# Q1 Power subsystem

## Q1.1 Specification

Charging module:

* Voltage input: 5V
* Voltage output to battery: 4.1V
* Current input: 0.5A
* Overcharge protection: regulates up to 18V down to 5V

Power supply:

* Voltage: 3.235V – 3.365V
* Current: 27mA
* Overcharge protection: regulates up to 18V down to 3.3V
* Schottky diode polarity protection
* Zener diode undercharge protection

## Q1.2 Draft BOM

Table, Excel

Description automatically generated

With the extra $3 for each extended part, the total cost is $9.2346.

https://github.com/murrayinglis/EEE3088-group-09/blob/main/PCB/SCHEMATICS/BOM.xlsx

## Q1.3 Interfacing

* STM32 - providing power at 3.3V.
* HAT - providing power to the circuitry at 3.3V.
* Battery level sensor – outputs battery voltage.
* Battery - drawing power
* Battery - charging

# Q2 Microcontroller interfacing

## Q2.1 Specification

Micro-usb:

* Name: USB 2.0 Surface Mount Female Micro-B SMD
* Part number: C404969
* Current rating: 1.8A
* Voltage rating: 30V

EEPROM:

* Name: HX24LC02B EEPROM
* Part number: C2987267
* Operating voltage: 1.7V – 5.5V
* Operating read current: 1mA
* Operating write current: 3mA

## Q2.2 Draft BOM

Table

Description automatically generated

With the extra $3 for each extended part, the total cost is $3,1473.

https://github.com/murrayinglis/EEE3088-group-09/blob/main/PCB/SCHEMATICS/BOM.xlsx

## Q2.3 Interfacing

* Battery to draw power.
* Analogue sensor to ADC pin of the STM (pin VBAT).
* The digital sensor to I2C pins of the STM (pins PB10 and PB11).
* Debugger on pins NRST, T\_SWCLK, T\_SWDIO.
* EEPROM on pins PA9 and PA10
* FTDI serial header on pins PA7, PA8, PA11.

# Q3 Sensing

## Q3.1.1 Digital Sensor Specification

Optical sensor:

* Name: LTR-303ALS-01
* Supply voltage: 2.4V - 3.6V
* Interface bus supply voltage: 1.7V - 3.6V
* I2C Bus Input Pin High Voltage: 1.2V
* I2C Bus Input Pin Low Voltage: 0.6V
* Operating temperature: -30°C – 70°C
* Active supply current: 220uA
* Standby current: 5uA
* Initial startup time: 100ms
* Wakeup time from standby: 10ms

## Q3.1.2 Analogue Sensor Specification

Battery sensor:

* Output voltage: 0V - 2.5V
* Output current: 27mA

## Q3.2 Draft BOM

Table

Description automatically generated

With the extra $3 for each extended part, the total cost is $3,4073.

https://github.com/murrayinglis/EEE3088-group-09/blob/main/PCB/SCHEMATICS/BOM.xlsx

## Q3.3 Interfacing

## Q3.1.1 Digital Sensor Interfacing

* STM on pins PB10 and PB11
* 3.3V from power supply

## Q3.1.2 Analogue Sensor Interfacing

* STM on pin VBAT
* Battery voltage from battery