Lab9 description

System A

- For safety, please, remember and make sure to unplug your Launchpad from the USB port before making any hardware changes.
- Connect jumper wires as shown in Figure 1. This is a BH EDU board with a Raspberry Pi pico board.
- The power wires between the Raspberry pi pico board and BH EDU board were already pre-wired. Please, do not remove these power wires.
- For System A, you do not need a power supply or a battery pack connected. You can connect the power supply or battery pack for System B.

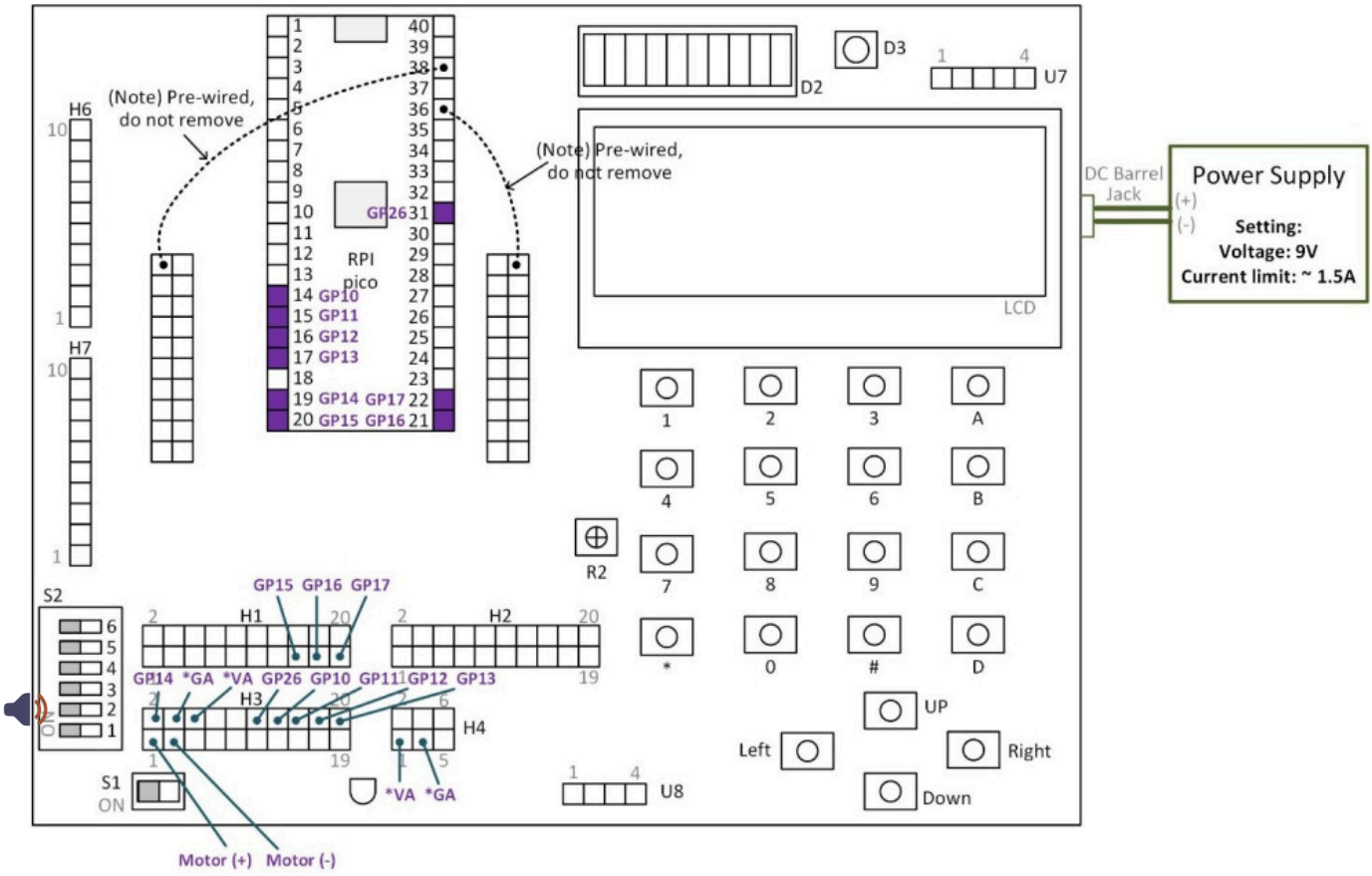
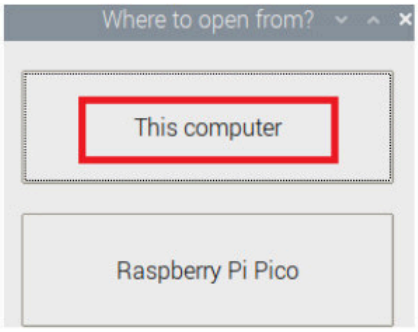


Figure 1. Connection diagram

- Students need to write a Micro-Python program for a Raspberry Pi pico.
- (Note) When it prompts in Thonny like the window below, make sure to choose “This computer”. For reference, if you happen to choose “Raspberry Pi pico”, the program will be stored in a Raspberry Pi pico. Make sure to delete any file that you stored in Raspberry Pi pico when you return your lab kit.



- For System A, you will write a program to implement the following functions.
  - ADC(0) is connected to the potentiometer. As it was tweaked, a converted voltage should keep printing on the shell sub-window at a reasonable speed. The full range of the voltage is 0 to 3.3V as the potentiometer is turned all the way to the right or left turn.
  - ADC(4) is connected to the internal temperature sensor. Perform the temperature conversion to a degree Fahrenheit and keep printing the converted value on the shell sub-window at a reasonable speed.
  - The RGB LED should work depending on the converted voltage by the potentiometer as follows:

Voltage < 1V	Turn off (Black)
1V ≤ Voltage < 2V	Turn on, RED color
2V ≤ Voltage < 3V	Turn on, GREEN color
Voltage ≥ 3V	Turn on, BLUE color

Table 1. RGB LED function

- Fill out the following tables when measured for ADC(0) and ADC(4). Make sure to include the tables in your lab report.

	adc_raw (u16)
Case 1 (1 V)	
Case 2 (2 V)	

Table 2. ADC(0) measurement / Potentiometer

	adc_raw (u16)	Converted temperature (°F)
Case 3		

Table 3. ADC(4) measurement

System B

- For System B, now, you need to connect a power supply, or a battery pack. There is an empty battery pack in the lab kit box. If the system is functional, you don't need to use a power supply once the hardware connection and the function are initially checked and confirmed. You can switch to a battery pack instead. It needs 6 AA batteries. Please bring your own batteries.
- For System B, you will write a program to implement the following functions.
  - If the “Up” button is pressed, the motor shaft should spin at a **fast** speed.
  - If the “Left” button is pressed, the motor shaft should spin at a **slow** speed.
  - If the “Down” button is pressed, the motor shaft should stop spinning.

- If the “Right” button is pressed, the motor shaft spin speed should be changed as the potentiometer is tweaked.
  (Note) For full credit, the “Right” button should be pressed once, then the motor speed can be changed as the potentiometer is tweaked. If the “Right” button needs to be kept being pressed multiple times to change the motor speed, it is NOT worth full credit.

- Make sure to complete the lab check-off assignment (Lab9-50X) posted on CANVAS before the given deadline. The code files should be submitted as a part of the lab check-off assignment. Laboratory assignment deadlines are 15 minutes before the end of your registered laboratory session.