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LED Examples in LabVIEW

Hans-Petter Halvorsen

Contents

- We will show how to turn on/off a LED using an I/O Module/DAQ Device in LabVIEW

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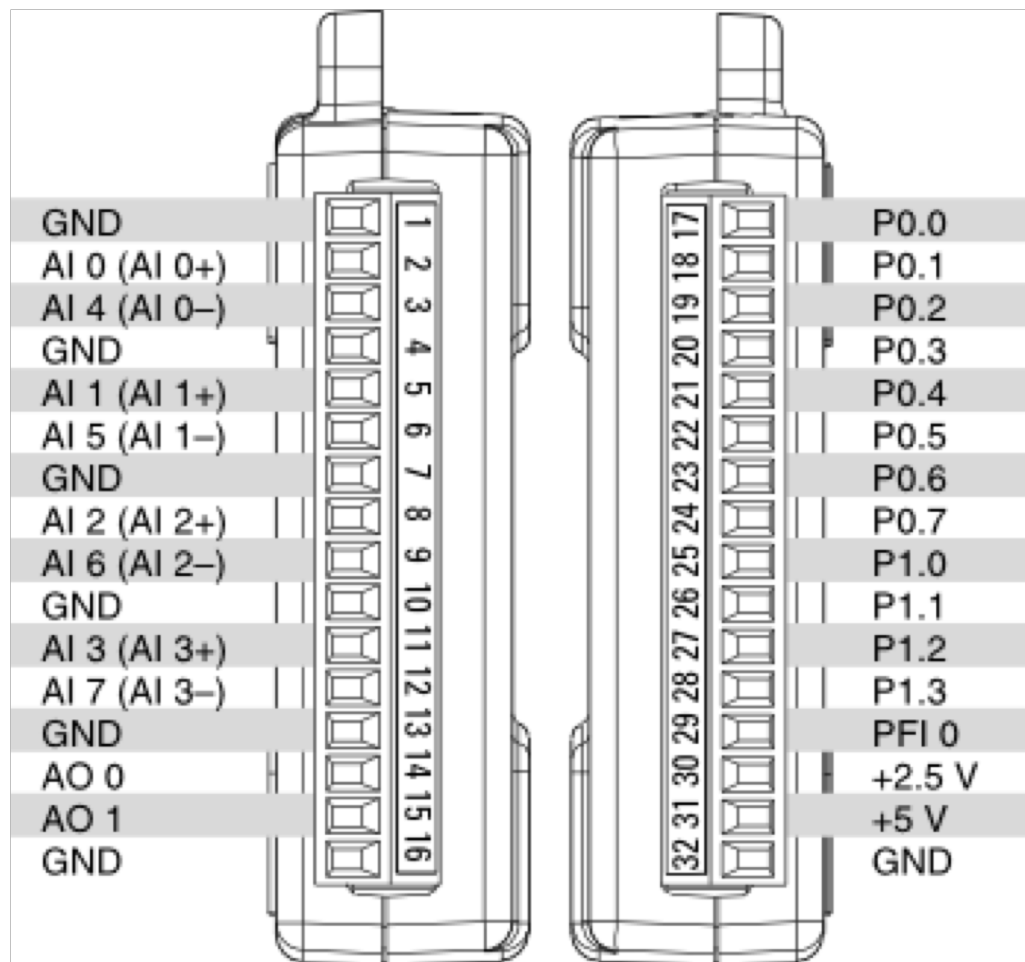
USB-6008

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USB-6008



I/O Pins



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Basic LED Example

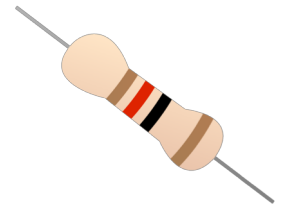
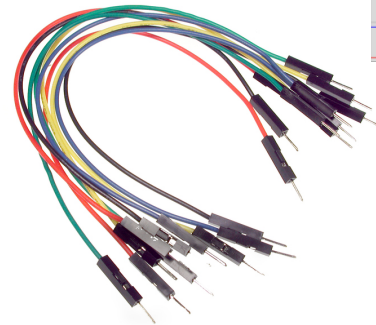
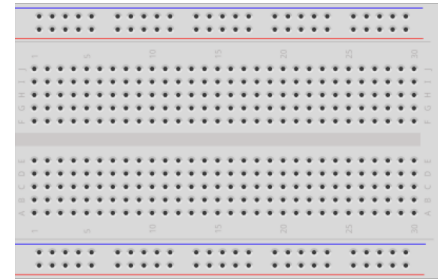
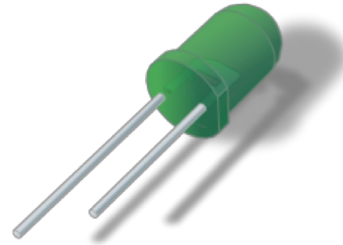
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Basic LED Example

- We will turn on/off the LED by clicking on a Boolean button on the Front Panel

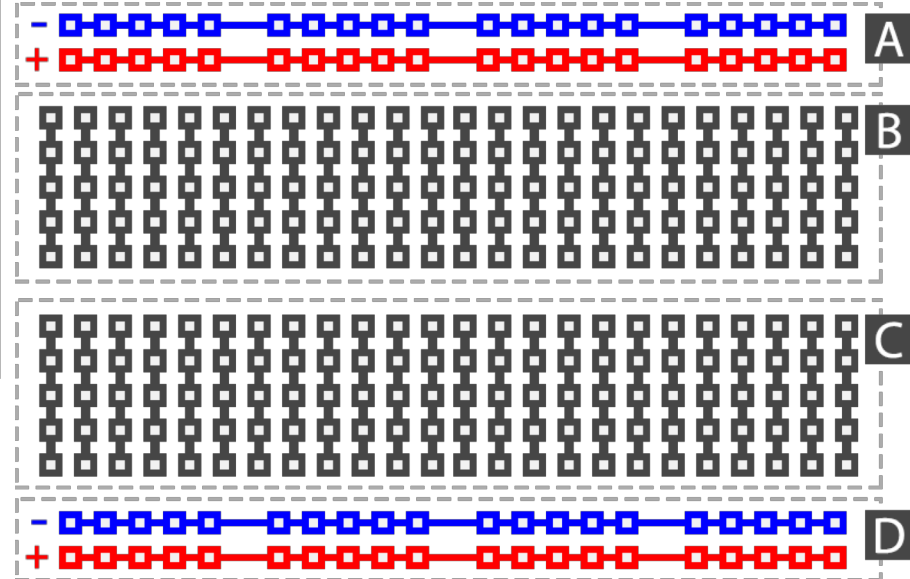
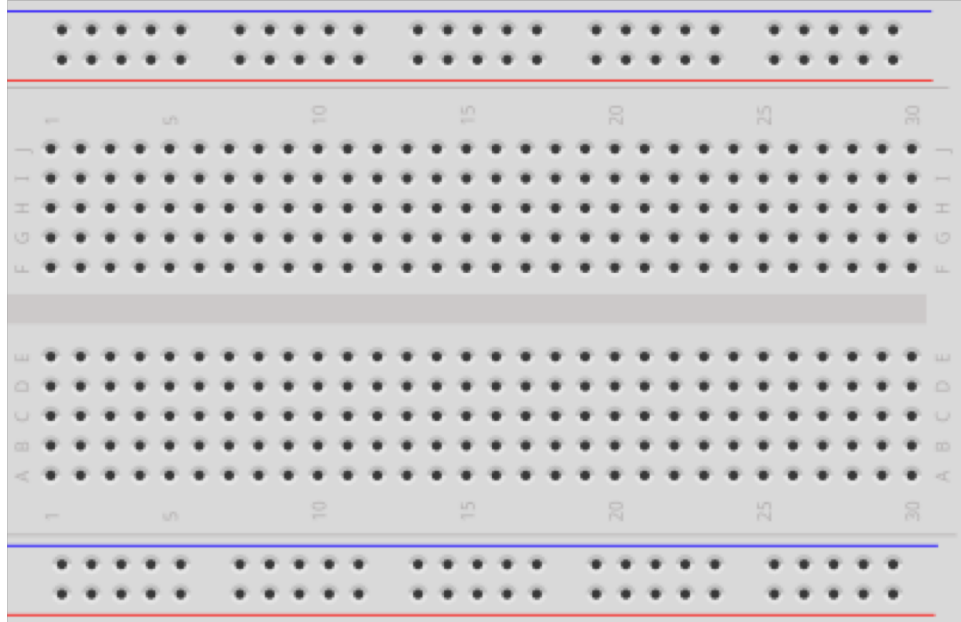
Hardware

- DAQ Device (e.g., USB-6008)
- Breadboard
- LED
- Resistor, $R = 270\Omega$
- Wires (Jumper Wires)



Breadboard

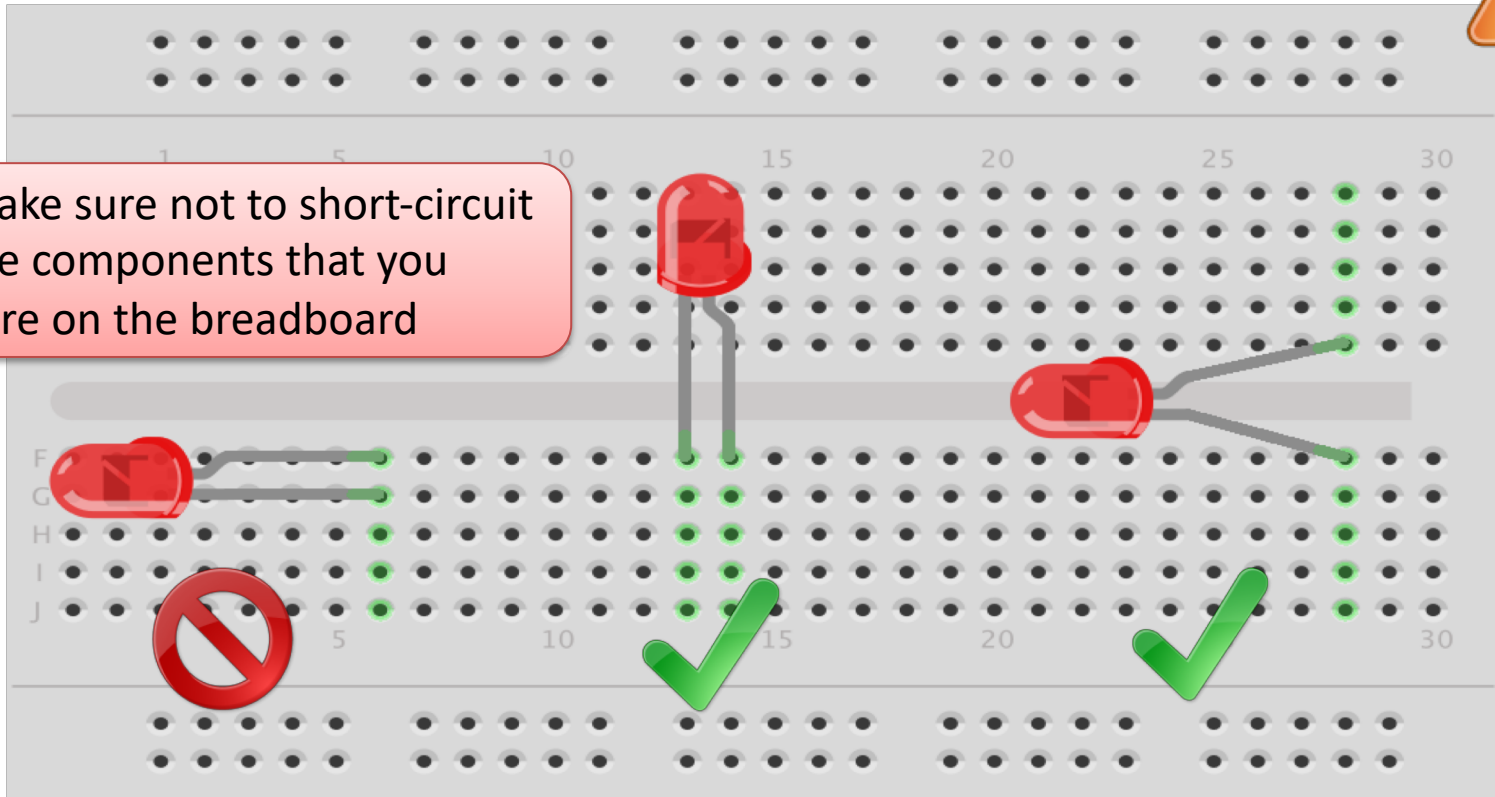
A breadboard is used to wire electric components together



Breadboard Wiring



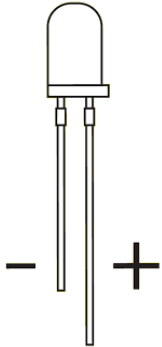
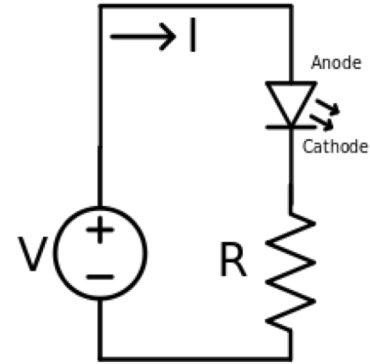
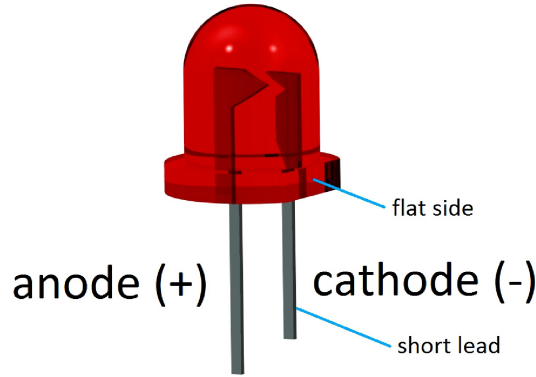
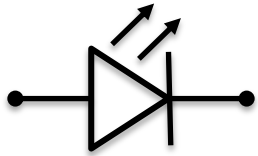
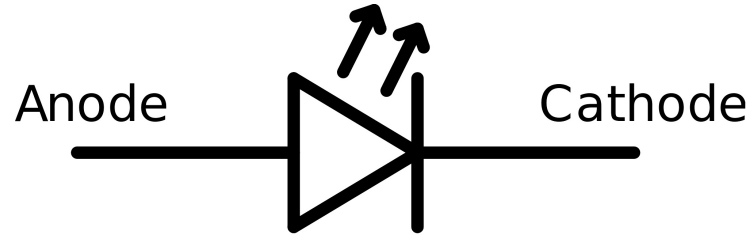
Make sure not to short-circuit the components that you wire on the breadboard



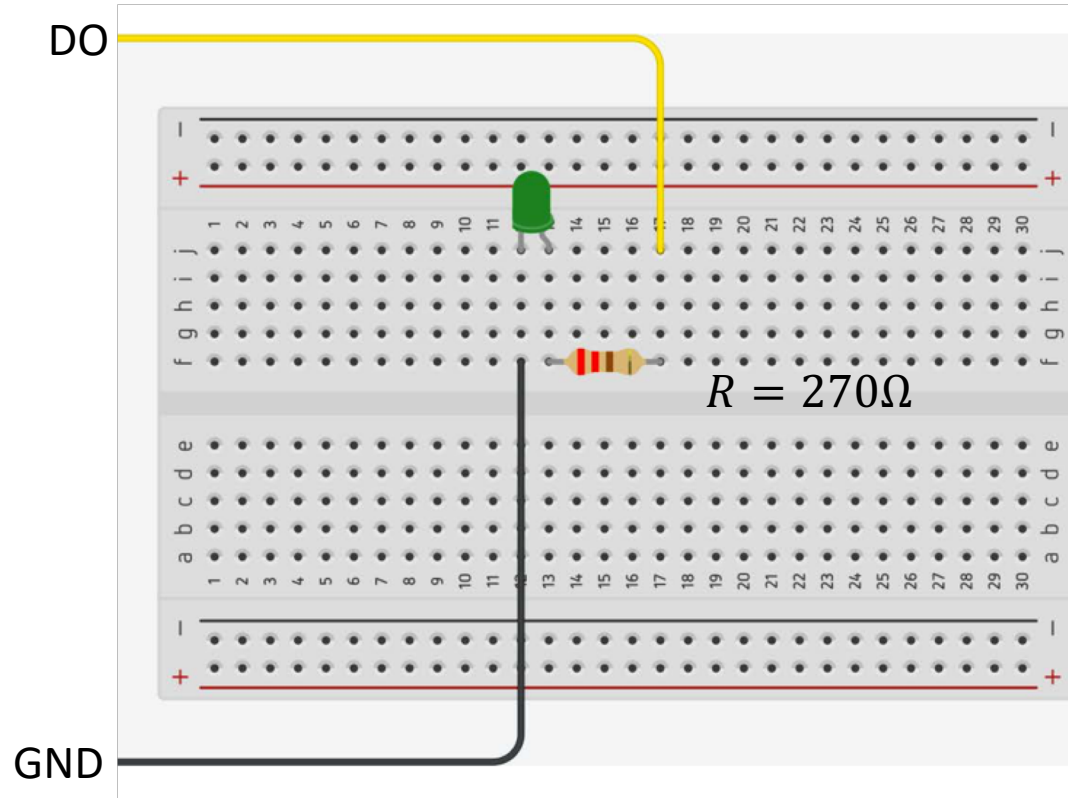
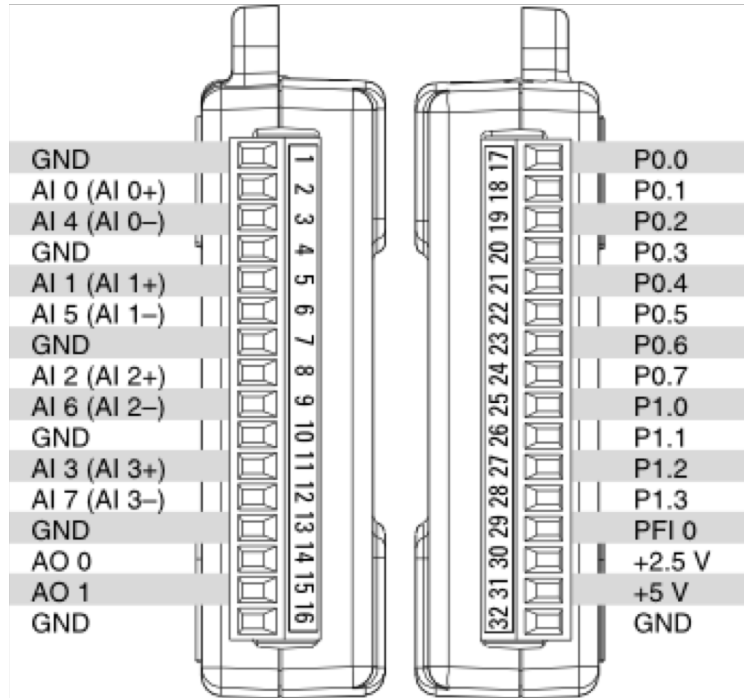
The Breadboard is used to connect components and electrical circuits

fritzing

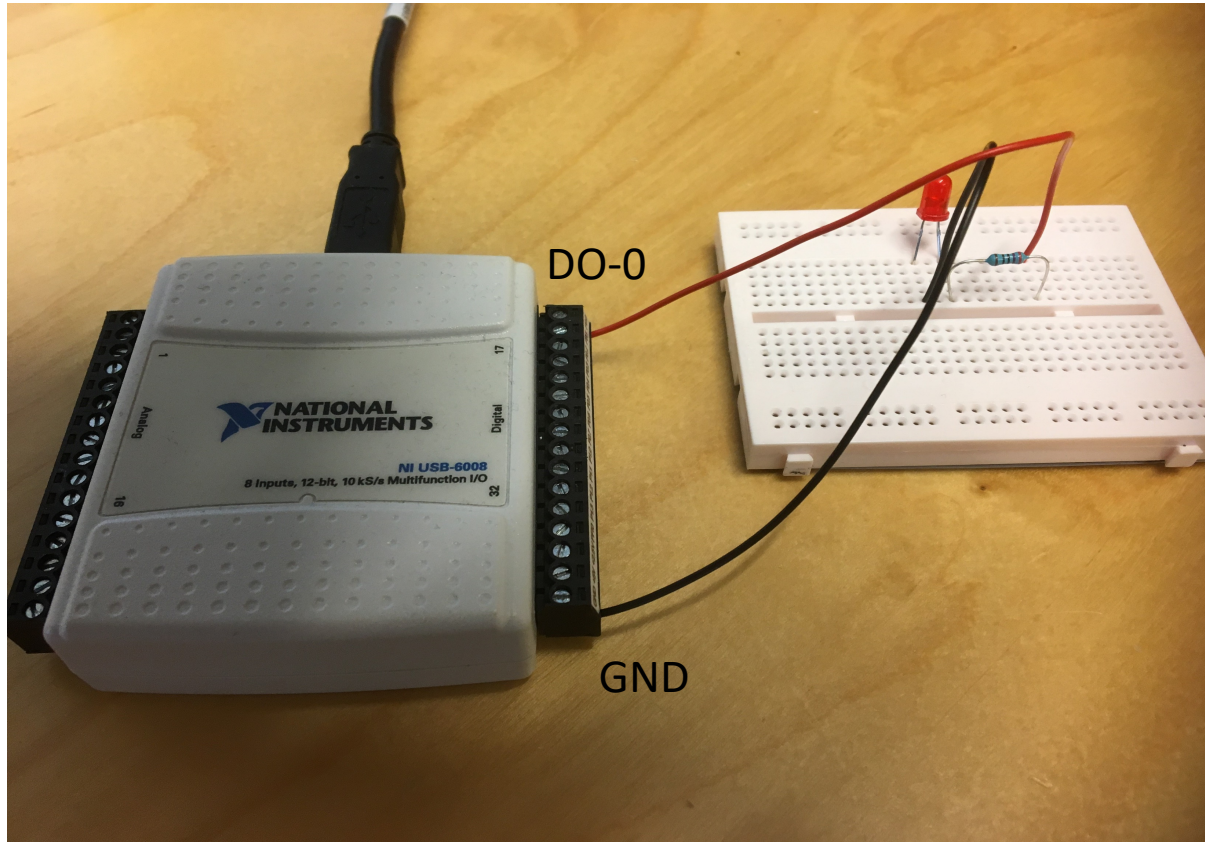
Light-emitting diode - LED



Wiring

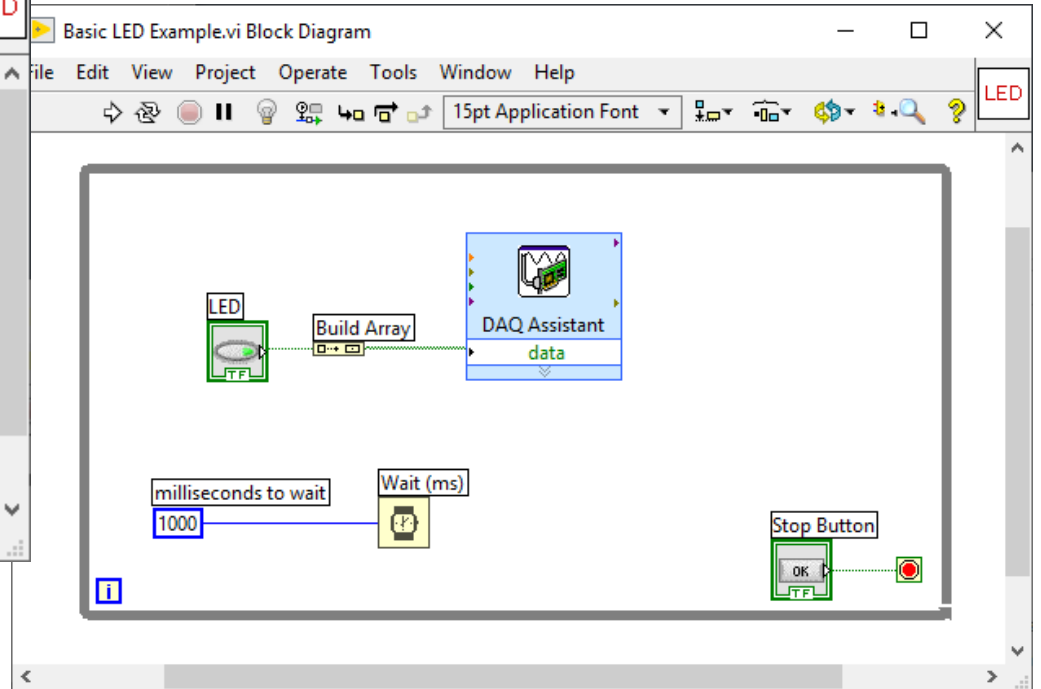
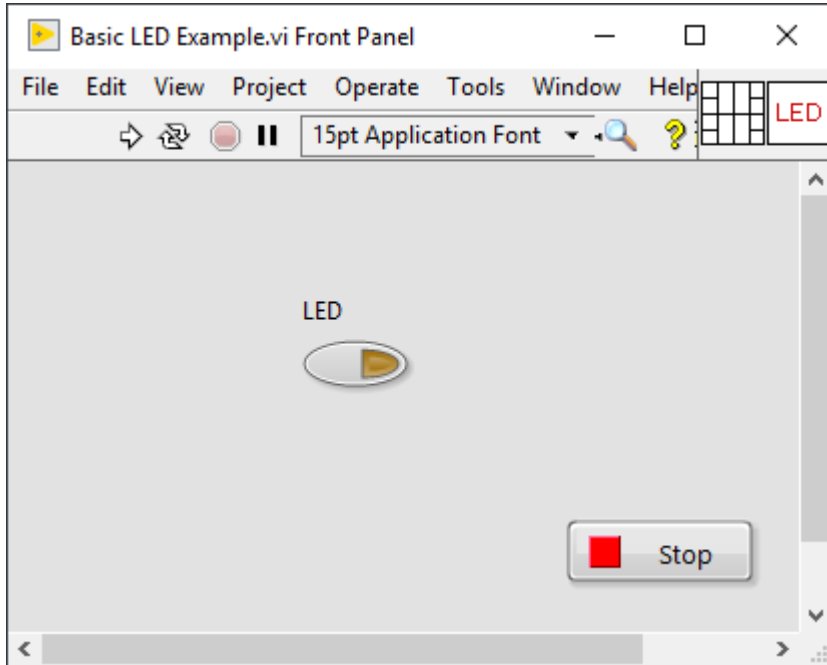


Hardware Setup

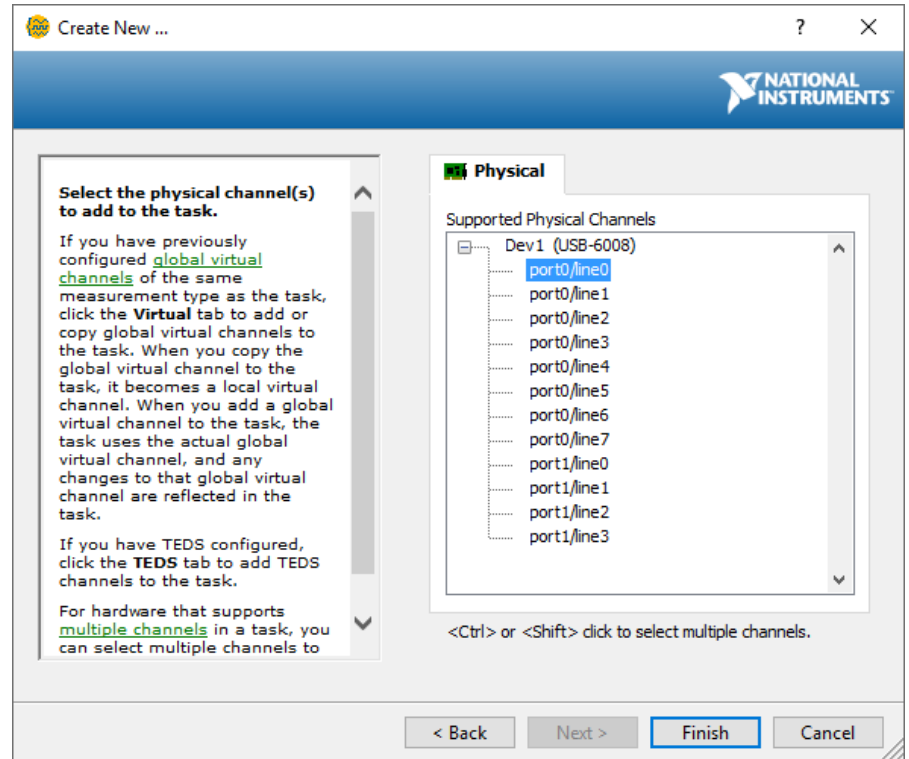
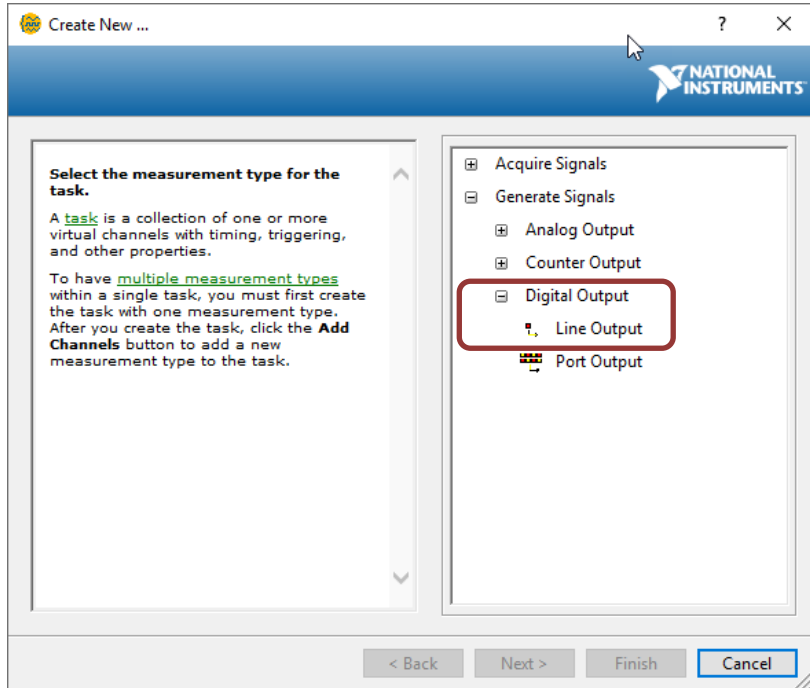


$$R = 270\Omega$$

LabVIEW Example



DAQ Settings



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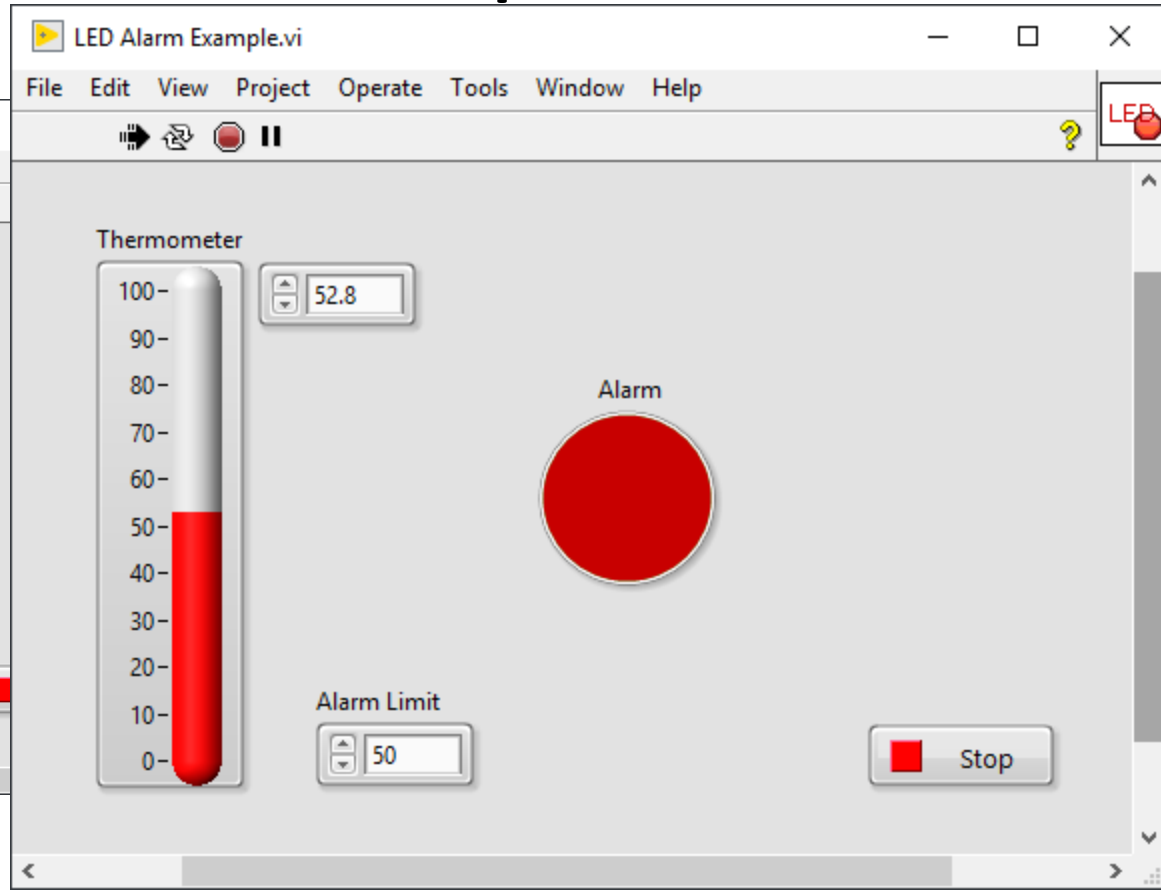
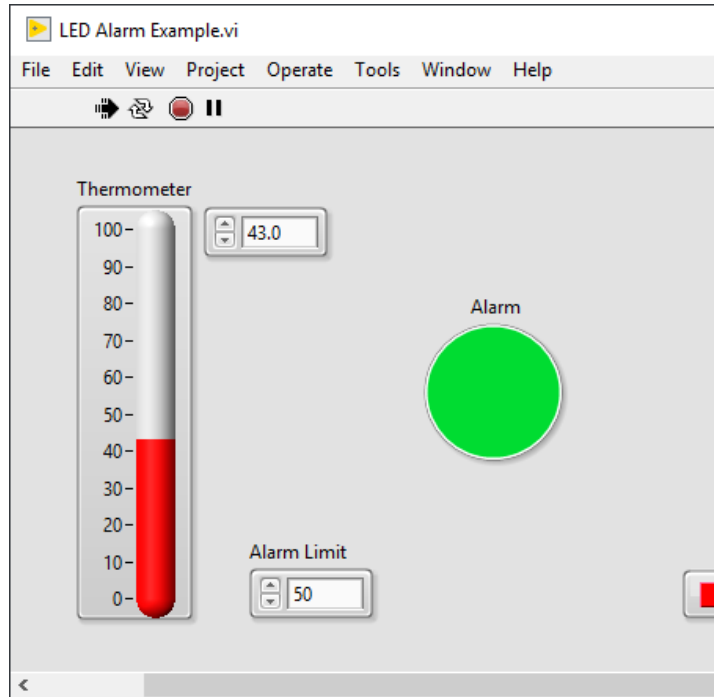
Alarm LED Example

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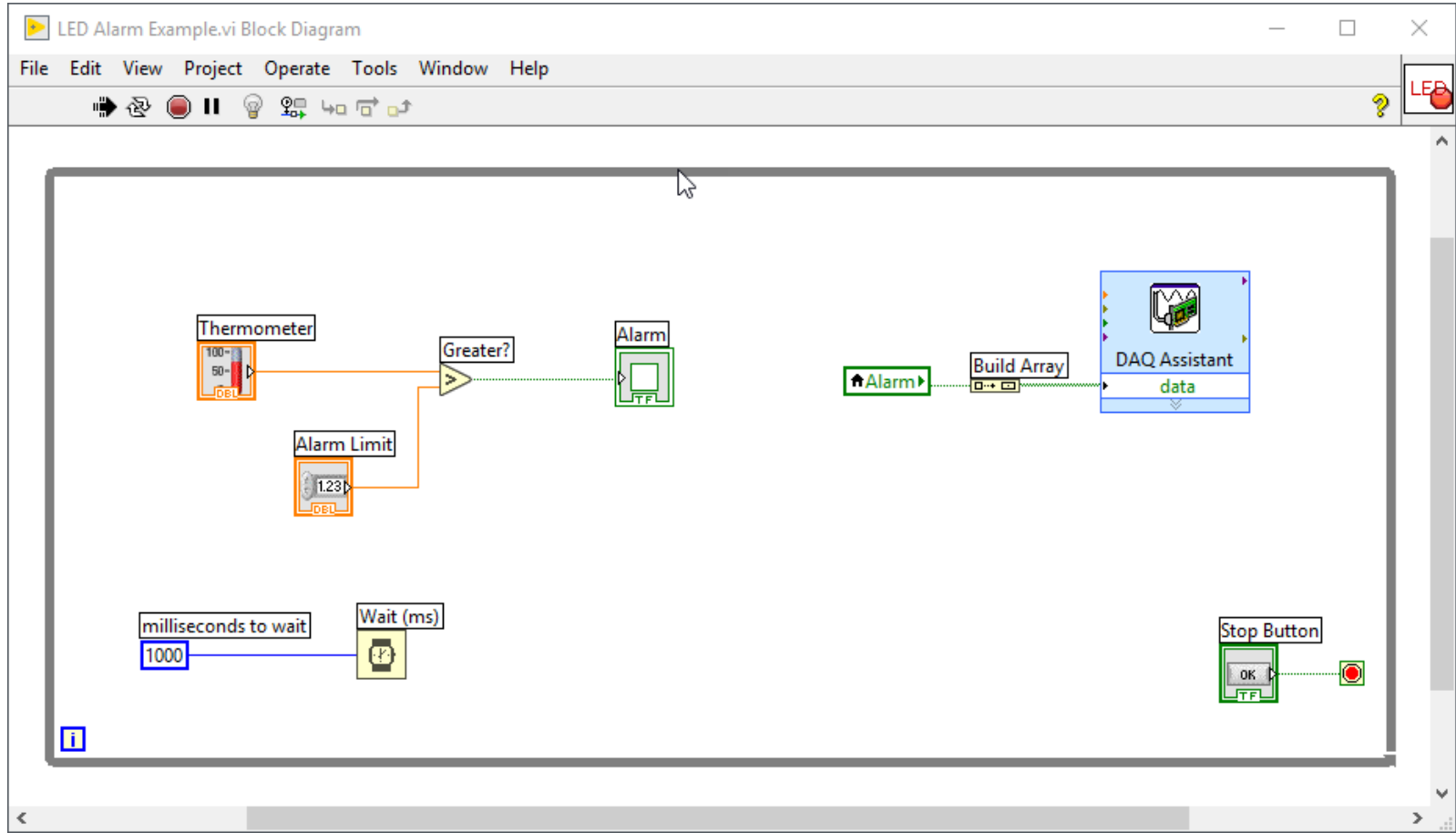
Alarm LED Example

- We will turn on the LED when the temperature reach a specific Alarm Level

LabVIEW Example



LabVIEW Example



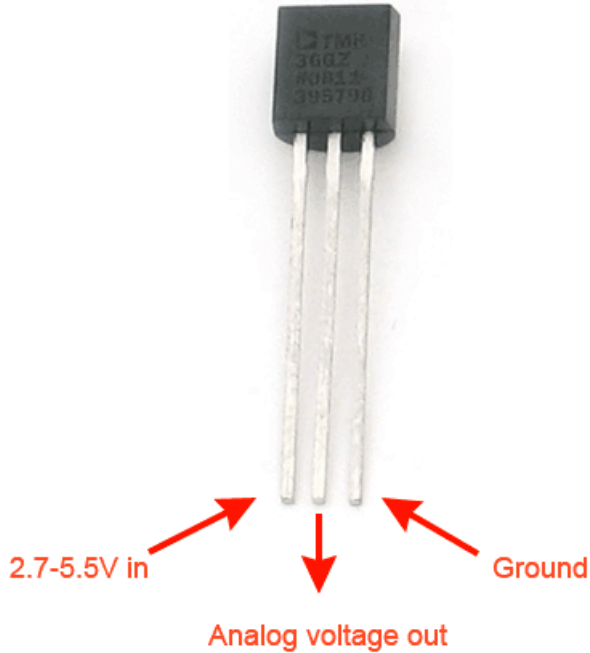
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Temperature Sensor Example

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TMP36 Temperature Sensor

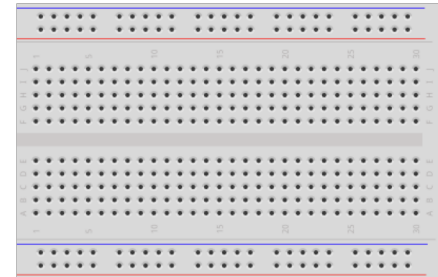
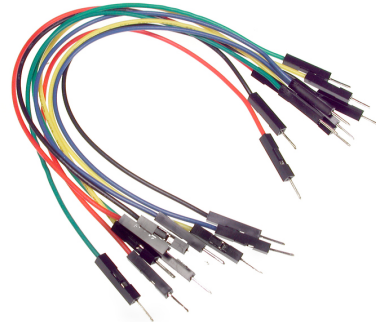


A Temperature sensor like TM36 use a solid-state technique to determine the temperature.

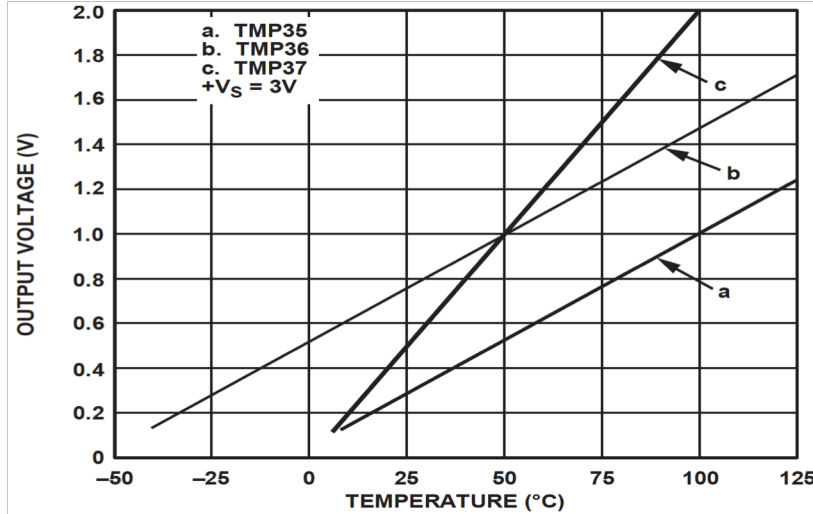
They use the fact as temperature increases, the voltage across a diode increases at a known rate.

Necessary Equipment

- PC
- DAQ Module, e.g., USB-6008
- Breadboard
- TMP36
- Wires (Jumper Wires)



Linear Scaling



This gives:

$$y - 25 = \frac{50 - 25}{1 - 0.75} (x - 0.75)$$

Then we get the following formula:

$$y = 100x - 50$$

Convert from Voltage (V) to degrees Celsius
From the Datasheet we have:

$$(x_1, y_1) = (0.75V, 25^\circ C)$$
$$(x_2, y_2) = (1V, 50^\circ C)$$

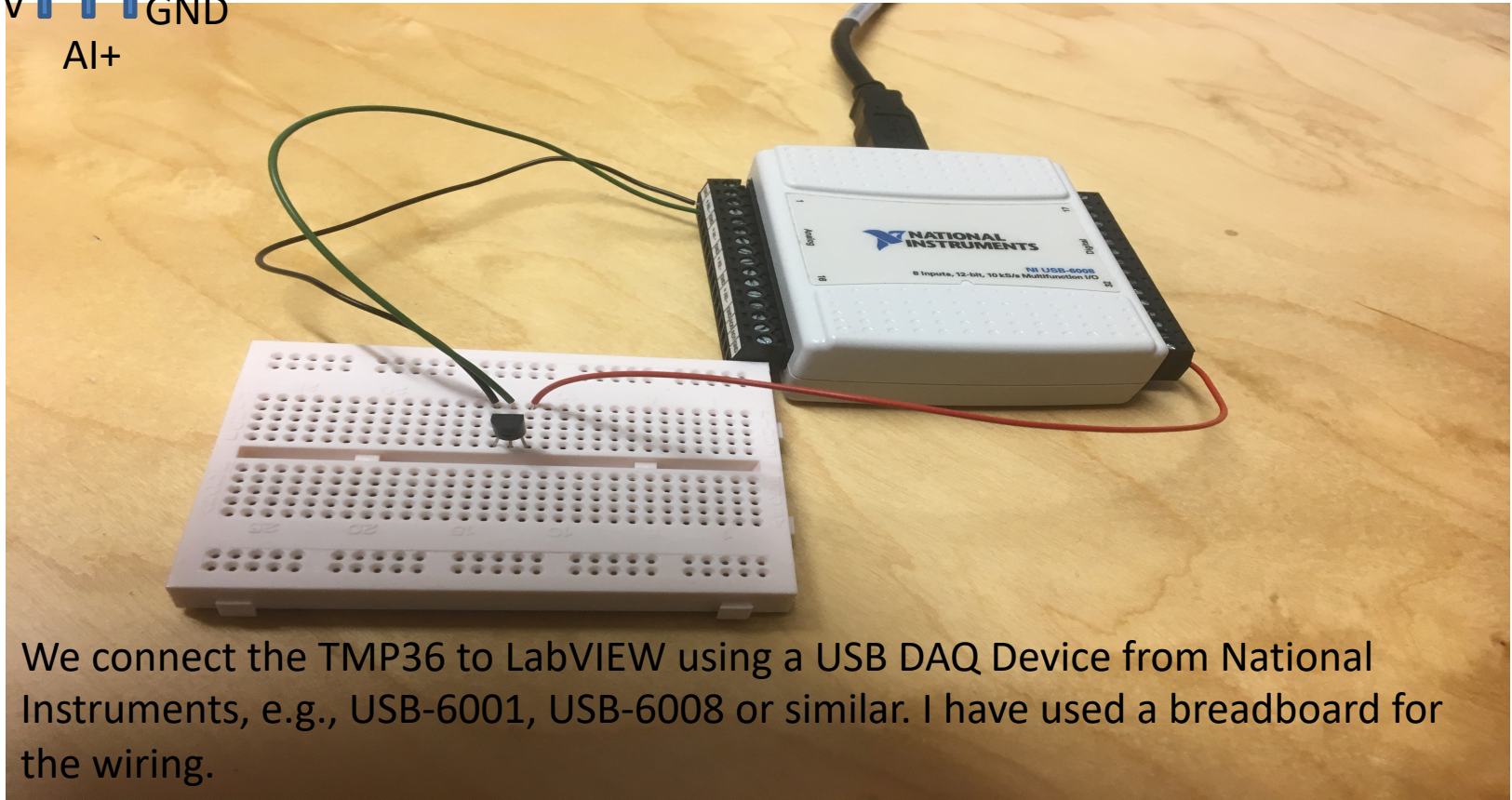
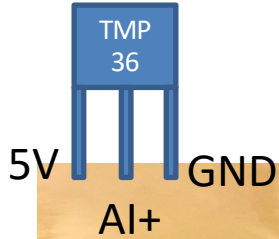
There is a linear relationship between
Voltage and degrees Celsius:

$$y = ax + b$$

We can find a and b using the following
known formula:

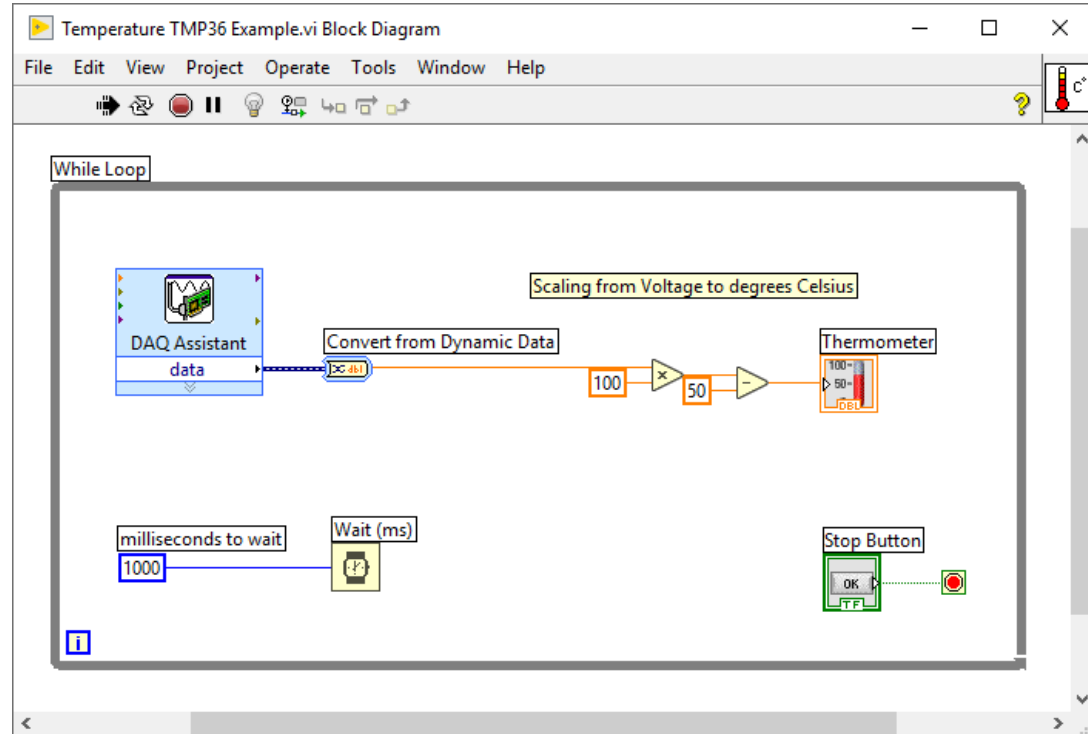
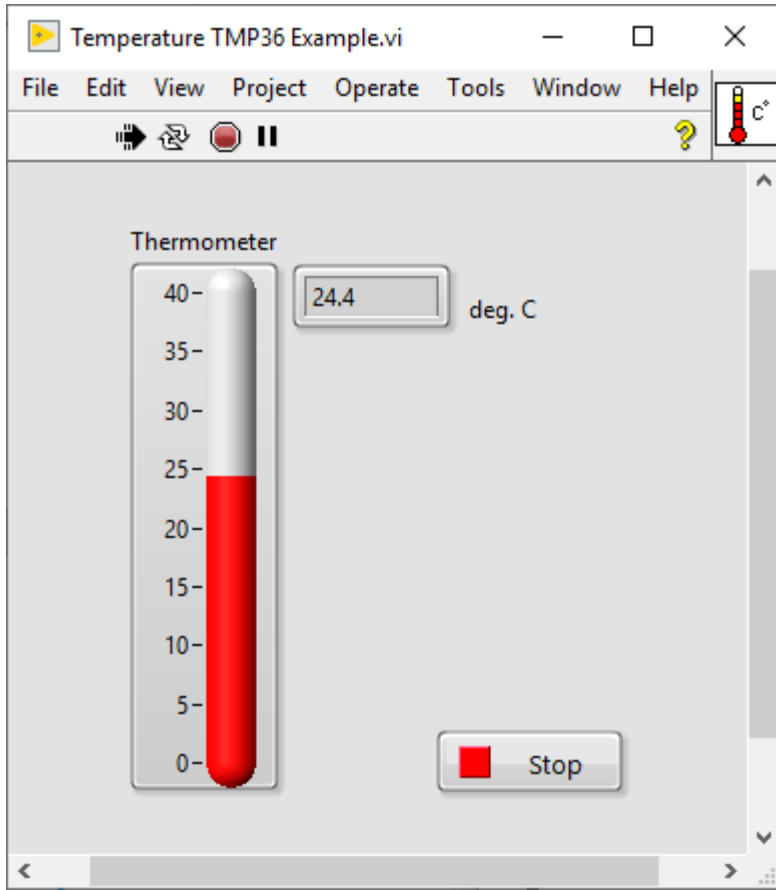
$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1} (x - x_1)$$

USB-6008 Wiring Example



We connect the TMP36 to LabVIEW using a USB DAQ Device from National Instruments, e.g., USB-6001, USB-6008 or similar. I have used a breadboard for the wiring.

LabVIEW Example



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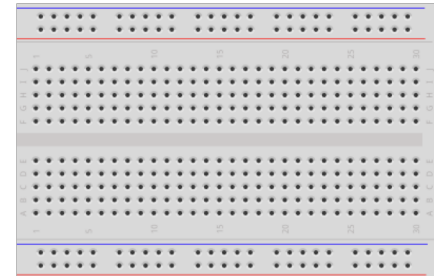
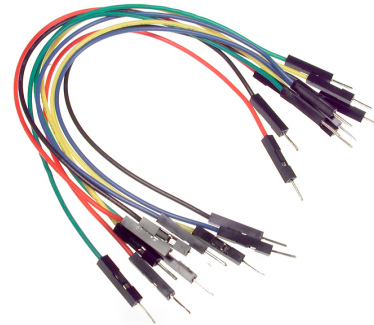
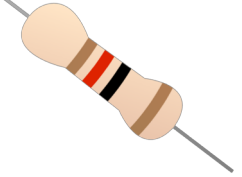
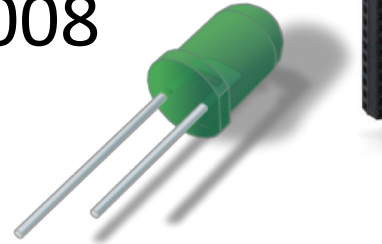


Temperature Sensor with Alarm Example

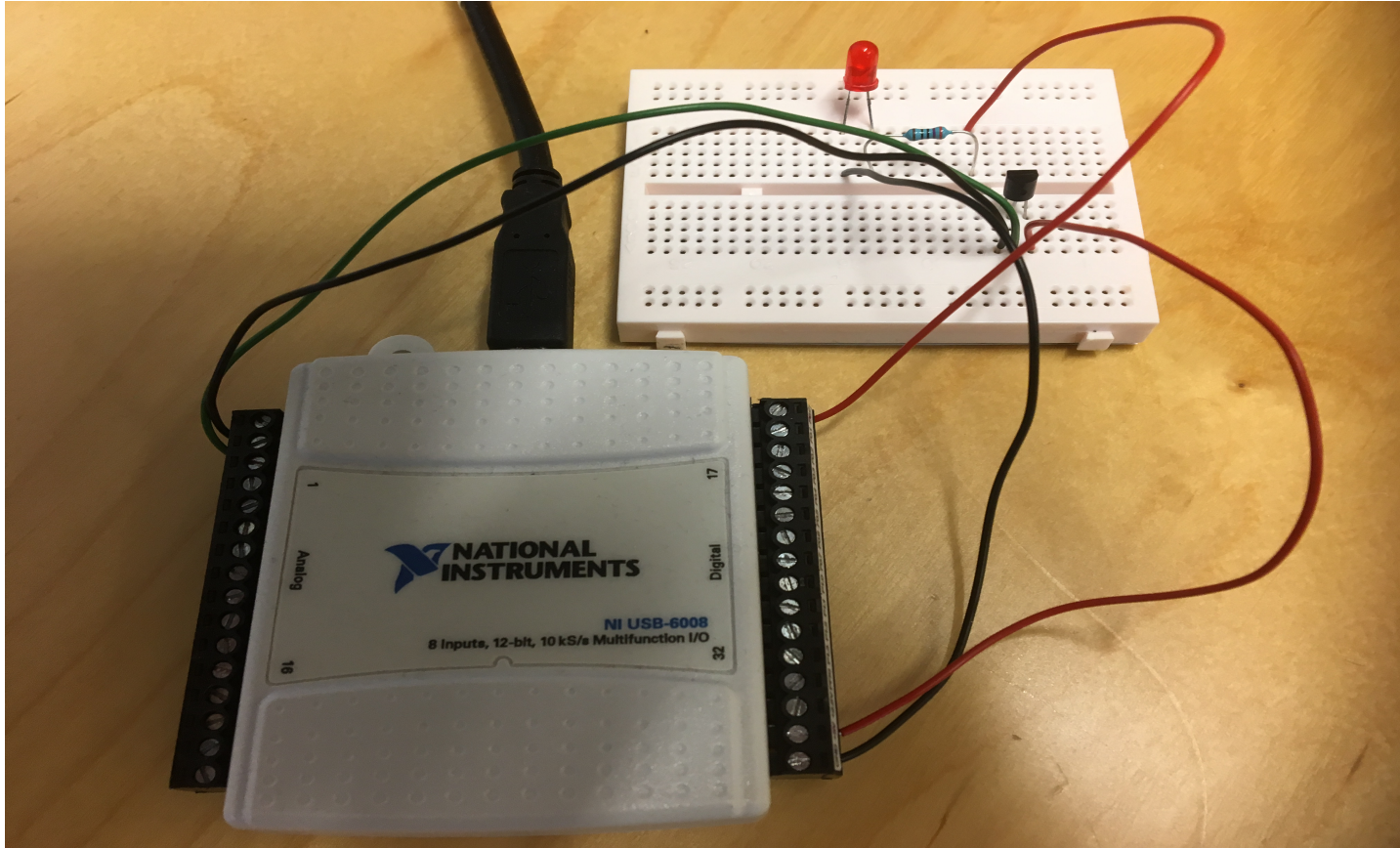
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Necessary Equipment

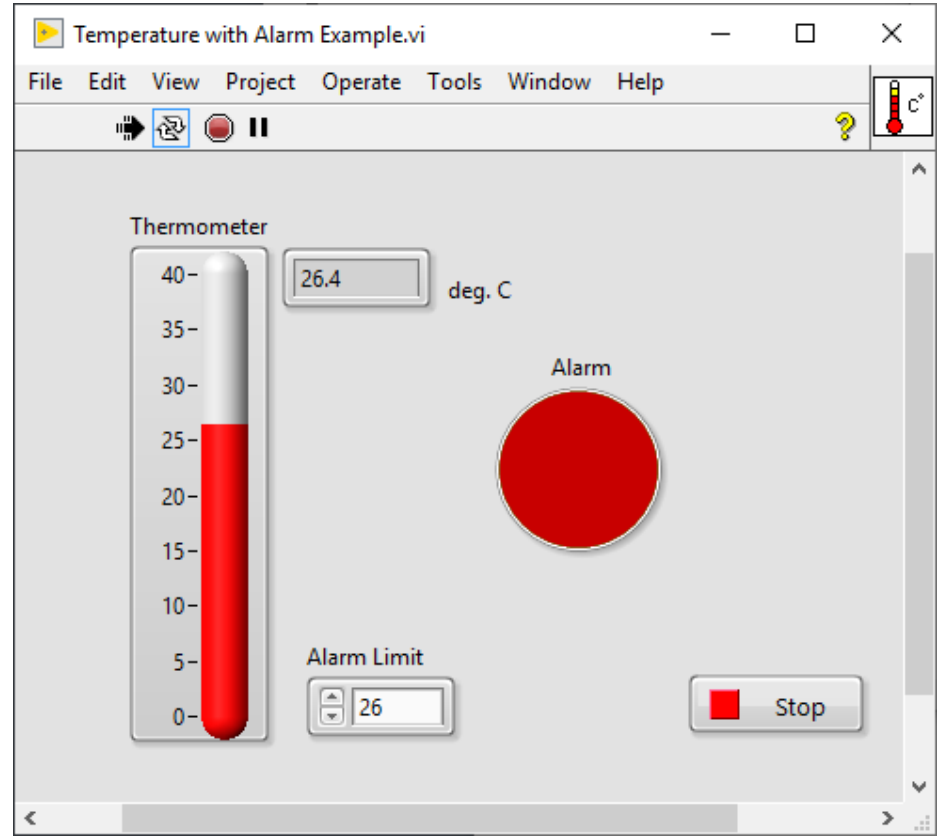
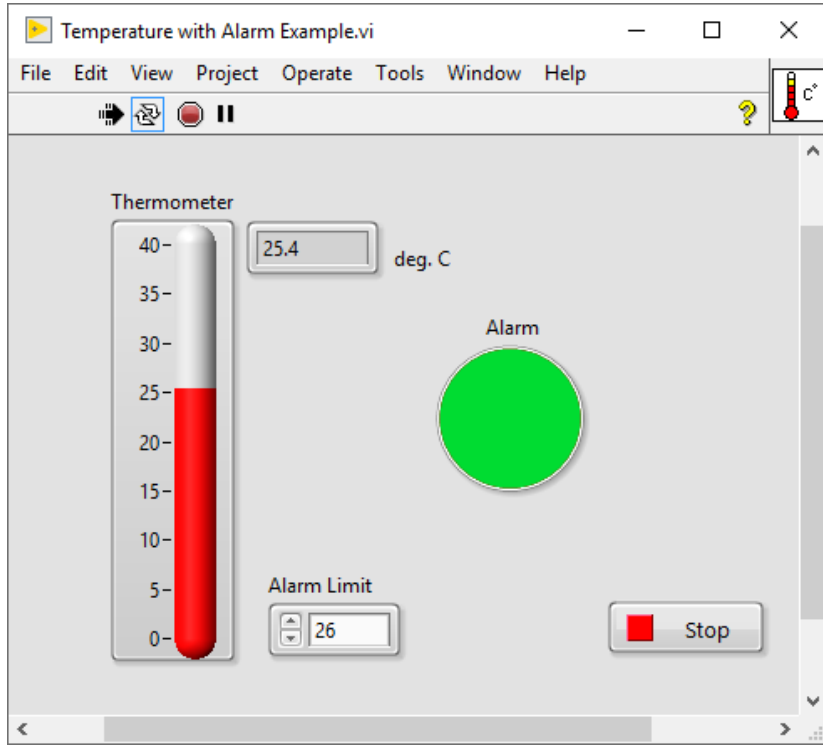
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- Breadboard
- TMP36
- LED
- Resistor, $R = 270\Omega$
- Wires (Jumper Wires)



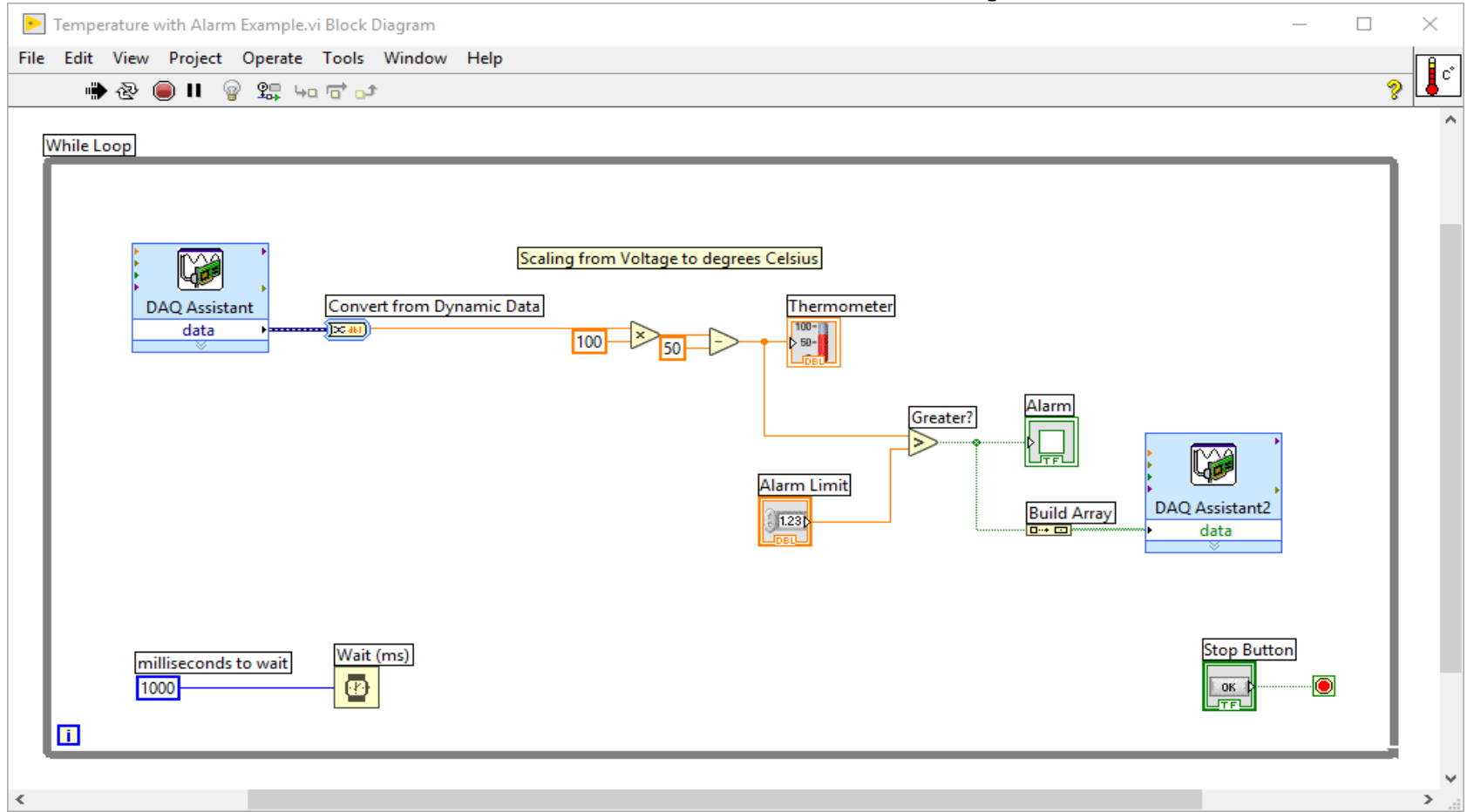
Wiring



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