.5 can be inputted at the end of the probe.
3. Power can be supplied through any micro USB source. Portable battery or laptop will work.
4. The trigger level can be adjusted using the potentiometer. Then the voltage per deviation and time per deviation can be adjusted using the two user buttons on the LaunchPad.

   Note: The GUI is still in its early stages and can be improved upon.

4.0 TODOs

This section contains improvements that can be made on this project and steps to continue its development.

1. Switch BNC connections so that they are vertical. They are currently unstable.
2. Add buffer to front end so that 10x probes cannot load circuit.
3. Add switchable attenuator to front end.
4. Add uDMA to software to collect samples faster and be able to achieve full 7 MHz bandwidth . Currently a timer interrupt is used and the bandwidth is about 200kHz.
5. Put 10MHz flat pass band active filter instead of current passive filter.

5.0 GitHub

On GitHub you can find a directory listing on the front page giving explanation to the file directory and source files.