Pressure Bed Demonstration Manual

Introduction

XO-NANO Smartfoam's technology is capable of sensing low pressures with its patented Smartfoam (SF) pressure sensor. The Pressure Bed Demonstration shows changes in pressure as a user adds an applied load to the array of sensors (figure 1). The XOnanoPressure app displays pressure numerically (psi) and with color intensity (more red meaning more pressure) (figures 2 and 3). The voltage information from the microcontroller (MCU) box (see figure 1) is communicated to an IOS device via Bluetooth Low Energy (BLE).
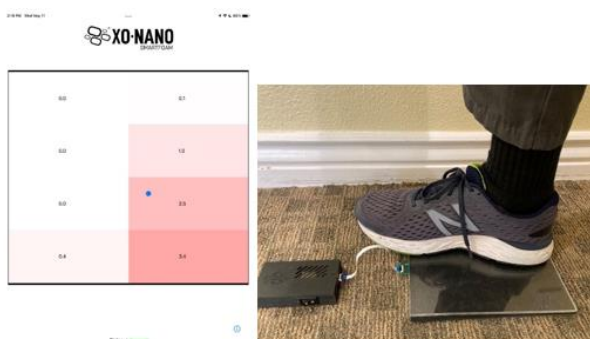

Figure 1 Example usage of XOnanoPressure app. The distribution of the weight of the foot is shown numerically by eight individual sensor locations and by the level of intensity of the red color. The blue dop is the location of the center of pressure. The MCU box is the black box on the left side of the right hand image.

Instructions for how to use this demonstration are in the first section of this manual. The second section lists troubleshooting tips. If more details and help is required than this manual, please contact XO-NANO Smartfoam via one of the representatives listed at the end of the manual.

Instructions

Software Set Up

The initial set up for the Pressure Bed Demonstration requires purchasing an IOS device (iPhone, iPad, etc.) with Bluetooth capabilities. Then download the app called "TestFlight"—icon shown in figure 2.
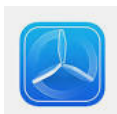

Figure 2 TestFlight app icon. This can be found in the apple store.

Once TestFlight is installed, then use the following link to download and install the XOnanoPressure app (figure 3). The link will send a prompt to install TestFlight if not already done.

https://testflight.apple.com/join/Tzi4lcmG

Figure 3 XOnanoPressure app's icon.

Pressure Bed Operation

In order to demonstrate SF's pressure sensing capabilities, please follow these steps below when operating the demonstration:

1. Discharge static electricity build up before touching the sensors or MCU box. Shocks may damage the MCU.
2. Place the MCU box and sensor PCB onto a flat, stable surface.
3. Center the Acrylic on the foam pad.
4. For the best results, stand on the sensor for at about 30 seconds and then let the foam rest for 10 seconds.
5. Flip the switch on the MCU box to the "ON" position. A red LED in the MCU box visibly shines when the MCU box is switched on. A close-up photo of the switch is below.

6. Open the XOnanoPressure app. The app will connect to the MCU automatically. The app is set to only connect to a microcontroller programmed by XO-NANO. Note the information icon in the bottom right corner of the app screen shows tips for running the demonstration.
7. Apply pressure in various locations to explore the possibilities of XO-NANO SF's pressure sensor and see the center of gravity of the applied load (blue dot) shift.

Battery Details

A rechargeable LiPo battery powers the MCU. In order to recharge the battery, use a USB-to-micro-USB cable to connect the MCU box to a computer or a 5V wall charger. DO NOT use a wall charger that uses more than 5V because it may damage the microcontroller in the MCU box. A wall charger with less voltage than 5V is not recommended because charging may be slow or charging will not occur.

The battery is charging if the yellow LED on the inside the MCU box is solidly lit—visible through the slots cut out on the top of the MCU box. If the yellow LED is flashing, then switch the MCU box to the "ON" position to begin charging the battery. The red LED will be lit when the MCU box is connected to a computer or 5V wall charger and the demonstration will function properly while the battery charges as long as the battery switch is in the "ON" position. The MCU's algorithm requires the switch be in the "ON" position whenever the app is in use. The battery is fully charged when the yellow LED does not light at all while the USB power is applied and the switch is in the "ON" position.

Figure 4 Micro-USB cable and the microcontroller's micro-USB port location for charging the battery.

Troubleshooting

Below are tips to troubleshoot the XO-NANO Pressure Bed Demonstration.

Issue	Solution(s)
The sensor locations are not changing color as pressure is applied.	• Ensure the MCU box is powered on. • Charge the battery or use a computer or wall charger to power the system. • Restart the app. The app will not automatically reconnect to the MCU box if power is lost to the board even though the app may continue to say "connected." • Microcontroller in the MCU box may be damaged. • Ensure the MCU box is not connected to a different device or app.
The app says "disconnected."	• Ensure the MCU box is powered on. • Check if the BLE is working from the MCU box with a BLE scanner app. The MCU will appear on the app as "Pressure Sense 8 Pads." If the MCU box is not discoverable on a scanner app, the circuitry may be damaged. We recommend using "BLE Scanner:"

Further Help

Here are representatives at XO-NANO Smartfoam that are available on weekdays to assist with further troubleshooting or replacement parts.

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Manual author: Max Tree
Date written: 04/27/2022
Last Update: 05/12/2022