Drone Simulation User Manual

Jack Jiang (z5129432)

This user manual describes how to use the emulating system, including:

- Wire connection.
- User interaction.

Wire Connection:

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 K	PK8	INPUTS	POT
PORT K	PK9	INPUTS	LDR
PORT K	PK10	AUDIO	MiO
PORT E	PE5	LCD CTRL	BL
PORT E	PE3	AUDIO	Ain
PORT E	PE2	MOTOR	Mot
PORT D	TDX2	MOTOR	OpO
PORT D	RDX3	INPUTS	PB1
PORT D	RDX4	INPUTS	PB0
PORT A	PA2	-	-
PORT A	PA3	MOTOR	LED
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	LED BAR	LED2
PORT C	PC1	LED BAR	LED3
PORT C	PC2	LED BAR	LED4
PORT C	PC3	LED BAR	LED5
PORT C	PC4	LED BAR	LED6
PORT C	PC5	LED BAR	LED7
PORT C	PC6	LED BAR	LED8
PORT C	PC7	LED BAR	LED9
PORT G	PG0	-	-
PORT G	PG1	AUDIO	ASD
PORT G	PG2	LED BAR	LED0
PORT G	PG3	LED BAR	LED1
PORT L	PL0	KEYPAD	C3
PORT L	PL1	KEYPAD	C2
PORT L	PL2	KEYPAD	C1
PORT L	PL3	KEYPAD	C0
PORT L	PL4	KEYPAD	R3
PORT L	PL5	KEYPAD	R2
PORT L	PL6	KEYPAD	R1
PORT L	PL7	KEYPAD	R0
P11	+5V (any)	MOTOR	OpE

User Interaction:

1. USER INPUT:

When resetting the board, the system is waiting for keypad input in order to get the accident location.

```
INPUT X: _
```

First input the location of x, which in range 0 to 63, press # to confirm.
Then input the location of y, which in range 0 to 63, press # to confirm.
If the input is out of range, a warning will be displayed and the system will ask you to input again.

```
INPUT OV
TRY AGAIN
```

If the input is valid, after being confirmed, the system will display current status and current location.

```
STATUS: GROUNDED
X: 0, Y: 0, Z: 30
```

Then the system will be waiting. When left button is pressed, the drone will begin to take off.

2. TAKE OFF:

LED:

Display an “increasing” pattern, to simulate that drone is “charging energy”.

Motor:

The motor is full speed, to simulate that engine is running.

LCD:

Display the current location. x, y keep 0,0, while z increase from the ground to ground plus flying height.

```
STATUS: TAKE OFF
X: 0, Y: 0, Z: 30
```

```
STATUS: TAKE OFF
X: 0, Y: 0, Z: 31
```

…

```
STATUS: TAKE OFF
X: 0, Y: 0, Z: 39
```

3. SEARCH:

Motor:

The motor is full speed, to simulate that engine is running.

LCD:

Display the current location of drone.

```
STATUS: SEARCH
X: 25, Y: 3, Z: 99
```

When drone come to the accident point, it will stop searching and go to inspect step.

Search can be interrupted:

While the drone is searching, it can be interrupted by pressing the right button. After pushing this button, the drone will abort the mission and return to base immediately.

4. INSPECT:

Motor:

The motor is half speed, to simulate that drone is halting on the sky.

LED:

LED is flashing, to simulate that drone is inspecting.

LCD:

Display the current location of drone, which is the accident location.

```
STATUS: INSPECT
X: 62 Y:53, Z: 69
```

5. RETURN:

Motor:

The motor is full speed, to simulate that engine is running.

LCD:

Display the current location of drone.

```
STATUS: RETURN
X: 25, Y: 3, Z: 99
```

...

```
STATUS: RETURN
X: 0 Y: 0, Z: 39
```

When drone come to the base, it will start landing.

6. LANDING:

LED:

Display a “decreasing” pattern, to simulate that drone is “discharging energy”.

Motor:

The motor is full speed at first, to simulate that engine is running. After it lands to the ground, the motor stops, to simulate that the engine is stop.

LCD:

Display the current location. x, y keep 0,0, while z decrease from the ground plus flying height to the ground.

```
STATUS: LANDING
X: 0, Y: 0, Z: 39
```

```
STATUS: LANDING
X: 0, Y: 0, Z: 38
```

…

```
STATUS: LANDING
X: 0, Y: 0, Z: 30
```

6. REPORT:

The drone will display different information base on whether it finds the target or not.

If drone finds the target, which means it hasn’t been interrupted while searching, it will display the location of the accident.

```
ACCIDENT
X: 62 Y:53, Z: 69
```

If the drone couldn’t find the target, which means it has been interrupted while searching, it will display:

```
ACCIDENT
NOT FOUND
```