COMP9032 Project – User Manual

What come's with the package

- AVR lab board x 1
- Wires x 10
- User's manual x1

Tutorial before flying

1. How to wire up AVR lab board

- All jumper wires should be connected already on the AVR lab board.
- Alternatively, please remove all the connected jumper wires on the AVR lab board and follow the instruction in Appendix 1. for detail wiring.

2. Keypad

- The keypad will the main control system during take-off, flying and landing operation.

Following is the detail actions for both manual mode and auto mode while a key is pressed

Key	Manual Mode	Auto Mode
0	N/A	value 0 on LCD
1	Moving Upward - U	value 1 on LCD
2	Moving forward - F	value 2 on LCD
3	Moving downward - D	value 3 on LCD
4	Rotate to right - R	value 4 on LCD
5	N/A	value 5 on LCD
6	Rotate to left - L	value 6 on LCD
7	N/A	value 7 on LCD
8	N/A	value 8 on LCD
9	N/A	value 9 on LCD
A	Switch to Auto Mode	N/A
B	N/A	confirm Input
C	Increase speed by 1	N/A
D	Decrease speed by 1	N/A
*****	Hovering/resume previous position - H	N/A
#	Take off/ landing	N/A

* please refer to appendix 2 for key-action illustration

3. LCD

The LCD display is used to display various of information during the flight

- Instruction for take-off in manual mode
- Set destination and speed
- Position, direction, compass and speed during flight
- Flight duration and distance after landing
- Crashed position and speed once it reaches boundary

3.1 Before take-off

Start (M mode):

S	t	a	r	t	:	(	M	)							
K	e	y		B		t	o		C	o	n	f	i	r	m

- Once the program is started or reset, above message will be displayed as default.
- **Press key B** to confirm current mode

Start (Auto mode):

S	t	a	r	t	:	(	A	)							
K	e	y		B		t	o		C	o	n	f	i	r	m

- **Press key A** on the keypad to switch to Auto mode.
- **Press key A** again to switch back to manual mode.
- **Press key B** to confirm current mode.

Before take-off (M mode selected):

M		m	o	d	e		s	e	l	e	c	t	e	d	
K	e	y		#		t	o		C	o	n	f	i	r	m

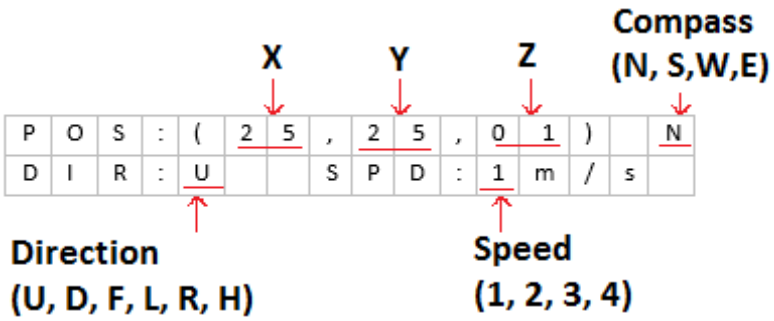
- When M mode is selected, **press key #** to perform taking-off action

Before take-off (Insert destination and flying speed)

	X				Y			Z			S	p	e	e	d
4	0	,		4	0	,		8	,		1	m	/	s	

- When A mode is selected, insert numerical value from keypad to set up destination.
- **Press key B** to confirm input destination at anytime

3.2 During flying



- In M mode, flying direction and speed can be amended from keypad
- **Press numerical value** from keypad to change flight direction:
- **Press key C or key D** to change speed
- **Press key** * to perform hovering
- **Press key #** to perform landing

3.3 End of flight

Successful landed

D	i	s	t	a	n	c	e	:	4	6	m			
D	u	r	a	t	i	o	n	:	1	4	s			

- Motor stop spinning,
- total distance and flying time

End of flight (Crashed)

P	O	S	:	(	1	9	,	-	2	,	0	3	)		N
D	I	R	:	F			S	P	D	:	3	m	/	s	

- Motor stop spinning
- Crashed position, direction and speed
- Full LED bar flash on and off continuously

4. Motor

The motor has 4 spinning speed:

- Slow spinning when speed is 1m/s
- Median spinning when speed is 2m/s
- High spinning when speed is 3m/s
- Max spinning when speed is 4m/s

The motor remains non-spinning during setup, landed or crashed phases

5. Constraints

Constraints

- Start position (x = 25, y = 25, z = 0) where x is length, y is width, z is height

Accessible area:	**Min (meter)**	**Max (meters)**
X (length)	1	49
Y (width)	1	49
Z (height)	1	9

- Auto mode need to be set before flight
- Speed range: 1m/s, 2m/s, 3m/s and 4m/s

Appendix

1. Wiring

Port Group	Pin	PortGroup	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	PE5	LCD CTRL	BL
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 K	PK15	KEYPAD	C3
PORT K	PK14	KEYPAD	C2
PORT K	PK13	KEYPAD	C1
PORT K	PK12	KEYPAD	C0
PORT K	PK11	KEYPAD	R3
PORT K	PK10	KEYPAD	R2
PORT K	PK9	KEYPAD	R1
PORT K	PK8	KEYPAD	R0
PORT L	PL4	MOTOR	JP91
N/A*	POT	MOTOR	Mot

* Remove cap of JP91 and use jumper wire to connect Potential meter with the Motor to prevent large current been drawn through the motor to cause damage

2. Operation flowchart