

# FLEXIFORCE™ PROTOTYPING KIT QUICK START GUIDE

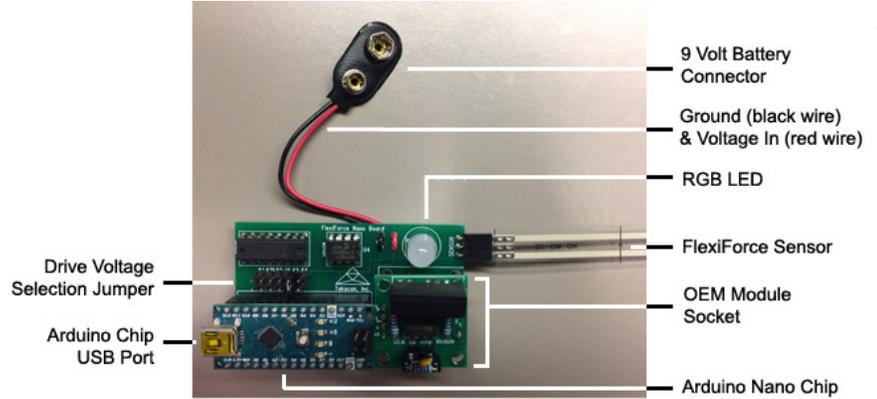
## Introduction

The FlexiForce Prototyping Kit is composed of an Arduino Nano Chip USB Interface Board with OEM Module Socket, RGB LED, Drive voltage selection jumper, 3-pin Sensor connector, and an attached 9-volt battery clip. The Arduino Circuit Board converts the analog signal coming from the Circuit Board into a digital signal, and outputs this signal via the RGB LED (and on the included MicroView software).

### COMPONENTS LIST

- (1) Prototyping board with Arduino Nano Chip
- (3) Interchangeable Testing Modules: (1) Voltage Divider, (1) Non-Inverting Op-Amp, and (1) Inverting Op-Amp
- (2) FlexiForce Sensors: (1) A201-1, and (1) A201-25
- (1) 3-Foot USB Extension Cable
- (1) 9 Volt Battery

Software Files (.zip package can be downloaded at <https://www.tekscan.com/fir>)



**FlexiForce Prototyping Board**

## Setup

**STEP 1.** Insert one of the FlexiForce Sensors face up into the white 3-pin connector slot on the Board.

**STEP 2.** Insert one of the three Analog Circuit Modules into the Module Socket.

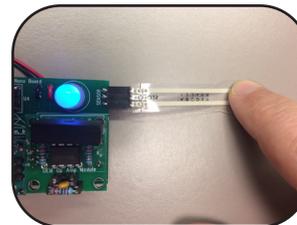
**STEP 3.** Power up the system. You have two options:

**STEP 3A.** If you are planning to take measurements using the MicroView software on your computer, use the USB Extension Cable to power the FlexiForce Prototyping Board. Insert one end into the Arduino Circuit Board's USB connector, and then insert the other end of the Cable into the USB port on your computer. The Arduino Chip's LEDs will cycle and the ON LED will remain illuminated yellow. At the same time, the RGB LED briefly flashes blue. *Note: the USB Cable must be connected in order for you to use the MicroView.exe software to read the data.*

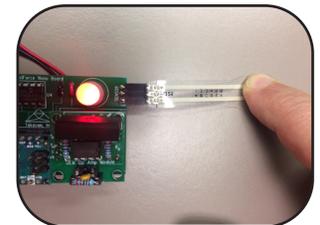
**STEP 3B.** If you plan to power the FlexiForce Prototyping Board in a location without a computer, and view the measurements on the RGB LED only, you can connect a standard 9-volt battery (not included) to the Development Board's battery connector clip. This allows the system to be fully portable. When the battery is connected, The Arduino Chip's LEDs will cycle and the ON LED will remain illuminated yellow. At the same time, the RGB LED briefly flashes blue.

## Viewing Measurements with the RGB LED

The RGB LED is a polychromatic light source that gradually shifts through the color spectrum as force on the sensor increases, from blue (lower sensor force) to green, and then yellow (higher sensor force), and finally to red (saturated sensor force).



RGB LED showing low pressure (blue)



RGB LED showing high pressure (red)

## Conditioning the Sensor

For best results, we recommend conditioning the sensors before each use and before calibration. This process "breaks in" the sensor.

Place 110% (or more) of the maximum test load on the sensor for approximately 3 seconds. For example, if the maximum test load is 10 pounds, place 11 pounds onto the sensor. Remove the load from the sensor. Repeat 4-5 times. When finished, proceed to "Calibration."

# Using the MicroView Software and Recording/Exporting Data into Microsoft Excel

**STEP 1.** Download and launch the **FlexiForce Microview.exe** software at <https://www.tekscan.com/>.

**STEP 2.** Select the last COM Port from the "Port" drop-down list (**COM3** in the example here).

**STEP 3.** With the Port selected, click the **Open Port** button. You will see the color-square turn Green. This indicates the system is ready to display measurement data. If the square is red, this means you may not have the correct Port selected. *Note that the Port you should use for the MicroView hardware is usually the last one in this list. But if this Port doesn't work, try each Port sequentially, until the correct one is found.*

**STEP 4.** Once started, apply force to the Sensor. The software will display measurement data. At the top right of the screen, you will see a numerical readout in the FlexiForce Output window. At the left of the screen, you will see the graph display the Sample Number along the X-axis, and the Digital Output along the Y-axis.

**Note:** To calibrate your sensor, select either **Linear Fit** or **Power Law Fit**, and click the **Calibrate** button. Follow the on-screen instructions. For more information on Calibration methods, refer to the "User Manual" included with your software download.

**STEP 5.** You can import the data provided by the FlexiForce Nano Board into Microsoft Excel using the **FlexiMicroReader.xlsm** (macro-enabled worksheet). Click the **Record** button.

**STEP 6.** On the next dialog, enter the number of data points (up to 600) that you want recorded. Then click the **OK** button.

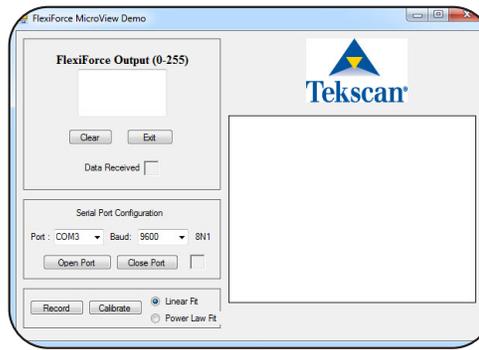
**STEP 7.** On the next dialog, enter the filename (along with the full path to the location of the file on your computer). Note: For easy retrieval later, it is recommended you place the file in the same folder as the **FlexiMicroReader.xlsm** file. When done, click the **OK** button.

**STEP 8.** The next dialog puts the software in hold mode. Nothing will be recorded until you press the **OK** button to initiate the recording. Once this button is pressed, the recording immediately starts. When ready, press the **OK** button.

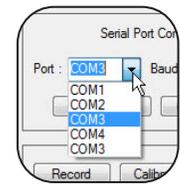
**STEP 9.** Once the number of points have been sampled, go into your Windows Explorer and locate the folder with both the **FlexiMicroReader.xlsm** and the data file you just recorded (**FlexiForceDataFile-01.txt** in the example here). Double-click on the **FlexiMicroReader.xlsm** file.

**STEP 10.** Microsoft Excel opens. Since this file contains Macros, you may have to first enable them by clicking on the **Enable Content** button.

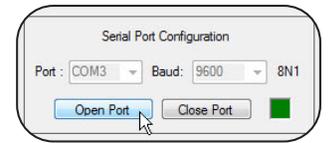
**STEP 11.** Click the **Load FlexiForce Data** button.



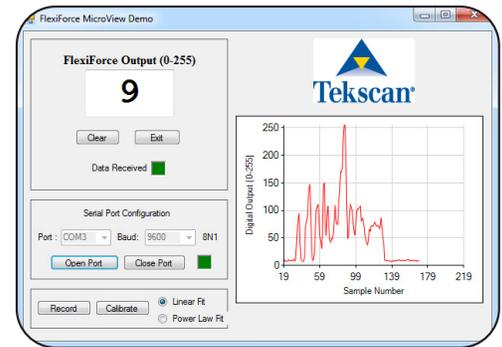
Step 1: FlexiForce Microview software window



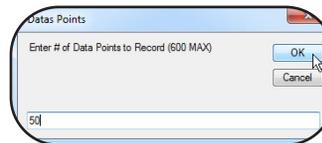
Step 2: COM Port selection



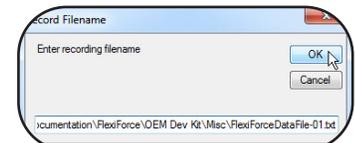
Step 3: Opening the COM Port



Step 4: Digital Output display from the Sensor



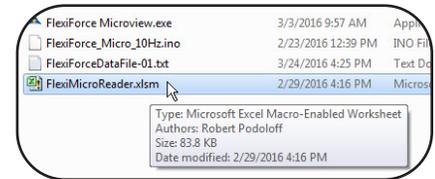
Step 6: Entering the number of data points



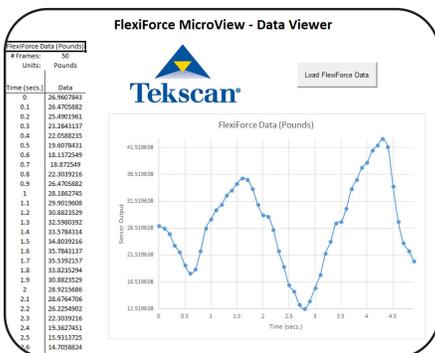
Step 7: Entering a Filename



Step 8: Start Recording



Step 9: Launch FlexiMicroReader.xlsm

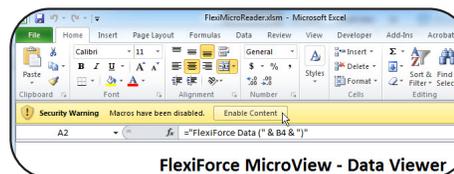


Data loaded into the Excel Worksheet

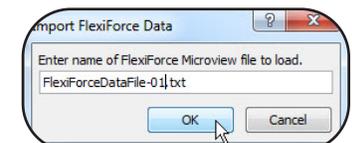
**STEP 12.** The "Import" dialog opens. Since the data file is in the same location as the **FlexiMicroReader.xlsm** file,

you do not need to enter the full path to find the file. Instead, simply enter the filename for the data file (**FlexiForceDataFile-01.txt**). Click the **OK** button.

The data from the file is loaded into the worksheet. The numerical data is displayed on the left side of the screen, and the data is plotted on the graph on the right side of the screen. *Note: You can load another file at any time by clicking the Load FlexiForce Data, entering a new file name, and clicking OK. The data from the new file overwrites the data from the old file.*



Step 10: Enabling Excel Document Macros



Step 12: Entering data filename for data Import