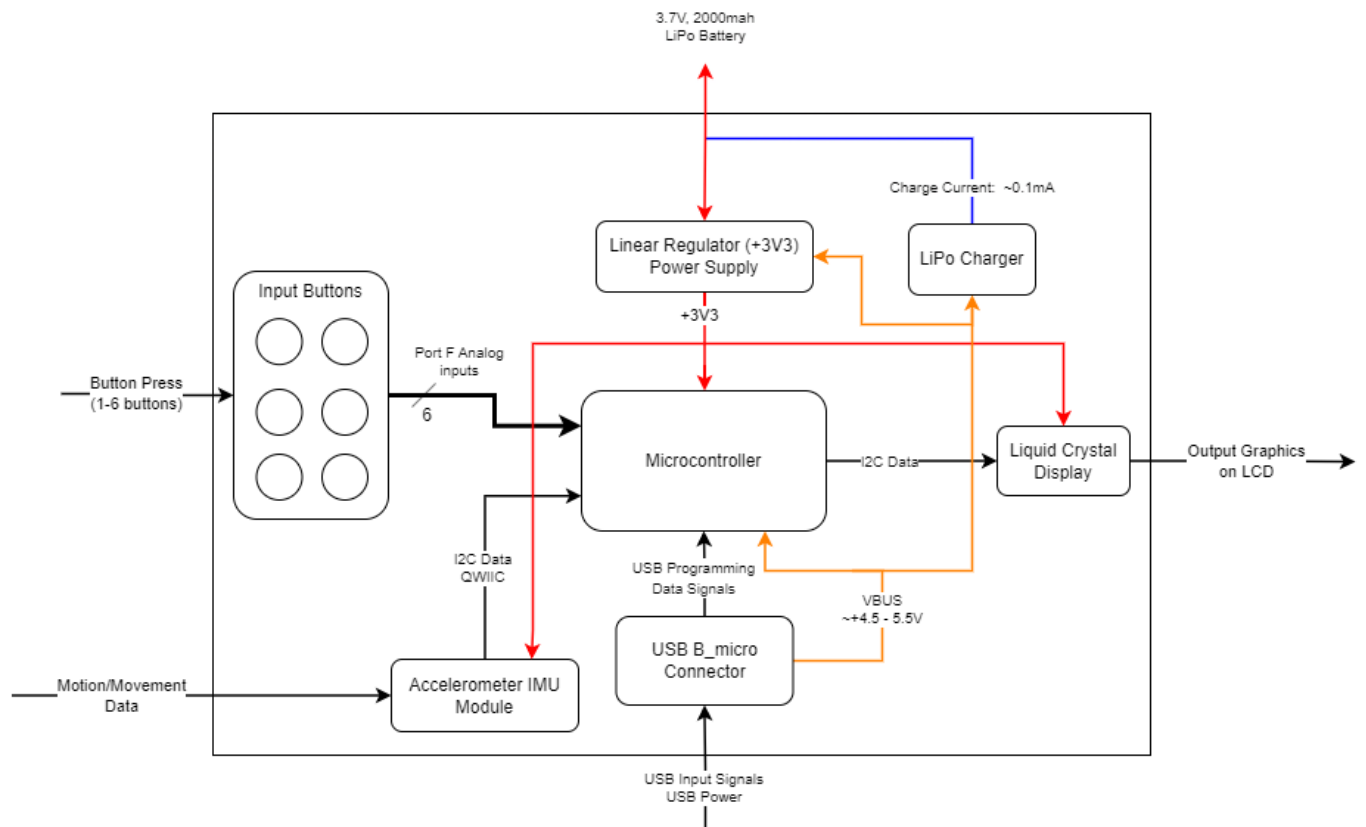


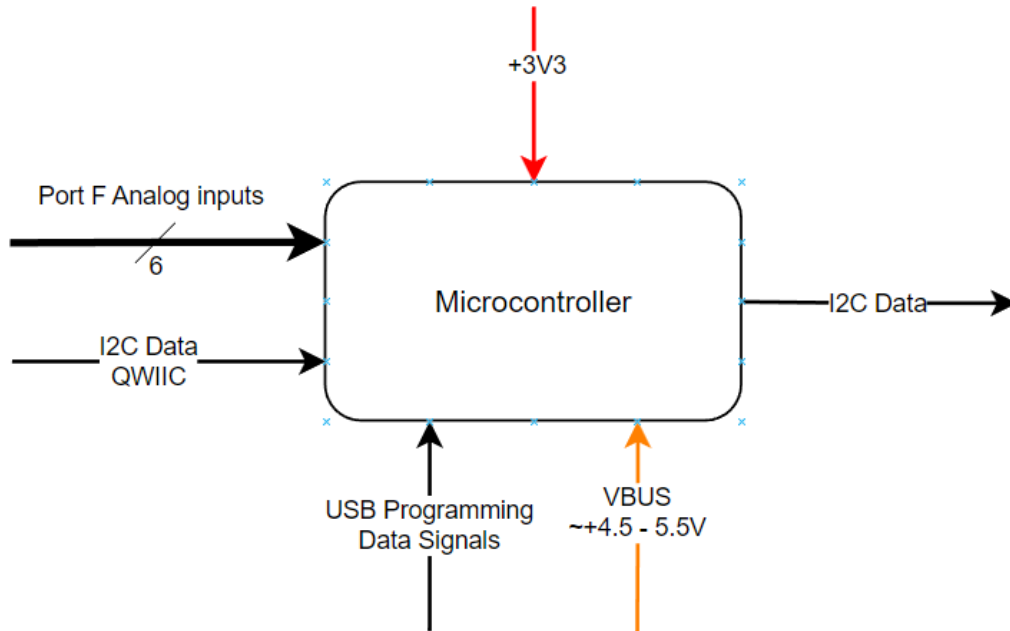
Hand-held Video Game Console: Level 1

Team: G11

Team members: Anthony, Cesar, Charles

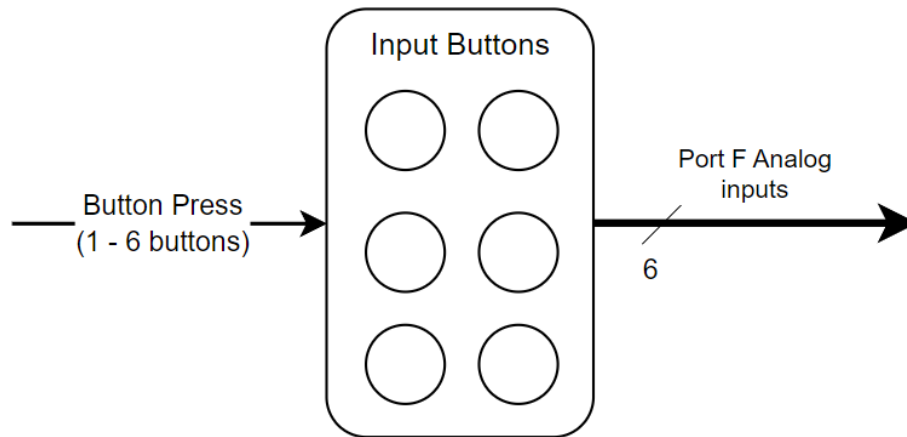


Microcontroller: Level 1



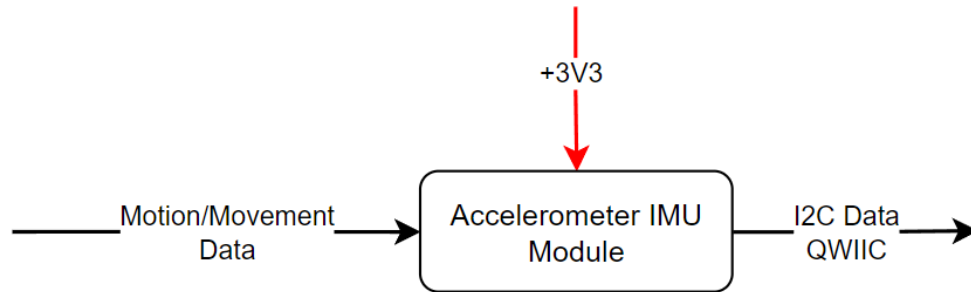
Module	Microcontroller (ATmega32u4)
Inputs	<p><u>Port F Analog inputs</u>: 6 analog inputs (pullups) to microcontroller's ADC</p> <p><u>I2C Data (QWIIC)</u>: 6 DoF IMU data in I2C communication protocol from accelerometer/IMU module. QWIIC is Sparkfun's I2C interface connection system for prototyping.</p> <p><u>+3V3</u>: +3.3V DC power for Microcontroller</p> <p><u>USB Programming Data Signals</u>: USB D+/D- programming signals to program the microcontroller behavior.</p> <p><u>VBUS (+4.5 - 5.5V)</u>: Supply from USB for programming, supplying the microcontroller</p>
Outputs	<u>I2C Data</u> : I2C communication protocol data for graphics and animation on the Liquid Crystal Display module.
Functionality	Microcontroller block is the small computer that converts inputs from buttons and accelerometer module into output game graphics and animations on the LCD screen. It is the processor of the system.

Input Buttons: Level 1



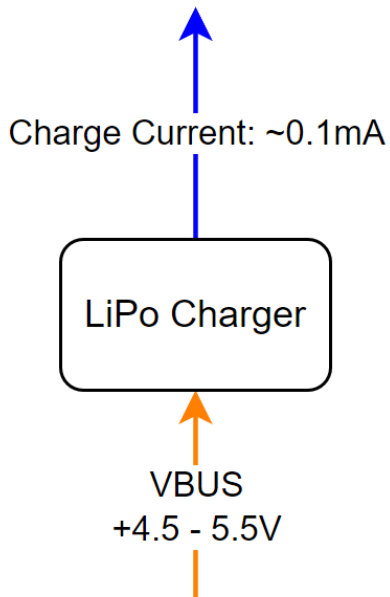
Module	Input Buttons
Inputs	<u>Button Press (1-6 buttons)</u> : 6 tactile (pullup) buttons pressed by the user. User presses 1 of the 6 buttons.
Outputs	<u>Port F Analog inputs (to microcontroller)</u> : 6 analog inputs (pullups) to microcontroller's ADC
Functionality	User presses 1 of the 6 tactile buttons which acts as analog input to the microcontroller's ADC on Port F. These buttons are pulled up (high) and the active input is low.

Accelerometer IMU Module: Level 1



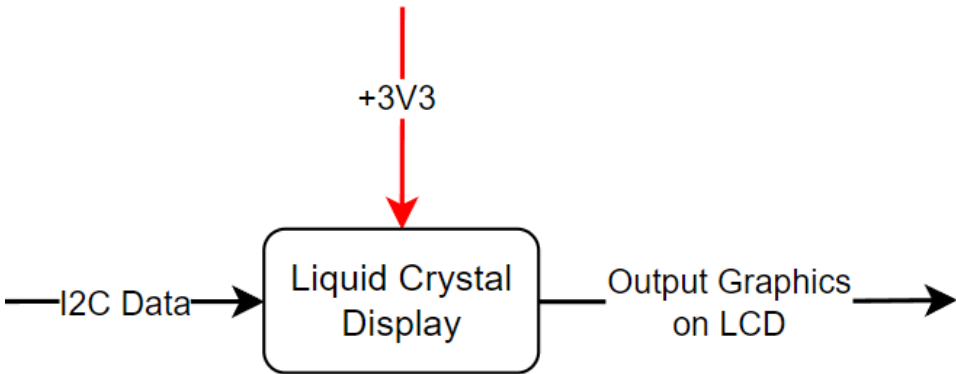
Module	Accelerometer IMU Module
Inputs	<u>Motion/Movement Data</u> : Data that is generated by physically moving and orienting the Accelerometer module in 3D space. Captured by the Accelerometer module. <u>+3V3</u> : +3.3V DC power for the Accelerometer IMU module
Outputs	<u>I2C Data (QWIIC)</u> : 6 DoF IMU motion data in I2C communication protocol (acceleration, orientation, etc.). QWIIC is Sparkfun's I2C interface connection system for prototyping.
Functionality	Moving the accelerometer IMU module around in 3D space will capture motion data (acceleration, orientation, etc.) and output this data to the microcontroller using I2C communication protocol.

LiPo Charger: Level 1



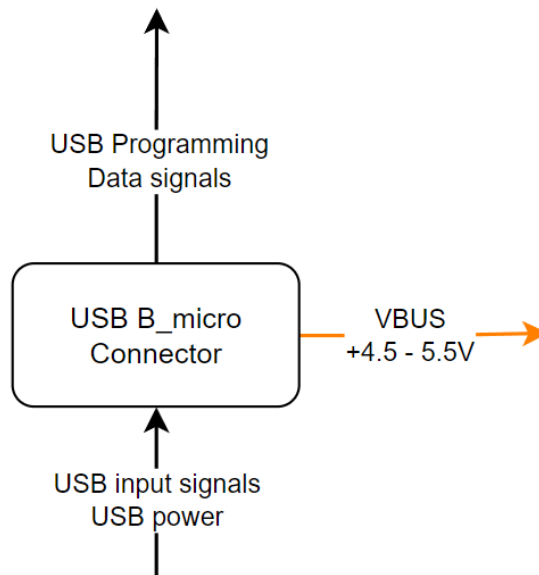
Module	LiPo Charger (MCP73831)
Inputs	<u>VBUS (+4.5 - 5.5V)</u> : Supply from USB VBUS supplying the LiPo charger and charging the LiPo battery.
Outputs	<u>Fast charge current</u> : ~0.1mA $I_{REG} = \frac{1000V}{R_{PROG}} \text{ where } R_{PROG} = 10k\Omega$
Functionality	Charges the LiPo battery in the system. The fast charge current is around 0.1mA.

Liquid Crystal Display: Level 1



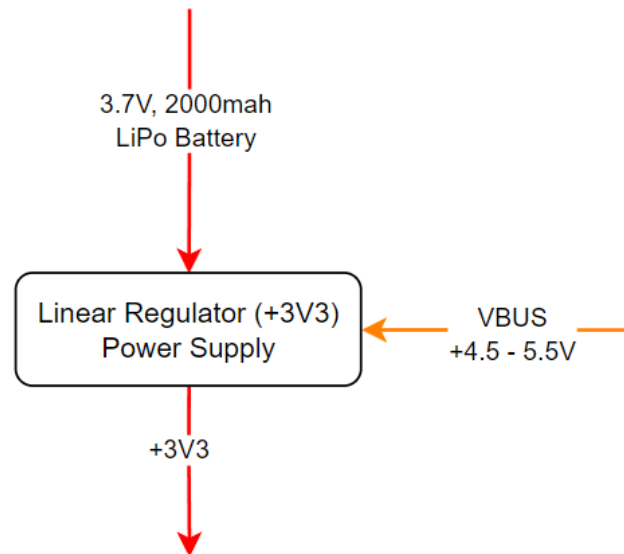
Module	Liquid Crystal Display (2.8" TFT LCD from adafruit)
Inputs	<u>+3V3</u> : +3.3V DC power for LCD module <u>I2C Data</u> : I2C communication protocol data from the microcontroller to the Liquid Crystal Display module.
Outputs	<u>Output Graphics on LCD</u> : The game console's graphics and animations displayed to the user on the LCD's pixels.
Functionality	This LCD displays the video game console's graphics and animations. The I2C data is sent to the LCD and the LCD controls the pixels on the LCD based on this data sent.

USB B_micro Connector: Level 1



Module	USB B_micro connector
Inputs	<u>USB input signals/USB Power</u> : USB communication protocol and power supply. USB input signals and power come from a Desktop or laptop running Arduino IDE with USB driver.
Outputs	<u>USB Programming Data Signals</u> : USB D+/D- programming signals to program the microcontroller behavior. <u>VBUS (+4.5 - 5.5V)</u> : Supply from USB, supplying the microcontroller, charging the LiPo Battery, source for Linear regulator
Functionality	This is the connector for the USB communication protocol. The connector takes USB D+/D- to program the microcontroller. The connector also fans out the VBUS supply to the microcontroller, LiPo charger, and Linear regulator

Linear Regulator (+3V3) Power Supply: Level 1



Module	Linear Regulator (+3V3) Power Supply
Inputs	<u>VBUS (+4.5 - 5.5V)</u> : Supply from USB, supplying the microcontroller, charging the LiPo Battery, source for Linear regulator (+3V3) <u>3.7V, 2000mah LiPo Battery</u> : Lithium Polymer battery source for the hand-held game console. Charged using LiPo Charger component
Outputs	<u>+3V3</u> : +3.3V DC power for LCD module, Microcontroller, accelerometer IMU module.
Functionality	This is the power supply for the hand-held game console. It regulates the power by delivering a steady +3.3V DC supply to the microcontroller, LCD module, and accelerometer IMU module.