

Flextimus Prime

Posture Detection Device

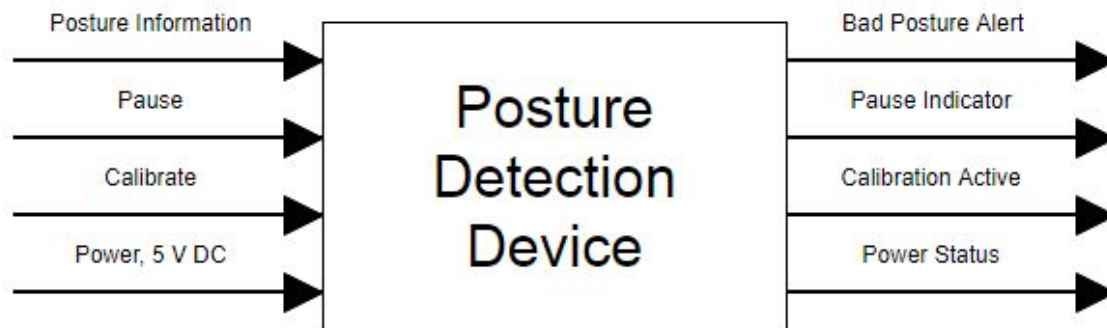
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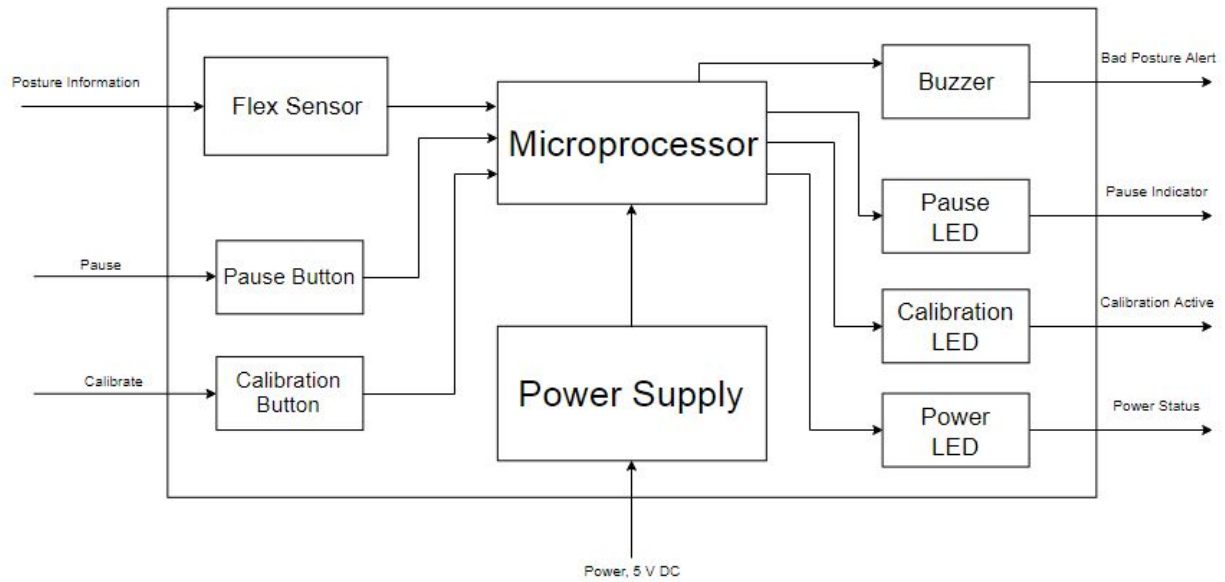
Grant Vesely

Posture Detection Device: Level 0



Module	Posture Detection Device
Inputs	<p>Posture Information: The range of values from the sensor that are considered either good or bad for posture.</p> <p>Pause: Stop the alert system for some amount of time.</p> <p>Calibrate: Change range that the system defines as “good” posture.</p> <p>Power: 5 V DC source from USB connection.</p>
Outputs	<p>Bad Posture Alert: Signals the user that they have bad posture.</p> <p>Pause Indicator: Tells the user that the system is paused.</p> <p>Calibration Active: Tells the user that the system is in calibration mode.</p> <p>Power Status: Displays if the system has power.</p>
Functionality	<p>Takes a range of values from a flex sensor based on the user’s posture. The values considered good can be changed by the user. If the user’s posture is out of the acceptable range then they are notified by a buzzer. The notification of bad posture can be paused.</p>

Posture Detection Device: Level 1



Microprocessor: Level 1



Module	Microprocessor
Inputs	<p>Flex Sensor: Receives a variable voltage from the flex sensor.</p> <p>Pause Button: Signal to the processor to stop alerts.</p> <p>Calibrate Button: Signal to the processor to begin calibration.</p> <p>Power Supply: 3.3 V DC</p>
Outputs	<p>Buzzer: Signal to activate the buzzer alert.</p> <p>Pause LED: Signal to turn on the LED when paused..</p> <p>Calibration LED: Signal to turn on the LED when calibrating.</p> <p>Power Status LED: Signal to LED indicating system has power.</p>
Functionality	Receives signals from hardware and produces appropriate output signals based on the combination of input signals and code constraints. Does any necessary internal calculations.

Flex Sensor: Level 1



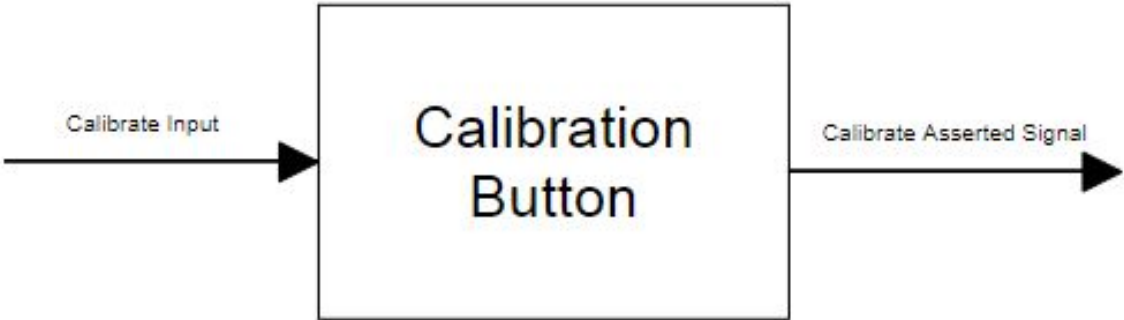
Module	Flex Sensor
Inputs	Posture Input: Based on how far the user moves their body (neck, back, wrists, etc.)
Outputs	Variable Voltage Output: Outputs a voltage that depends on how bent the flex sensor is.
Functionality	Converts how bent a desired part of the body is into a voltage value that can be used by the processor track posture. The resistance of the flex sensor changes with how much it is bent.

Pause Button: Level 1



Module	Pause Button
Inputs	Pause Input: Button press from user.
Outputs	Pause Asserted Signal: Logic High.
Functionality	Gives the user a way to tell the processor to stop sending the alert signal for some period of time or potentially until pressed again.

Calibration Button: Level 1



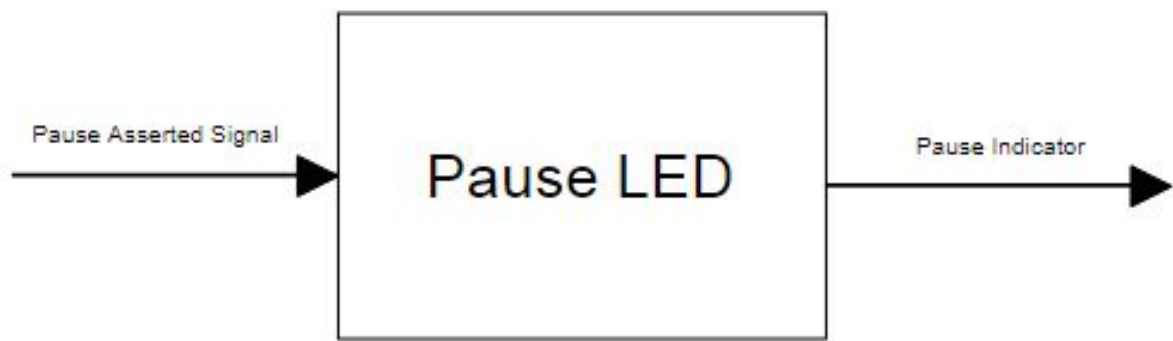
Module	Calibrate Button
Inputs	Calibrate Input: Button press from user.
Outputs	Calibrate Asserted Signal: Logic High.
Functionality	Allows the user to set their own desired range of accepted values for good posture.

Buzzer: Level 1



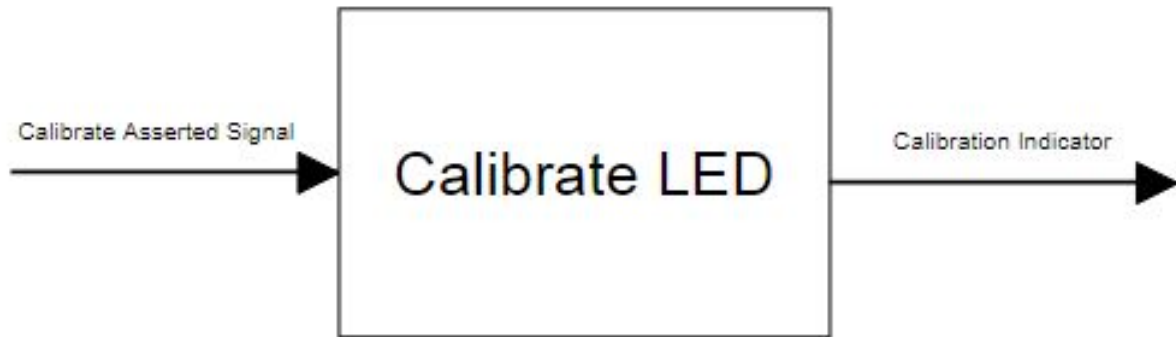
Module	Buzzer
Inputs	Buzzer Asserted Signal: Signal from processor when a posture violation has occurred.
Outputs	Bad Posture Alert: Buzzer activation
Functionality	Buzzer to vibrate and make noise to alert the user that their posture is bad. Stops when user resumes a good posture.

Pause LED: Level 1



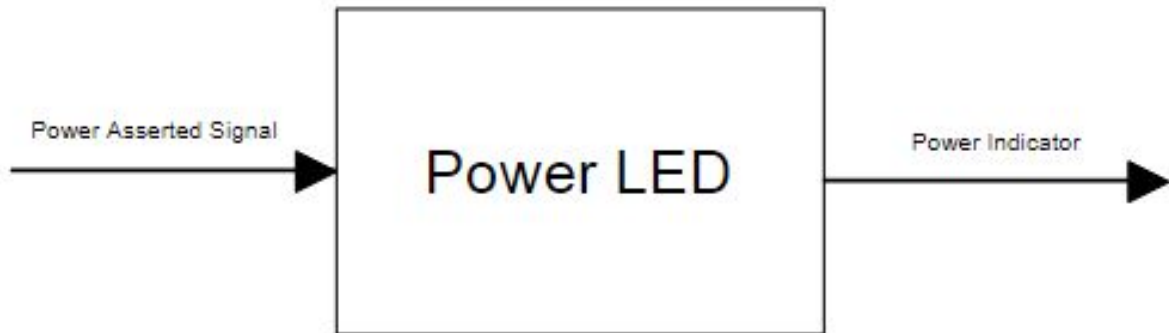
Module	Pause LED
Inputs	Pause Asserted Signal: Signal from processor that system is paused.
Outputs	Pause Indicator: LED turns on/off.
Functionality	LED that tells the user that the system is in pause mode when lit and bad posture violations will not be reported.

Calibrate LED: Level 1



Module	Calibrate LED
Inputs	Calibrate Asserted Signal: Signal from processor that the system is in calibration mode.
Outputs	Calibration Indicator: LED turns on/off.
Functionality	When lit, indicates that the system is in calibration mode and is recording new maximum values for the range of legal motion.

Power LED: Level 1



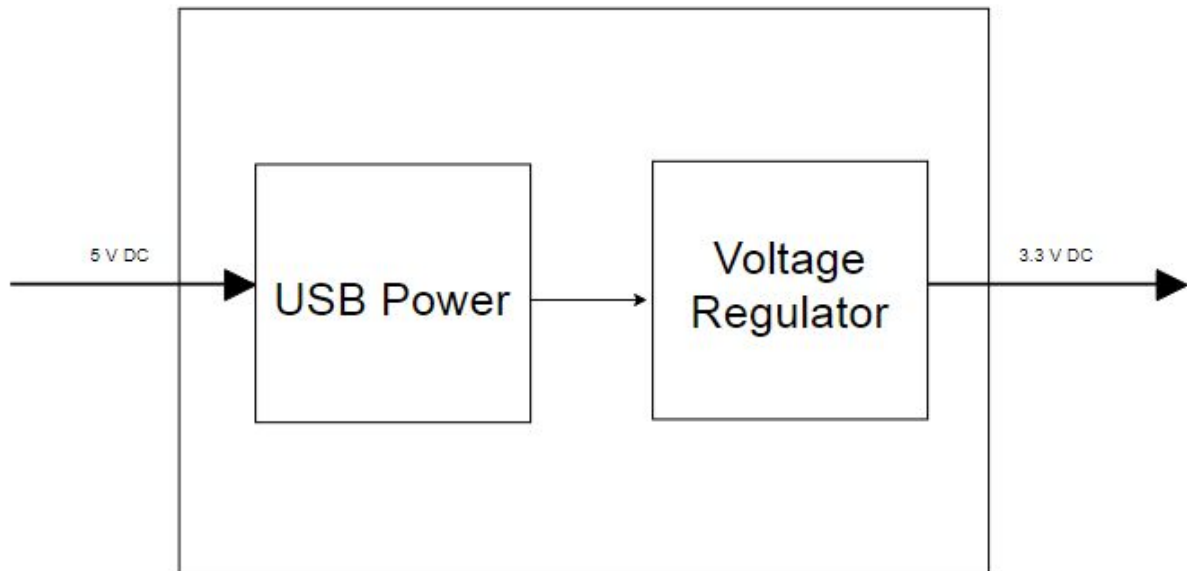
Module	Power LED
Inputs	Power Asserted Signal: Signal from processor or possibly tied to power supply.
Outputs	Power Indicator: LED turns on/off.
Functionality	LED on indicates the system has power.

Power Supply: Level 1



Module	Power Supply
Inputs	5 V DC: Power
Outputs	3.3 V to device: Power to the Microprocessor.
Functionality	Powers the device with desired values.

Power Supply: Level 2

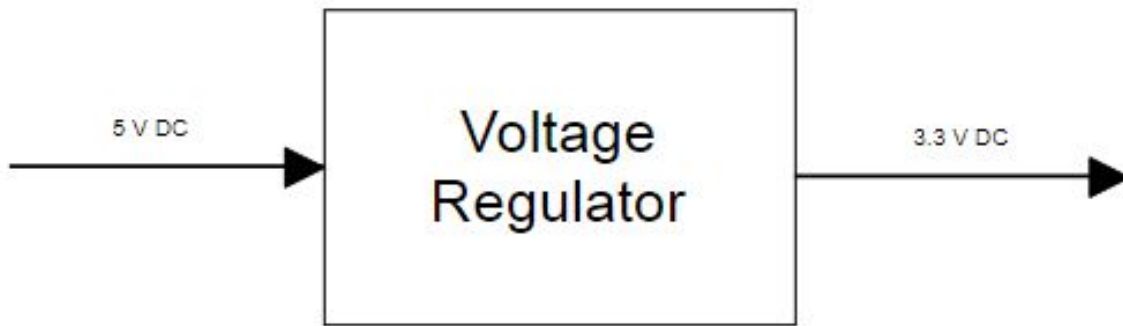


USB Power: Level 2



Module	USB Power
Inputs	Power Source: Plug from USB port.
Outputs	5 V DC: Output to power supply system.
Functionality	Main connection for powering the device.

Voltage Regulator: Level 2



Module	Voltage Regulator
Inputs	5 V DC: From USB power.
Outputs	3.3 V DC: to processor.
Functionality	Converts the 5 volt input from the USB power to 3.3 volts for the processor.