

Project Title: Establish communication with battery module balancing board and demonstrate integration with control and SCADA platforms

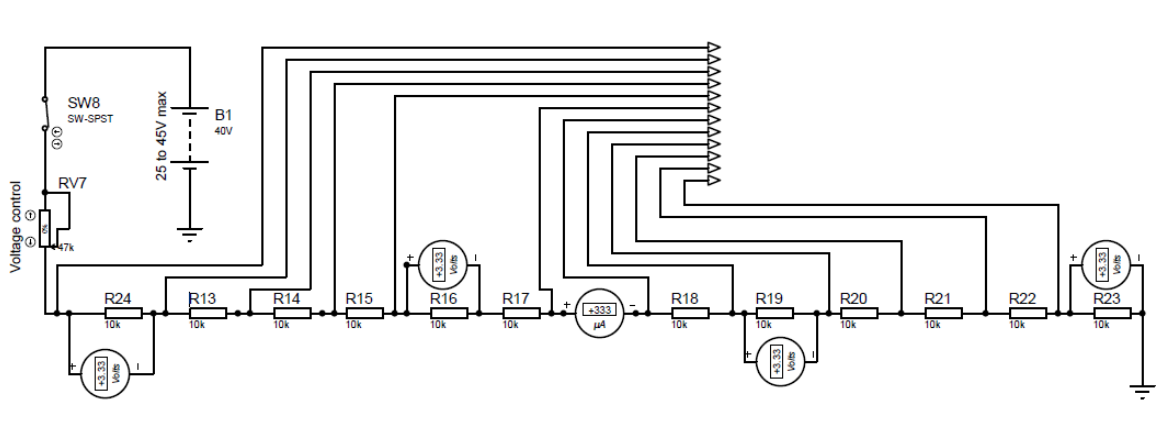
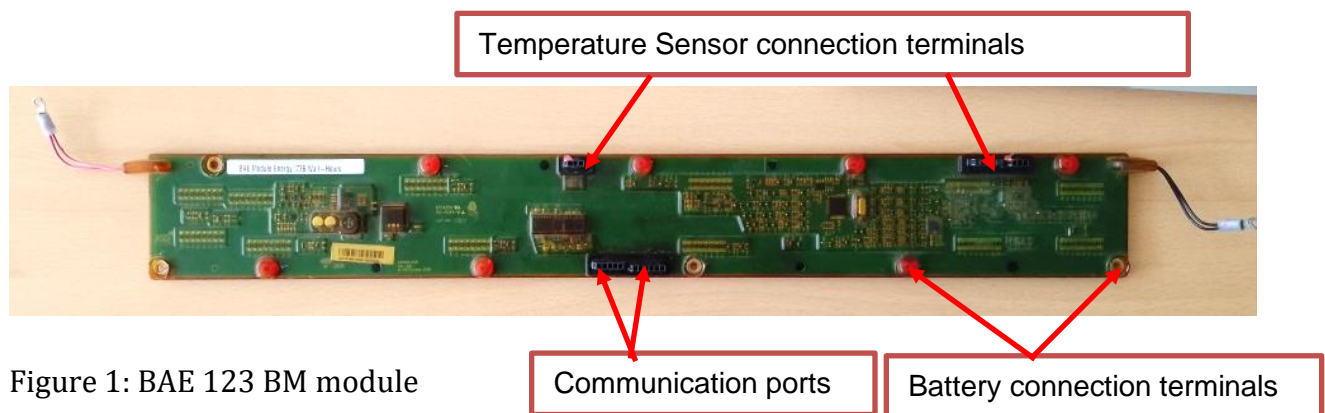
Author: Emenike Goodluck

Email: egoodluc@alumni.cmu.edu

Task 2: Migrating existing script from Arduino to Raspberry pi

2.1 Design of the mock battery module

The battery balancing board handles 12 series connected cells. The power supply in the design is able to output a variable DC voltage to simulate the batteries. The figures below show the design, equipment and physical connection of the mock battery module.



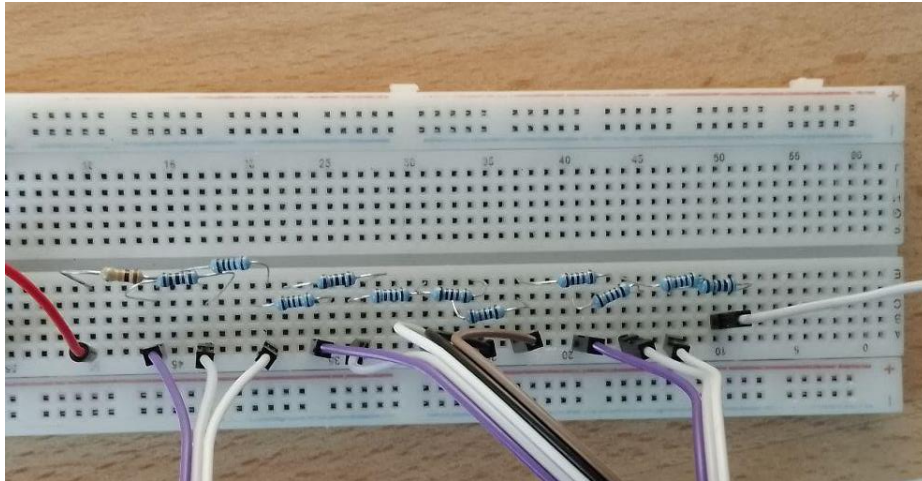


Figure 3: Physical connection of the mock battery module.



Figure 4: Automatic voltage stabilizer

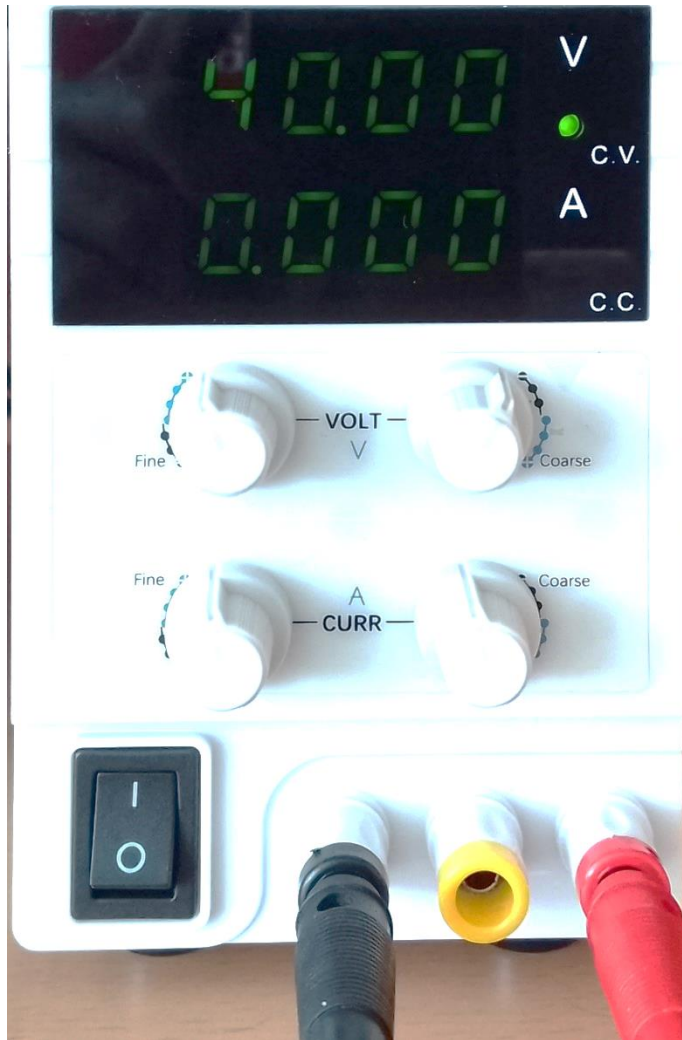


Figure 5: 0 to 60 VDC power supply (110 VAC input)

Task 2: Migration of existing communication script from Arduino to Raspberry pi

2.1 Items required

- Raspberry pi
- Hookup wires
- BAE 200 battery management module
- Mock battery modules (or A123 systems battery module)
- Breadboard
- Power supply (30 to 50v)

- Buzzer
- 3.3V/5V logic level converter
- Laptop (assumed that the required software is installed)

Three (3) modules were used for the test. All you need to do is to modify the code to match the number of modules that you have. The logic converter is shown below:

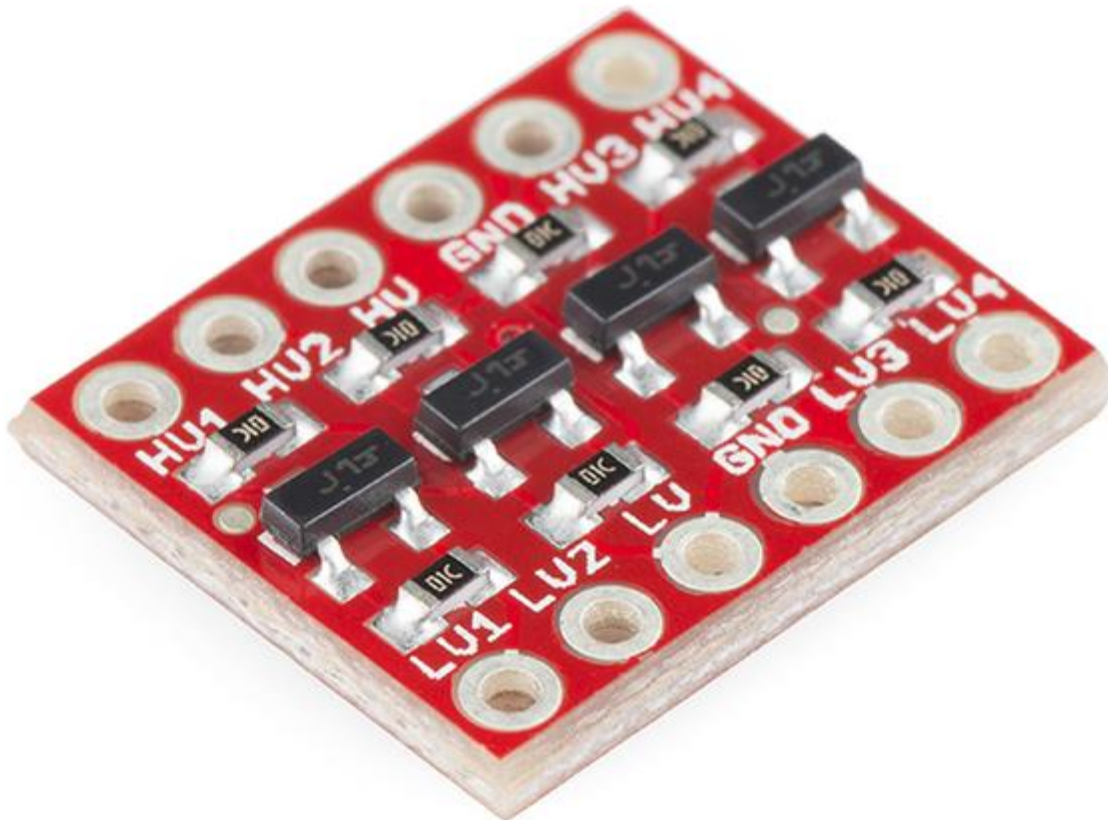


Figure 6: Logic converter

2.2 Setting up the connection with Raspberry pi

The pinout of the BM is shown below

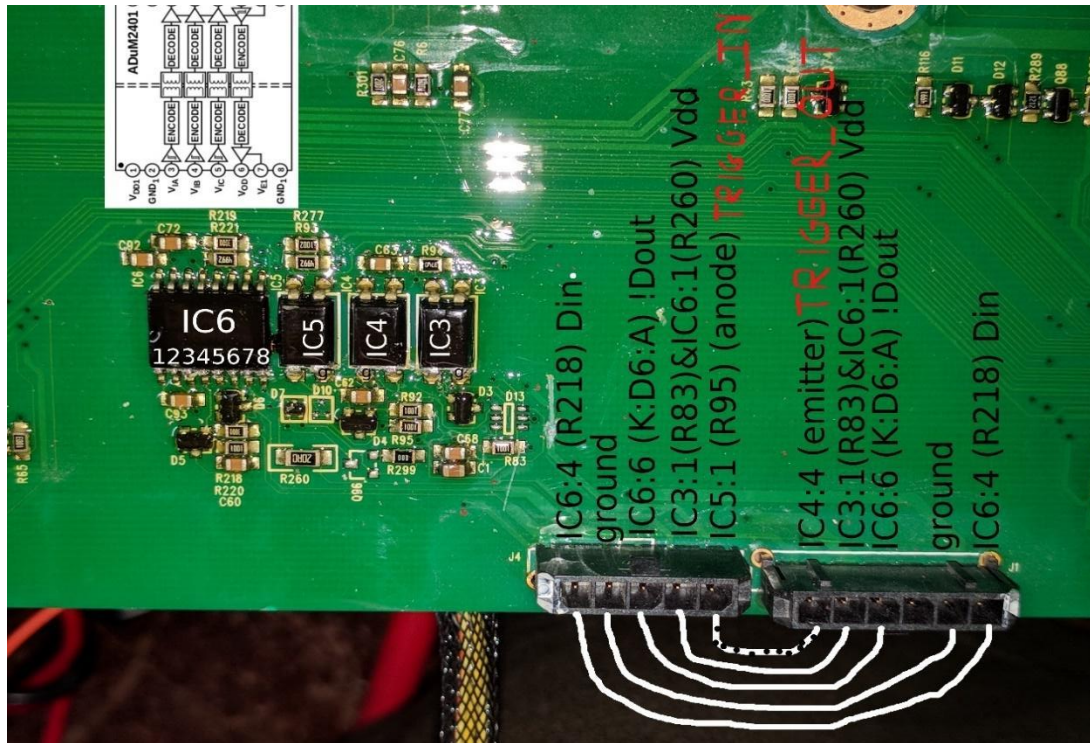


Figure 7: Pinout of the BM

Table 1: Pin connections between Rpi, BM and Logic converter

BM 1 (Left connector)	Logic Converter		Rpi
Din (Rx)	HV1	LV1	Tx
GND	GND	GND	GND
!Dout (Tx)	HV2	LV2	Rx
VDD (5V)	HV	LV	3.3V
Anode (Trigger_In)	No Connection	No Connection	Pin 23

After connecting the first BM to Raspberry pi through the logic converter, connect other BMs in chain starting from the first module.

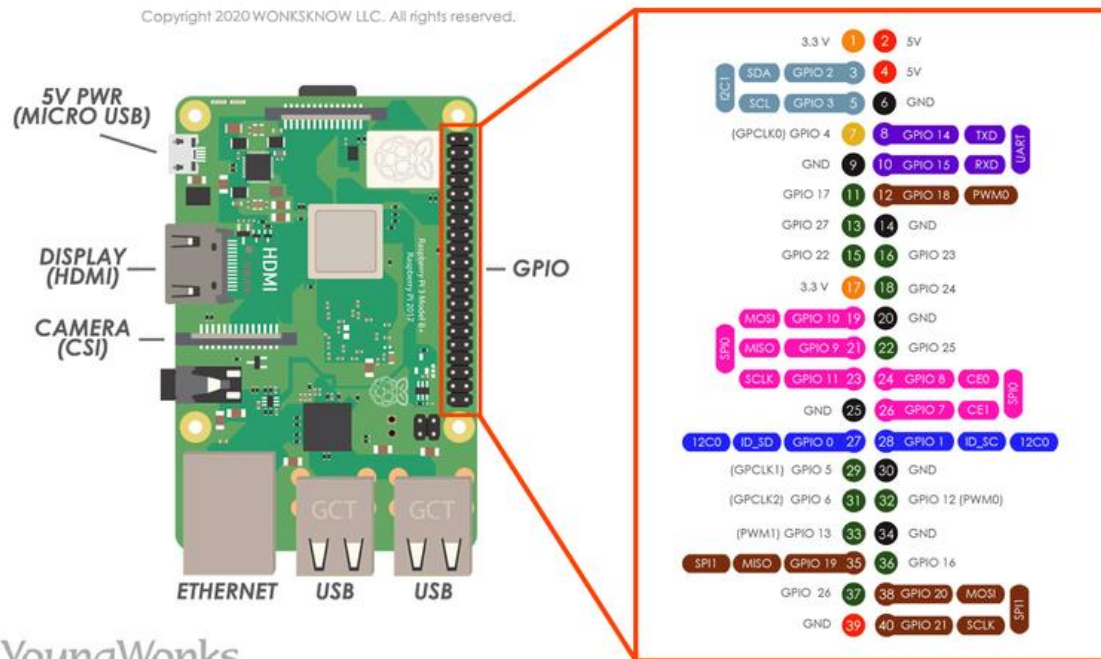


Figure 8: Raspberry pi 4 pinout

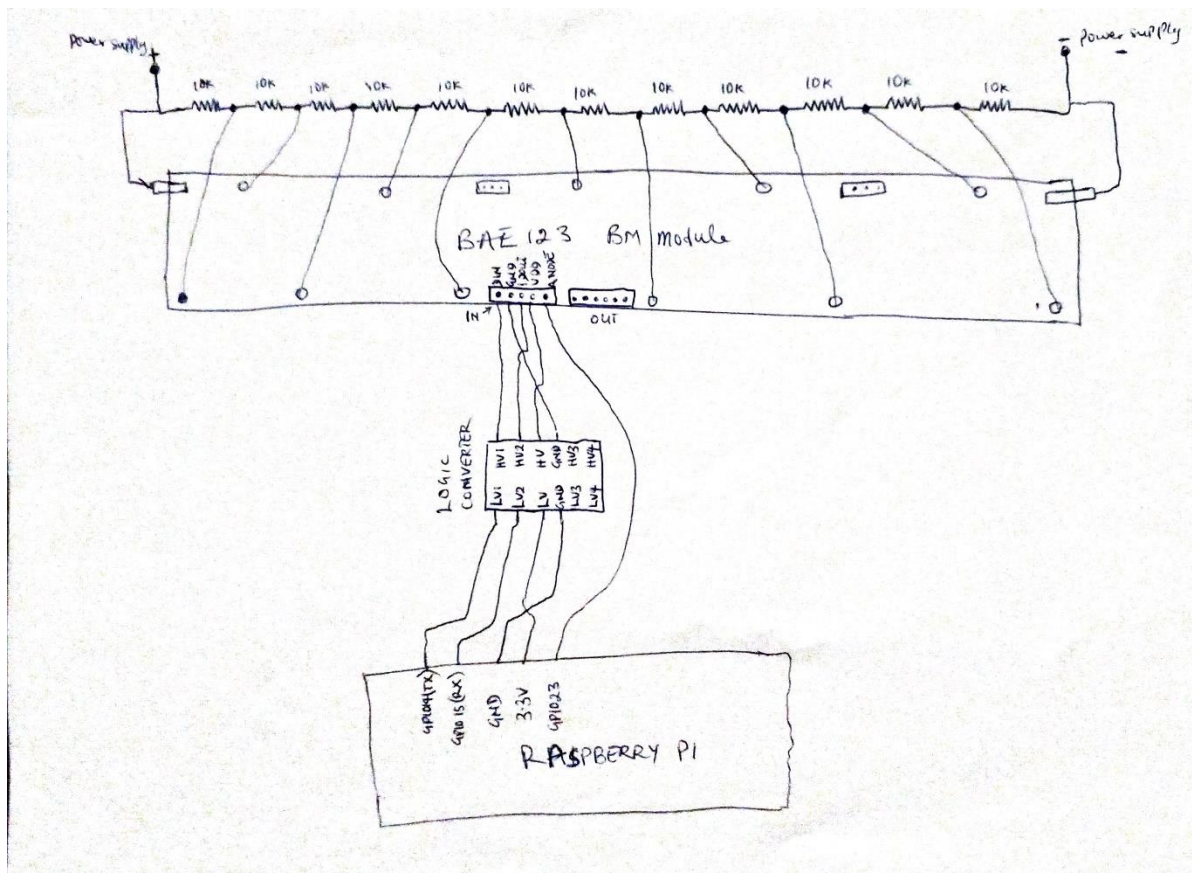


Figure 9: Connection schematics

2.3 Testing multiple BMs on Raspberry Pi

If you want to debug the signal using logic analyzer, you can refer to the Arduino setup on adding the logic analyser to the circuit.

Now the connection is complete, SSH to the raspberry pi and run the “**controlModule.py**” program to test the circuit.