

Homework #3

LabVIEW

Dr. Pogo

Assignment is due on Tuesday, September 19, 2023

Assigned September 12, 2023

Assignment #3: Voltage to Temperature Conversion

- Inputs:**
- An “Enable Data” button.
 - A “Store Data” button.
 - A “Done” button.
 - A dial with digital display to set the voltage.
 - A ring with 4 elements (Celsius, Kelvin, Fahrenheit, Rankine)
- Outputs:**
- A waveform chart for temperature.
 - A thermometer for temperature.
 - A voltage range warning light [yellow/green/red] with Boolean text.
 - Boolean “Voltage increasing” and Voltage decreasing” indicators.
 - A current Date and Time display.

We are again converting voltage into temperature, using the same subvi from assignment #2 (although you are permitted to make changes, since you must resubmit it anyway):

$$T (^{\circ}\text{C}) = 123.4V + 8.62V^2 \quad (-1\text{volt} \leq V \leq +1\text{volt})$$

When the “enable” button is off, the user can change the temperature scale, but cannot use the dial or the “store” button. When “enable” is on, the user can operate the dial or the “store” button, but cannot change the scale. If the user changes the scale, prior data already shown on the chart should be corrected for the new units. When the units ring is changed, the text label for the chart should change. The “done” button terminates the program without adding data, and turns off the “increase/decrease” lights, and turn off the “enable” button. Each time the program is run, all lights and switches initialize “off”, and the dial initializes to 0.0 volts.

Temperatures are recorded to the chart once each time the “store” button is pressed. The “increase” and “decrease” indicators should light when the data point being stored is higher or lower than the last point stored, respectively. Neither should light when the first data point is taken. The dial should accept voltages between -2 and $+2$ volts. The warning light should be yellow when the dial voltage is too low, red when it is too high, and green when it is normal. While the voltage is out of range, the “store” button should be disabled. In contrast to the chart, temperatures are constantly recorded to the thermometer, but the thermometer should peg when the voltage is out of range.

The strip chart should always start empty whenever the program is run. The axis label and scale of the strip chart and thermometer should automatically adjust as follows:

Celsius:	$-150^{\circ} \leq T \leq +150^{\circ}$
Kelvin:	$+150^{\circ} \leq T \leq +450^{\circ}$
Fahrenheit:	$-200^{\circ} \leq T \leq +300^{\circ}$
Rankine:	$+200^{\circ} \leq T \leq +800^{\circ}$

You should rename and resubmit the subvi (e.g., 03PogoEsub1.vi). Here is an example of how your front panel might appear:

