

User Manual

Descriptions:

1. Button Action

Button	Action
2	Forward(F)
4	Left(L)
6	Right(R)
8	Backward(B)
1	Up(U)
3	Down(D)
*	Hover
#	Take off / Land
PB0	Speed Up(1m/s every time with 0.5s delay)
PB1	Speed Down(1m/s every time with 0.5s delay)

2. LCD and LED

(1) Initial state:

Reset or connect with USB the LCD displays "Start:" on the upper left.

(2) Flying state:

During flight, the location, direction, and the speed of the helicopter are displayed on the LCD (after pressing #). And the flight speed is simulated with the motor. The motor speed is according to the helicopter's speed. For example:

pos	dir	speed
25,25,7	U	2M/S

If the hovering button is pressed, the LCD only display the current location of the helicopter, and the motor still spinning. For example:

pos	dir	speed
25,25,7		

(3) Off the border state:

If the helicopter off the border the LED bar would start flashing (one second on, one second of). And the LCD will display the place that the helicopter crashed.

(4) Safe landed state:

The LCD would display the helicopter's flight distance and flight time. For example:

Distance: 4
Duration: 8

Wiring

For the design to perform correctly, the following connections should be made. These connections are described in terms of the labelling on the board.

AVR Pins (top and bottom row)		Input / Output Device Pins (middle row)	
Port Group	Pin	Port Group	Pin
KEYPAD			
PORT F		KEYPAD	R0
PORT F	PF1	KEYPAD	R1
PORT F	PF2	KEYPAD	R2
PORT F	PF3	KEYPAD	R3
PORT F	PF4	KEYPAD	C0
PORT F	PF5	KEYPAD	C1
PORT F	PF6	KEYPAD	C2
PORT F	PF7	KEYPAD	C3
LCD			
PORT K	PK8	LCD DATA	D0
PORT K	PK9	LCD DATA	D1
PORT K	PK10	LCD DATA	D2
PORT K	PK11	LCD DATA	D3
PORT K	PK12	LCD DATA	D4
PORT K	PK13	LCD DATA	D5
PORT K	PK14	LCD DATA	D6
PORT K	PK15	LCD DATA	D7
PORT A	PA4	LCD CTRL	BE
PORT A	PA5	LCD CTRL	RW
PORT A	PA6	LCD CTRL	E
PORT A	PA7	LCD CTRL	RS
LED BAR			
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
MOTOR			
PORT L	PL4	MOTOR	MOT
PORT D	TDX2	MOTOR	OPO
P11	+5V	MOTOR	OPE
BUTTON			
PORT D	RDX4	INPUTS	PB0
PORT D	RDX3	INPUTS	PB1