

USER'S MANUAL

1. AVR lab board

Figure 1 shows a picture of the assembled lab board that contains peripherals, connectors, and the Arduino MEGA 2560 R3 microcontroller board. The serial number of my lab board is #168.

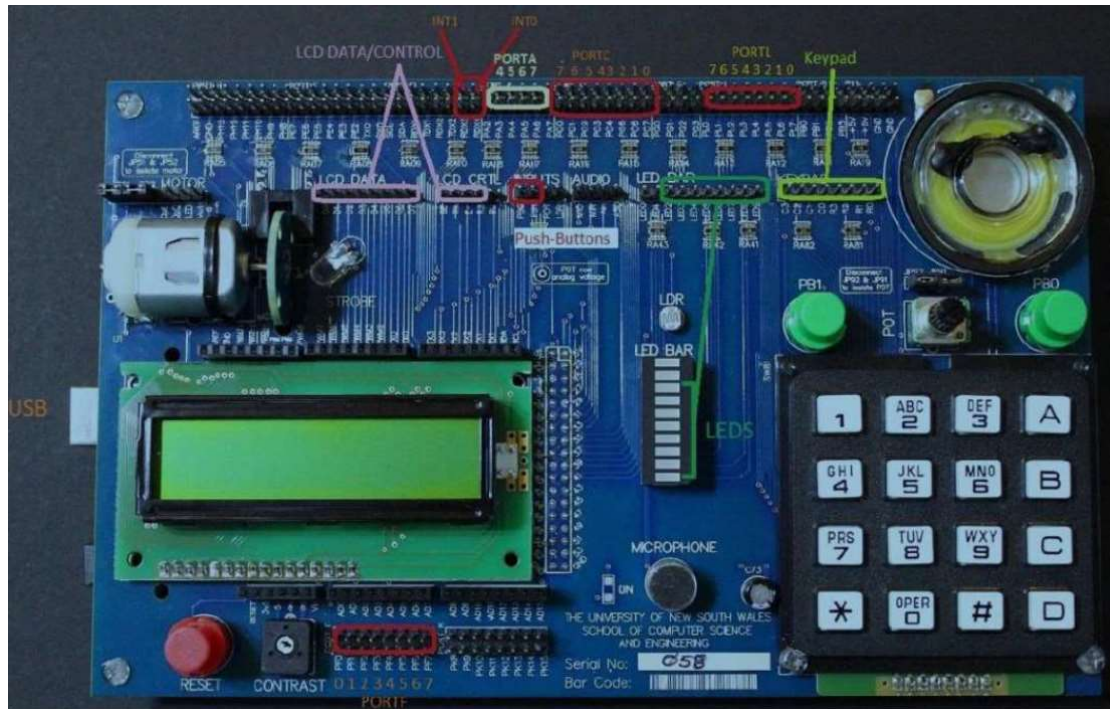


Figure 1: AVR Lab Board

2. Wiring

This wire connection worked on AVR lab board #168.

AVR Pins (top and bottom row)		Input/Output Device Pins (middle row)	
Port Group	Pin	Port Group	Pin
PORT F	PF0	LCD DATA	D0
PORT F	PF1	LCD DATA	D1
PORT F	PF2	LCD DATA	D2
PORT F	PF3	LCD DATA	D3
PORT F	PF4	LCD DATA	D4
PORT F	PF5	LCD DATA	D5
PORT F	PF6	LCD DATA	D6
PORT F	PF7	LCD DATA	D7
PORT E	PE2	MOTOR	Mot
PORT D	RDX4	INPUTS	PB0
PORT D	RDX3	INPUTS	PB1
PORT A	PA4	LCD CTRL	BE
PORT A	PA5	LCD CTRL	RW

PORT A	PA6	LCD CTRL	E
PORT A	PA7	LCD CTRL	RS
PORT C	PC0	KEYPAD	C3
PORT C	PC1	KEYPAD	C2
PORT C	PC2	KEYPAD	C1
PORT C	PC3	KEYPAD	C0
PORT C	PC4	KEYPAD	R3
PORT C	PC5	KEYPAD	R2
PORT C	PC6	KEYPAD	R1
PORT C	PC7	KEYPAD	R0
PORT L	PL0	LED BAR	LED2
PORT L	PL1	LED BAR	LED3
PORT L	PL2	LED BAR	LED4
PORT L	PL3	LED BAR	LED5
PORT L	PL4	LED BAR	LED6
PORT L	PL5	LED BAR	LED7
PORT L	PL6	LED BAR	LED8
PORT L	PL7	LED BAR	LED9
P11	+5V	MOTOR	OpE

3. Initial State

Figure 2 shows an initial state of the lab board. ‘G’ represents the initial state of the drone, which means the drone is grounded at the beginning.

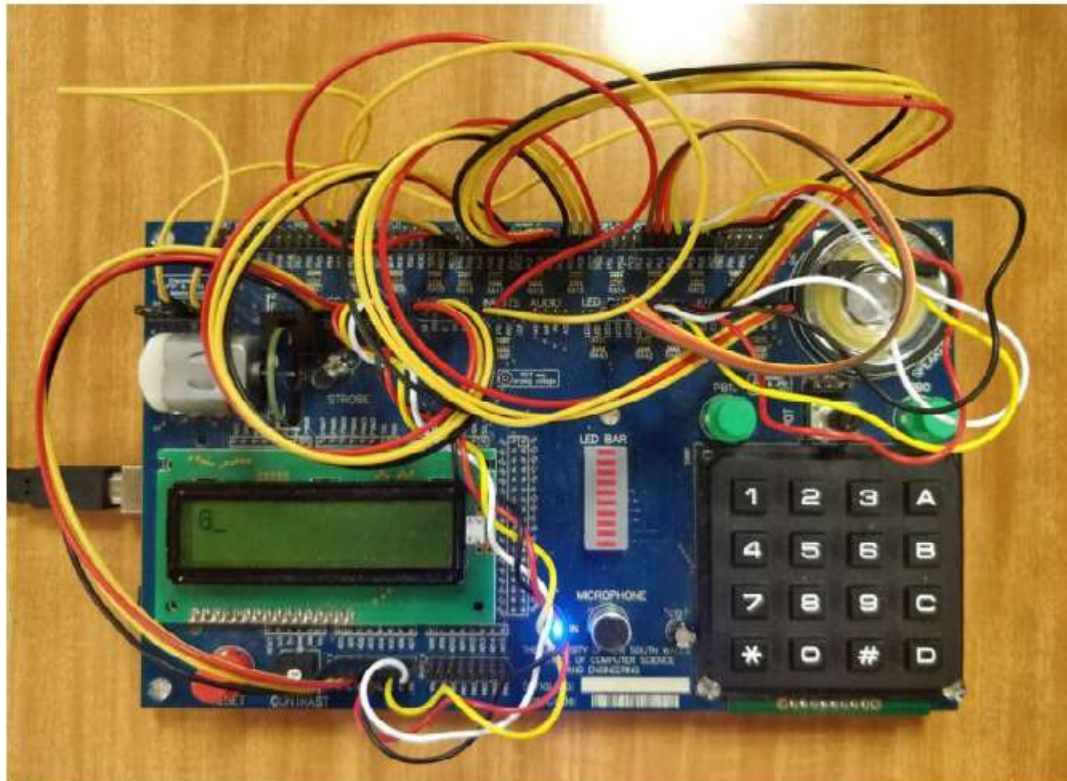


Figure 2: Initial State

4. Start

Figure 3 shows a picture of the start state. After pressing PB0 to start the program, the LED lights is going to flash. When it flashes three times, then you can start to input the location of the accident.

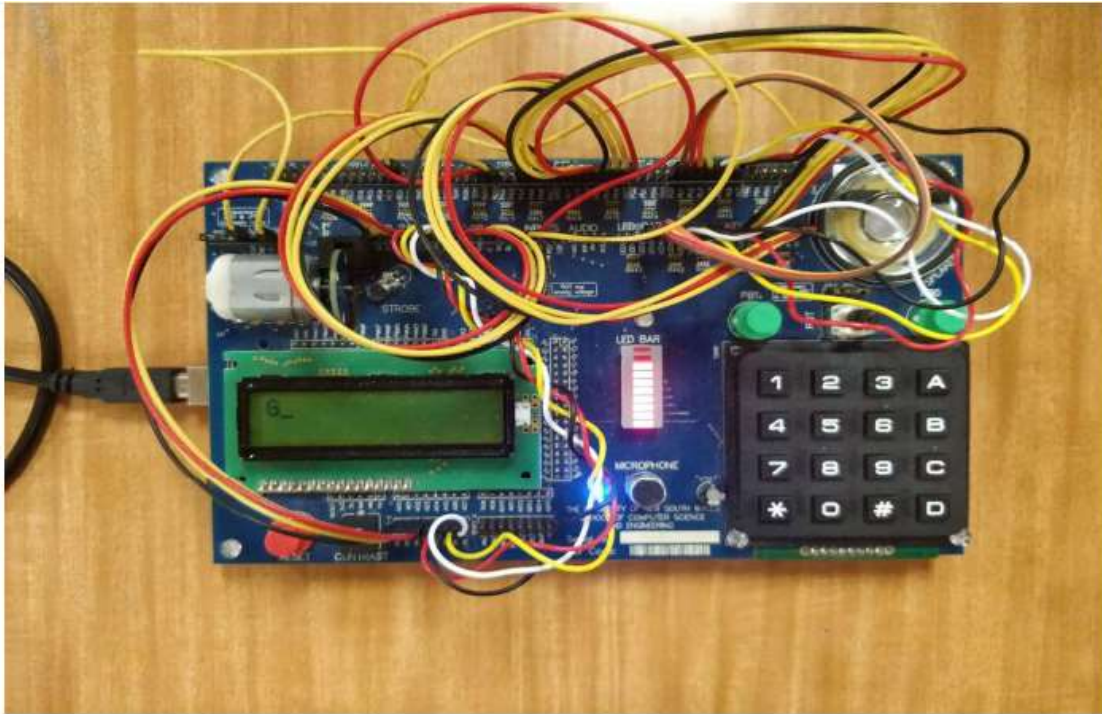


Figure 3: Start

5. Input State

Figure 4 shows a picture of Input State, which is a state waiting for the user to input.

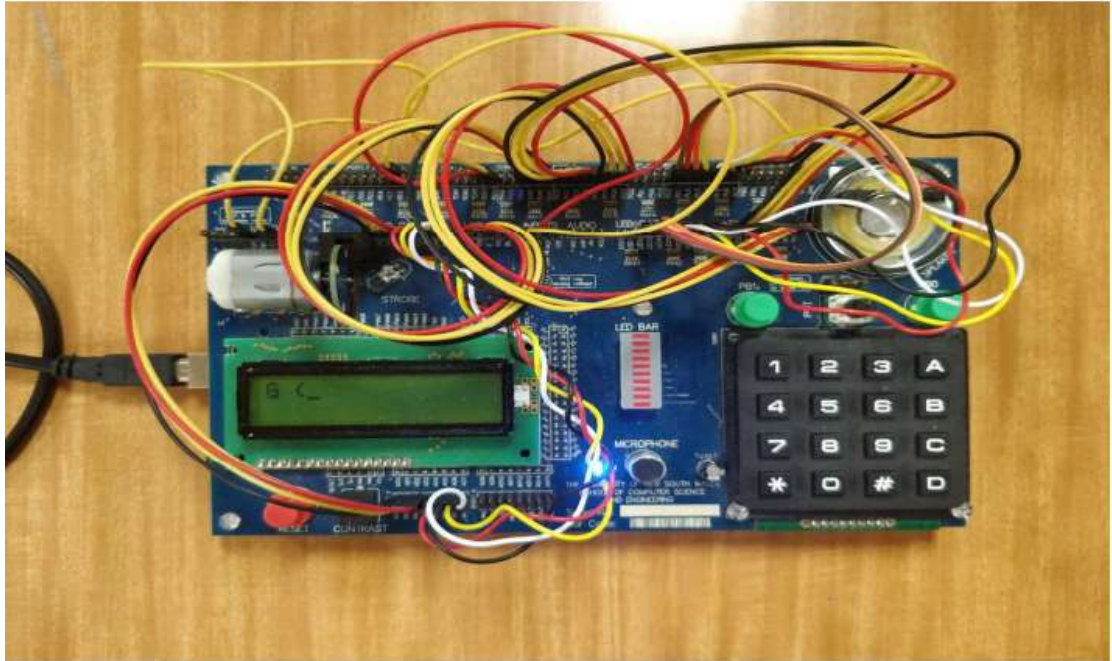


Figure 4: Input State

6. Input Accident Location

Figure 5 ~ Figure 7 show every step of inputting accident location, which has two parameters x and y.

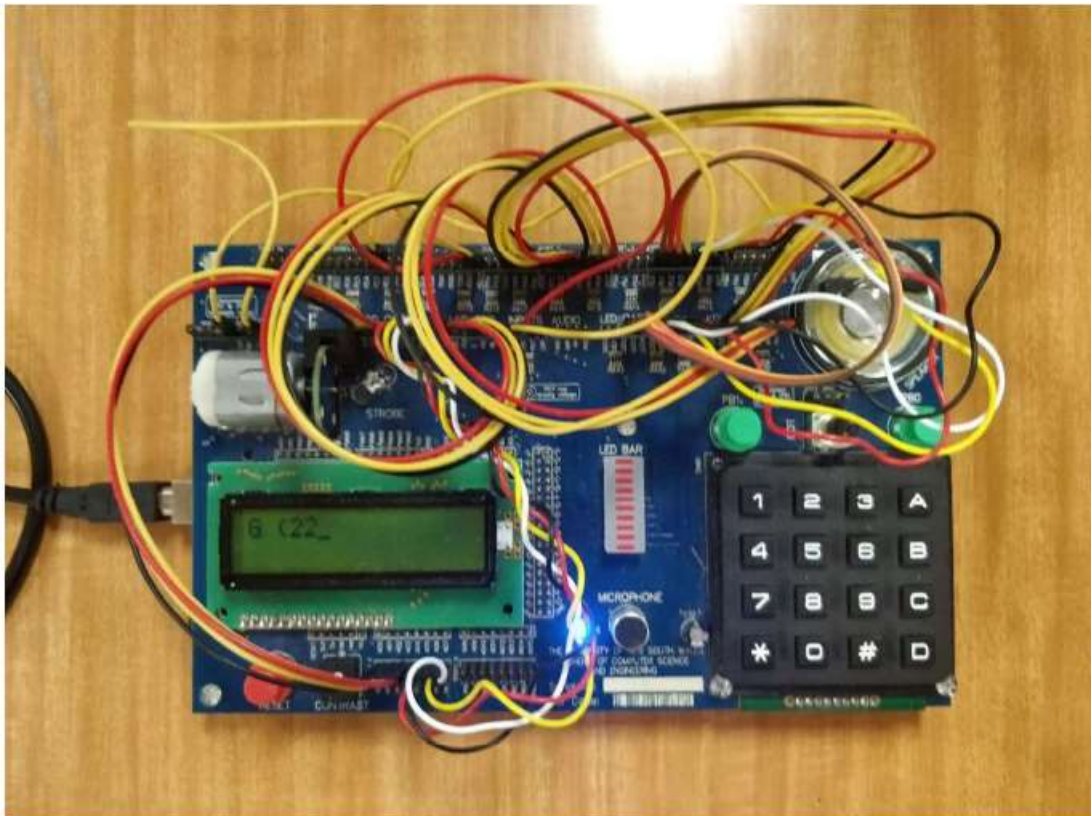


Figure 5: Input the x value

Figure 5 shows what is on the LCD when the user input the x value of the accident location. Here we take 22 as an example.

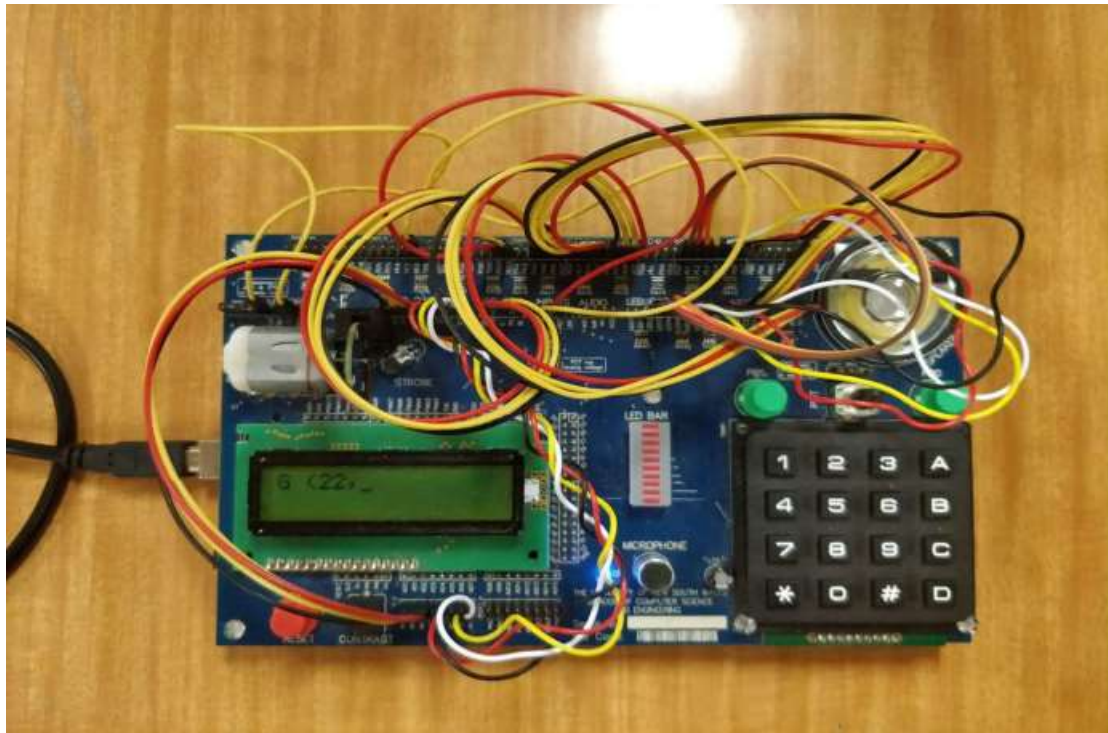


Figure 6: End of the x value

After pressing '*' key, there comes a comma on the LCD. This means the input of the first value x is finished, and the user can input next value y now.

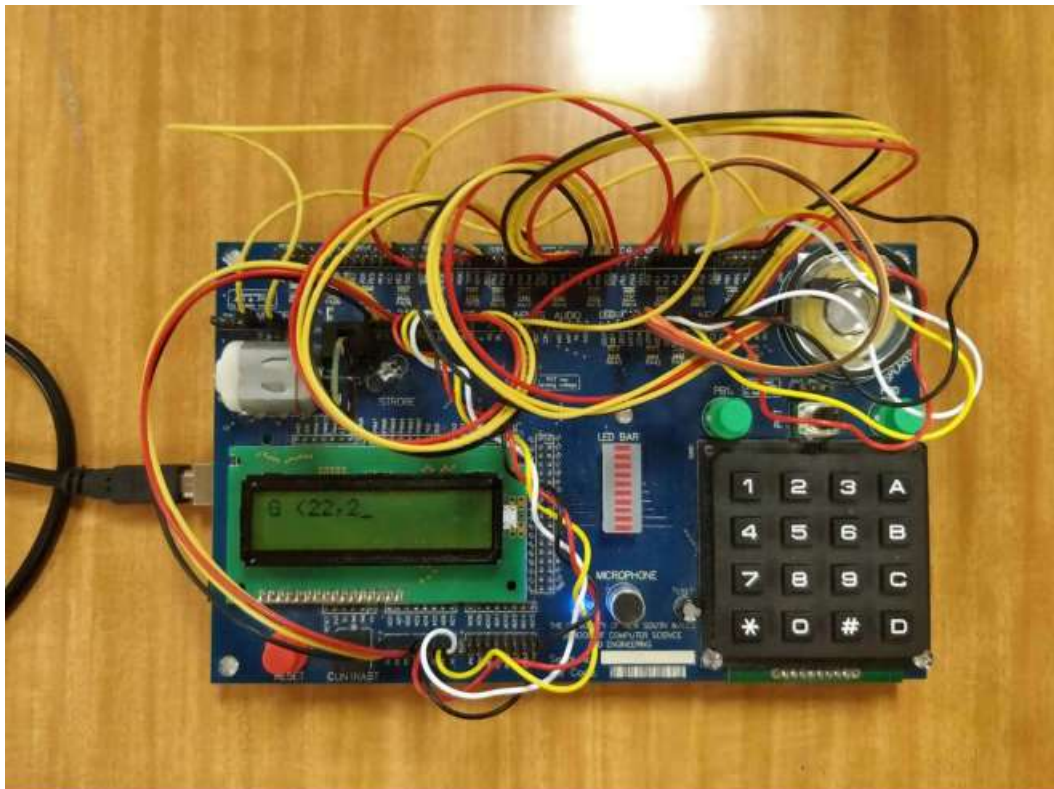


Figure 7: Input the y value

Figure 7 shows that LCD displays what you input for y value of the accident location. Then user can press '#' to end the input of the y value, and it means user has already finished the input of the accident location. After this operation, the search will start automatically.

7. Search State

Figure 8 shows the picture of searching procedure. The LCD displays the current location of the drone with state 'S' and x, y, height in the first line. And LCD displays 'not found' in the second line, and this means it have not found the location yet.

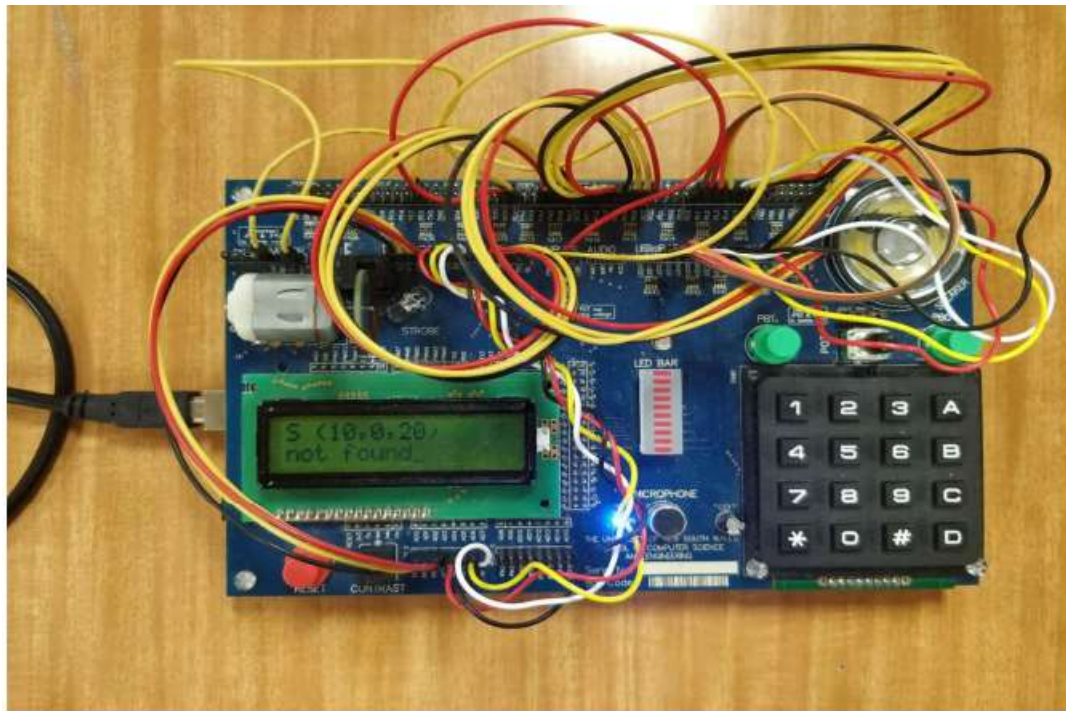


Figure 8: Searching

8. Found Accident

Figure 9 shows what displays on the LCD when the program found the location with x, y and height, and it also has a state of the drone meaning grounded. Since the drone needs to fly back, so the result will keep on the LCD for about 3 seconds.

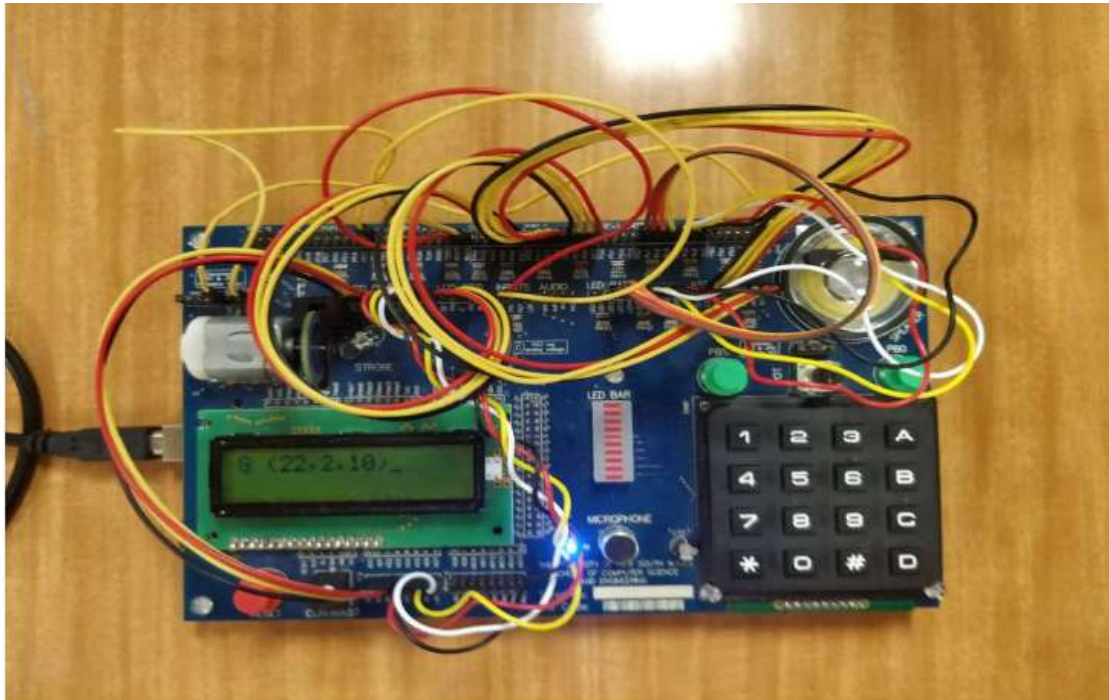


Figure 9: Found the accident location

9. Fly Back

Figure 10 shows what display on the board when the drone flies back.

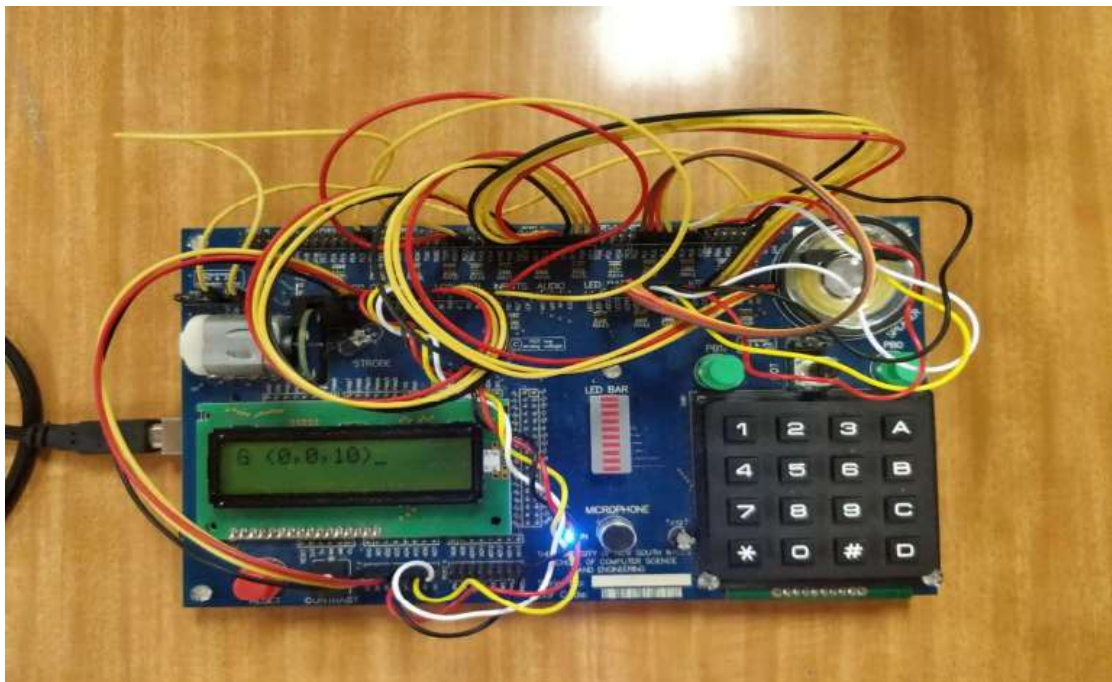


Figure 10: Drone flies back

10 Abort State

Figure 11 shows the Abort State. Every time user press PB1 to input 'Abort' state to the program,

the LCD displays Figure 11.

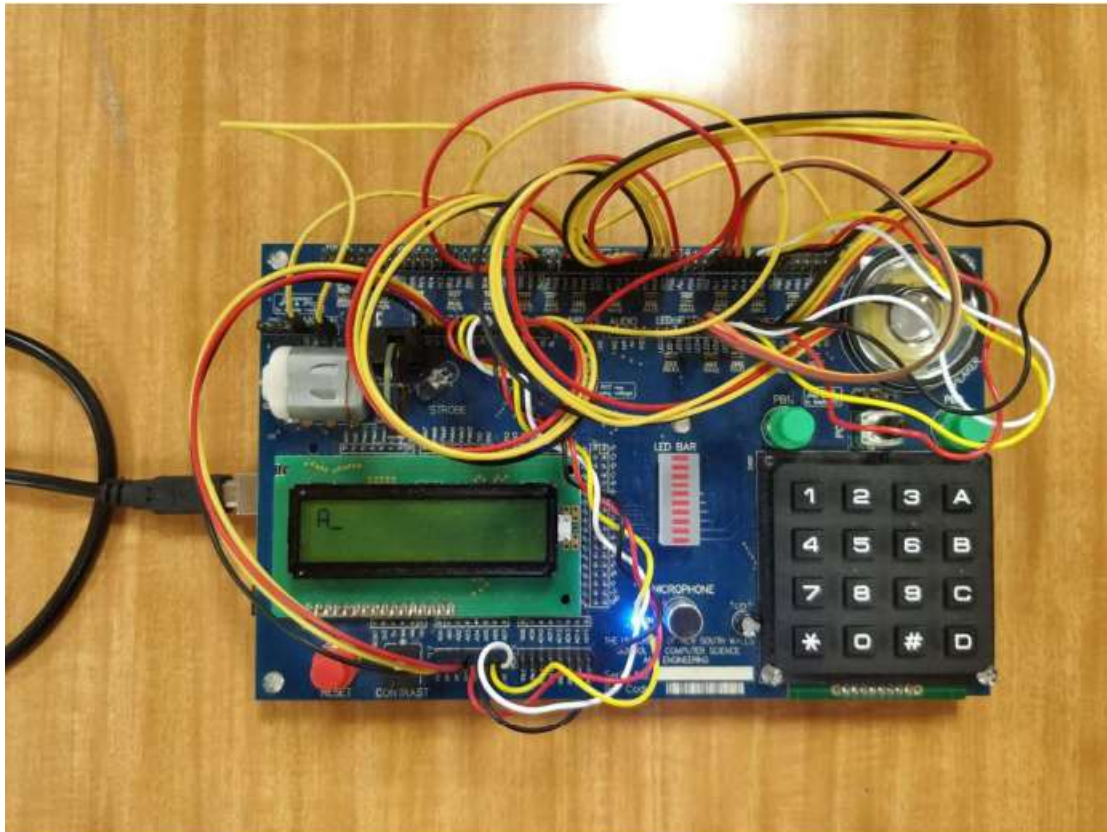


Figure 11: Abort State