UECU Operation and Setup

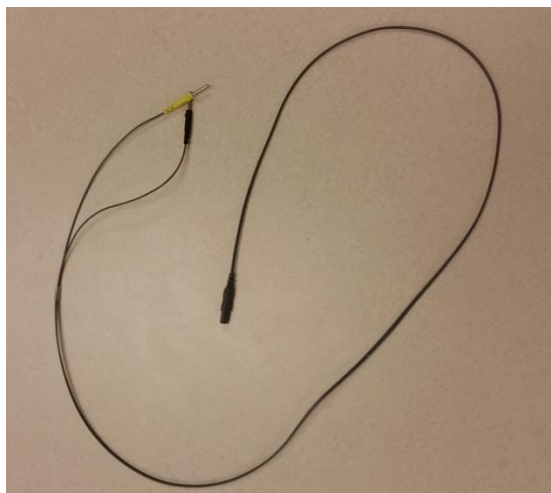By: Michael Brodnik

Date: 5/5/16

Purpose

The purpose of this report is to instruct a user on how to start up and operate the UECU (Universal External Control Unit) provided by Case Western Reserve University. Those who utilize the UECU must ensure that the individuals who are receiving the stimulation know all of the risks and feelings that will occur during the testing. These statements will be discussed later in this report. If you need help developing code on how to "speak" to the UECU, please refer to the "How to operate Serial Port Communication with the Stim Board" document.

Items needed

1. Computer With Code
2. UECU
3. Battery
4. Battery Charger
5. FTDI Cables

6. Medical Cables
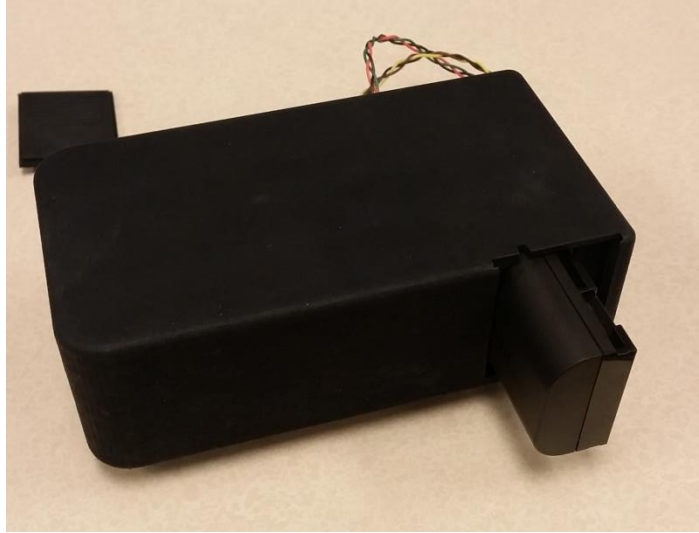
7. Stimulation Pads

UECU Setup

1. Charge the battery that you are going to use with the UECE (1 fully charged battery will yield 1 hour of testing). A green light on the charger will indicate full charge

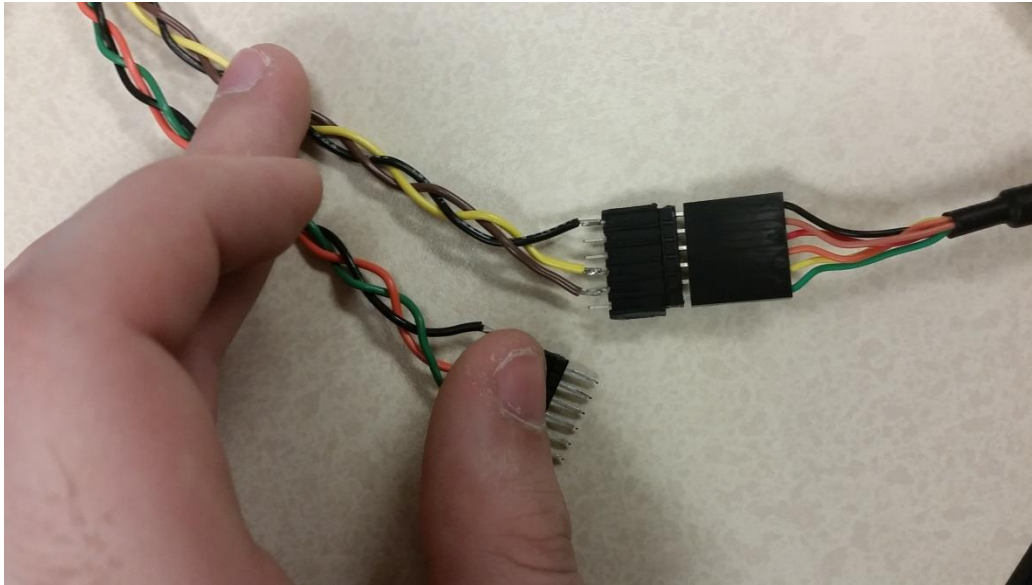

2. Remove battery gate on the UECU

3. Place battery within the UECU battery port with the arrow on the battery pointed in.
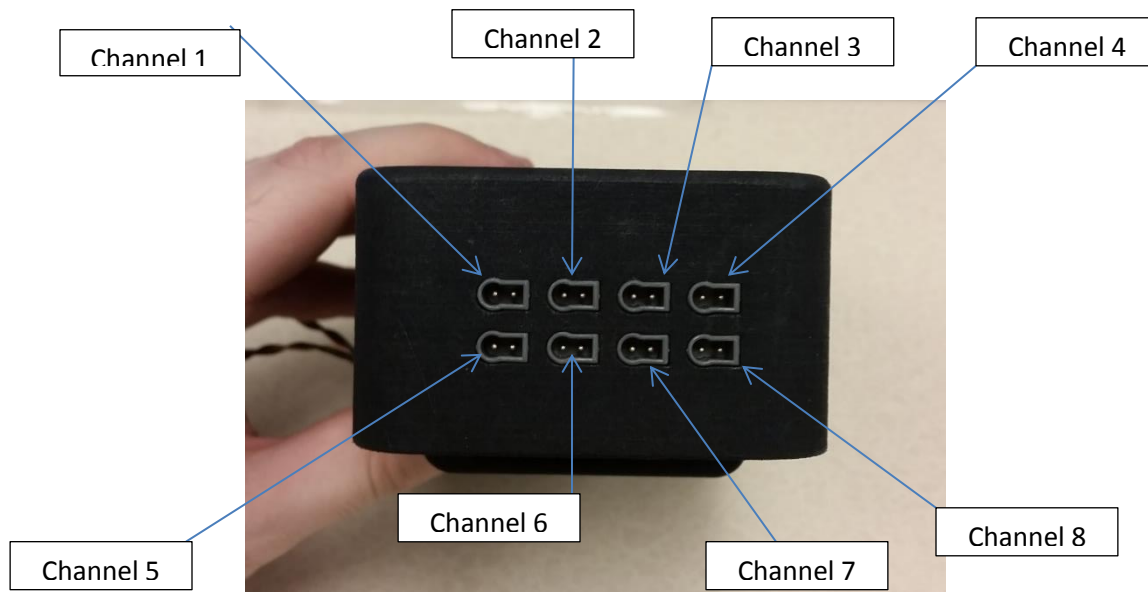
4. The battery port is spring loaded, push the battery into the port and hold in place with your thumb.
5. Slide battery gate into place to finish the battery setup.

6. Have the code you wish to run open on your computer ready to execute.
7. Take one FTDI cable and plug it into one of the USB ports. This will now be called serial port 0 Note: The computer will name the USB port as you plug it into the computer. (The order of plugging in matters!).
8. Take one FTDI cable and plug it into one of the USB ports. This will now be called serial port 1
9. Steps 10 and 11 require a specific plug in orientation. LINE UP THE BLACK CABLES. See Picture.
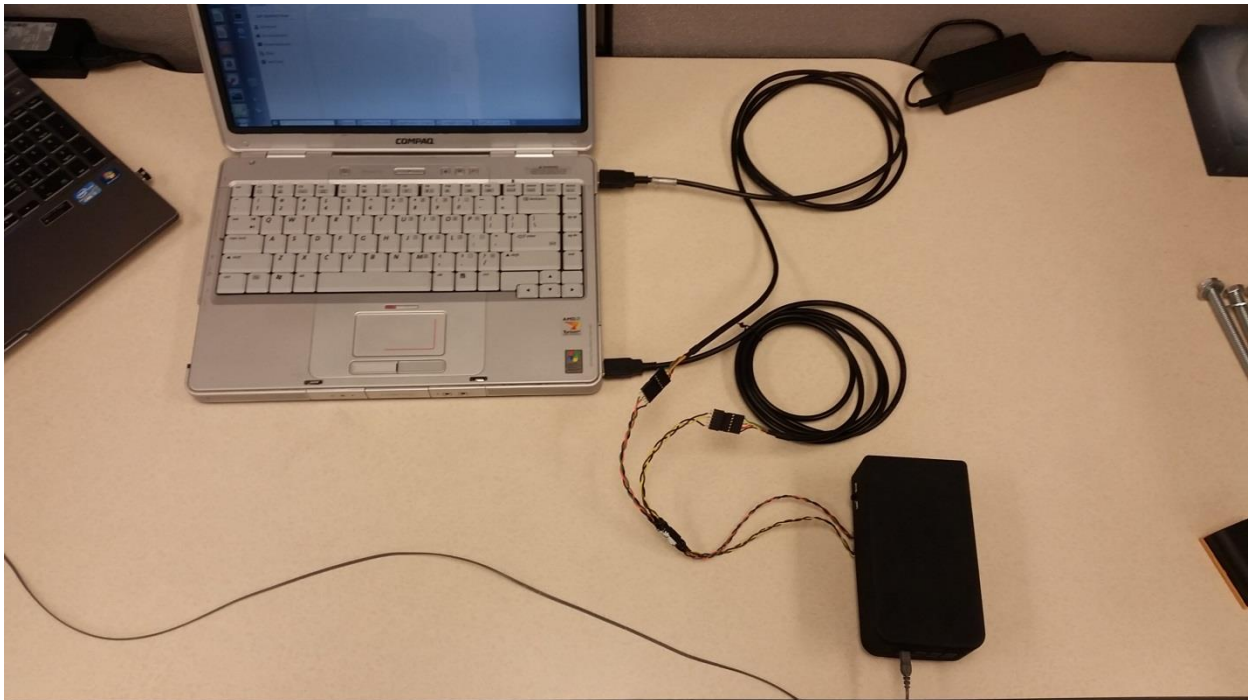
10. Take the FTDI cable that is in serial port 0 and plug it into the BROWN AND YELLOW cable on the UECU

11. Take the FTDI cable that is in serial port 1 and plug it into the ORANGE AND GREEN cable on the UECU

12. For step 12, please take mention of the labeling of the ports so you know which port you are plugging into. This procedure assumes that you are utilizing the "Pulse_Width_Slider" GUI and will refer to the channels as in the following picture

13. Take the medical cables and plug them into each of the ports on the UECU.

14. The complete setup for the computer end of the UECU should look like the picture below:

Subject Setup

1. Instruct the subject to wash their hands.
2. Place the two stimulation pads at the locations that you wish to stimulate.
3. Take the BLACK and YELLOW ends on the medical cables and plug them into the stimulation pads. The YELLOW pin is the POSITIVE end. The BLACK pin is the NEGATIVE end.
4. Instruct the subject to sit down and be in a relaxed position.
5. Tell them the following:
   a. The UECU will deliver a voltage and current through the medical cables into the muscle, causing it to contract. Many refer to the feeling as a numbing "pins and needles" sensation. If you wish that the stimulation intensity be reduced, there is a reset button on the program that will reduce the stimulation to zero, or the stimulation can be stepped down. If at any time you feel uncomfortable or in any amount of intolerable pain, the UECU has a kill switch that will cease all stimulation. It is no trouble to reset the testing situation
   b. Everyone has a different stimulation tolerance, so the amount of stimulation will be different at different levels of voltage intensity. This being said, we will first attempt to find this point.
   c. If the pads become loose or uncomfortable, please let me know so I can adjust them to your liking.
   d. I am going to begin the test. I will alert you of any change I make on the program as I step up the stimulation intensity.

Testing Execution

NOTE: In order to reach this step, you must complete sections "UECU Setup" and "Subject Setup"

1. Turn the UECU switch to the on position and run your code.
   a. To run "Pulse_Width_Slider", open Qt creator and click on the program.
   b. In the lower left hand corner is the Run button. Click on it to execute.
2. When testing is complete, TURN THE UECU SWITCH TO THE OFF POSITION FIRST.
3. Terminate the program
4. For battery changes, Unplug the FTDI ports from their respective USB Ports. Repeat steps 2-11 in UECU Setup.