IASTM Device LabVIEW Project

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Description: This LabVIEW project is designed for specific hardware to apply targeted load magnitudes and frequencies during IASTM treatments. The program is intended to be used with the accompanying MATLAB script to analyze the data after the IASTM treatments. A test data file and test output are included in the .zip file.

Inputs: Load cell calibration variables, target load, and target frequency

Outputs: .dat file with raw wata for applied load, time elapsed, and target load profile

Hardware

Data Acquisition Chasis: cDAQ-9171

Bridge Module: NI 9237 (RJ50 Connection)

Load Cell: Omegadyne LCMFD-10N

Software

LabVIEW 2015 SP1-32 with NI-DAQmx drivers

Instructions

1. **If you know the N/mV slope for your load cell** you may skip the calibration VI and enter the inputs manually into the **IASTM Load Measurement.vi** and **move to step 8. Note:** if you manually enter in the N/mV slope and intercept you will have to restart the code to balance the load cell
2. Open the **Load Cell Calibration VI**
3. Enter your **Calibration weights** for each sample in grams
    a. It is best to calibrate with multiple different weights, but at minimum you need one measurement with no load and one with load
    b. You have the option to calibrate with more samples at each weight by changing the number of samples, but it is not necessary
4. Start the VI
5. Click the **sample#1 button** and let the sample iterations complete; **Repeat for sample#2-4**
6. Stop the VI and the slope will be stored as a global variable for use in the main code
7. Open the IASTM Load Measurement.vi
8. Set the file path for your data file output
9. Set the file path to the sound file provided in the .zip file with this code.
10. Set the **Target Load, Target Frequency, and Treatment Duration**
11. Start the Vi
12. Hold the device perpendicular to the ground click the **balance load cell** button
13. Adjust the screen so that the **live load reading** graph is in the center of the screen.

14. Hit the **start test** button
15. Try to match the **Blue target load line with the Live load line**
    a. Listen for the sound to indicate when to start and end a stroke
    b. Practice with the device until you can closely follow the line
    c. The Target Load wave and the sound will stop when the treatment is over
16. **Stop the code** and **Change the file name** to start new test
17. Once all tests are complete use the MATLAB script to analyze the data. **Note:** instructions for using the MATLAB script are contain in the beginning sections of the code.

Additional Notes

The **DAQassistant VI** in the block diagram reads signals from the module. The key module settings are…

Samples to Read: 1K

Sample Rate (Hz): 20K

In the VI the load is sampled at a rate of **20Hz** not 20KHz. The module itself is sampling at 20K Hz and stores 1000 points in a buffer. The load reading is actually an average from 1000 data point buffer sampled at 20Hz. You can adjust these settings to get higher data storage rates from the VI. For our applications these settings worked well. Changing these settings might also require a change in the MATLAB code to account for the increased/decreased number of data points recorded.

The **DAQassistant will have to be changed** if you intend to use a different module or DAQ to record data from your load cell.