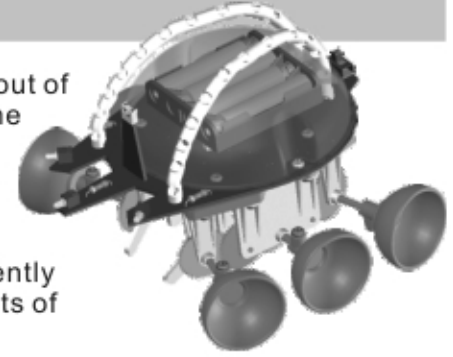


Escape Robot Kit

1. Product Introduction:

The Escape Robot Kit works just like an A.I. robot. It never fails to find its way out of a maze. The Escape Robot makes use of three infrared emitting diodes and one infrared receiving module to send and receive signals and detect obstacles. Escape Robot has an in-built microprocessor which enables it to "think" on its own, as it process information about its environment and maneuvers itself around obstacles.







Escape Robot moves on six legs. The Kit comes complete with 2 sets of differently designed legs, which provides endless fun and excitement with its different sets of movements.




Power source required:


Voltage / Electrical / Mechanical: 1.5V "AAA" x4 batteries (not included)


2. Tools You May Need:


Soldering Iron	Solder Wire	AAA Battery (4pcs)	Long Nose Pliers	Diagonal Cutter	Screwdriver
					


3. Electronic Parts List:


Resistor						
	Value	Color				Qty
	10Ω	brown	black	black	gold	4 pcs
	1.2K	brown	red	red	gold	2 pcs
	2.2K	red	red	red	gold	1 pc
	100Ω	brown	black	brown	gold	1 pc
	1K	brown	black	red	gold	5 pcs
	10K	brown	black	orange	gold	1 pc
	22K	red	red	orange	gold	4 pcs

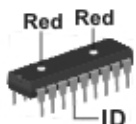
Transistor		
	Value	Qty
	8550	4 pcs
	9013	1 pc
	8050	7 pcs
	C945	4 pcs


Ceramic Capacitor		
	Value	Qty
	30	2 pcs
	103	1 pc
	104	3 pcs
	224	1 pc

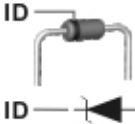
LED 5mm Red	
	Qty
	1 pc

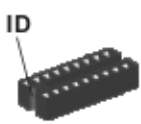
LED Holder	
	Qty
	3 pcs


Buzzer	
	Qty
	1 pc


Integrated Circuits		
	I.D.	Qty
	78P156	1 pc


Electrolytic Capacitor		
	Value	Qty
	100uf	1pc


Zener Diode		
	Value	Qty
	3.9V	1 pc


IC Socket	
	Qty
	1 pc


Infrared Emitting Diodes 5mm	
	Qty
	3 pcs (Clear)


Oscillator		
	Value	Qty
	4MHz (4.000)	1pc

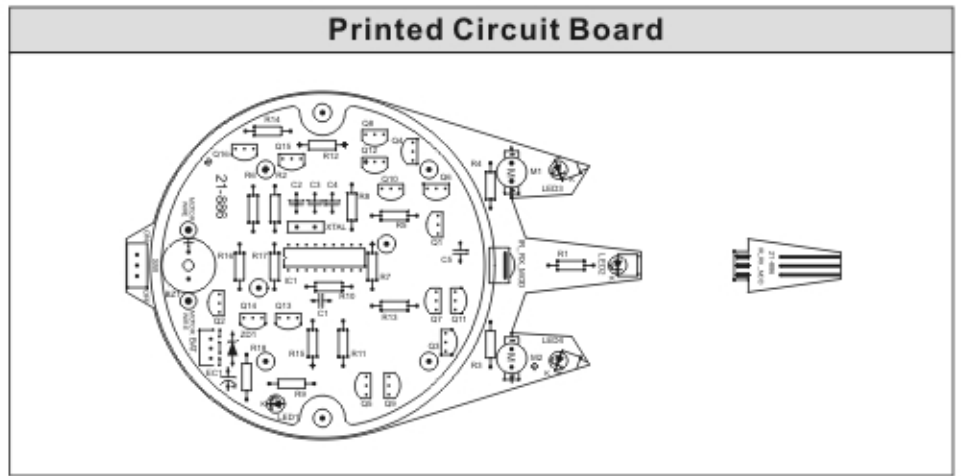
Housing	
	Qty
	1 pc


Pins	
	Qty
	4 pcs

Infrared Receiving Module	
	Qty
	1 pc

Slide Switch	
	Qty
	1 pc


Battery Holder	
	Qty
	1 pc





Connector With Wire		
	Qty	
	Yellow	1pc
	Green	1pc
	Blue	1pc
	Orange	1pc


4. Mechanical Part List:


P13	Screw	
	Qty	
	2 pcs	(3x6mm)

P15	Hex Post	
	Qty	
	2 pcs	(10mm)

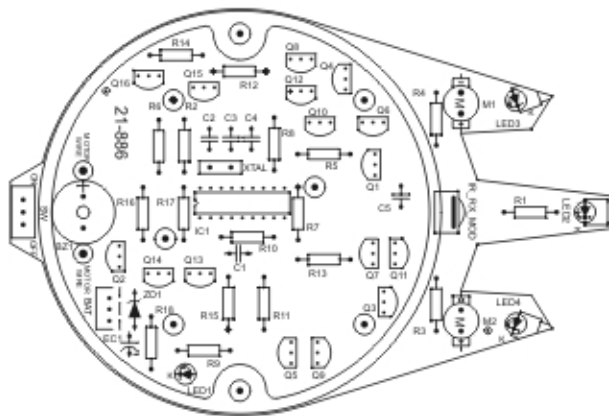
P17	Body	
	Qty	
	1 pc	

P14	Screw	
	Qty	
	4 pcs	(3x6mm)

P16	Nut	
	Qty	
	2 pcs	(M3)

P18	Hosepipe	
	Qty	
	2 pcs	

5. PCB Assembly:



✳ The parts I.D.(identification) for each component has been printed on PCB.

Step1: Suggest you start from the low-key components first such as the resistors and zener diode.

Part I.D.	Description	Color Code	Qty
R18	100Ω	brown black brown gold	1 pc
R11 /12 /13 /14	10Ω	brown black black gold	4 pcs
R3 / 4	1.2K	brown red red gold	2 pcs
R1	2.2K	red red red gold	1 pc
R5 /7 /8 /9 /10	1K	brown black red gold	5 pcs
R15	10K	brown black orange gold	1 pc
R2 /6 /16 /17	22K	red red orange gold	4 pcs

Part I.D. →	Description	Qty
ZD1	Zener Diode 3.9V	1 pc

Step2:Mount and soldering the components such as Ceramic capacitor,Electrolytic capacitor, Transistor,Oscillator.

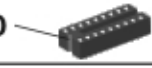




Part I.D. →	Description	Qty
C2,C3	Ceramic Capacitor 30	2 pcs
C1	Ceramic Capacitor 103	1 pc
C4	Ceramic Capacitor 104	1 pc
C5	Ceramic Capacitor 224	1 pc

Part I.D. →	Description	Qty
EC1	Electrolytic Capacitor 100uf	1 pc

Part I.D. ∩	Description	Qty
Q5 / 6 / 7 / 8	Transistor 8550	4 pcs
Q2	Transistor 9013	1 pc
Q1 / 3 / 4 / 9 / 10 / 11 / 12	Transistor 8050	7 pcs
Q13 / 14 / 15 / 16	Transistor C945	4 pcs

XTAL	Oscillator 4MHz	1 pc
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Step3:Mount and soldering the components such as IC socket,Housing,Slide switch,Buzzer, Pins.

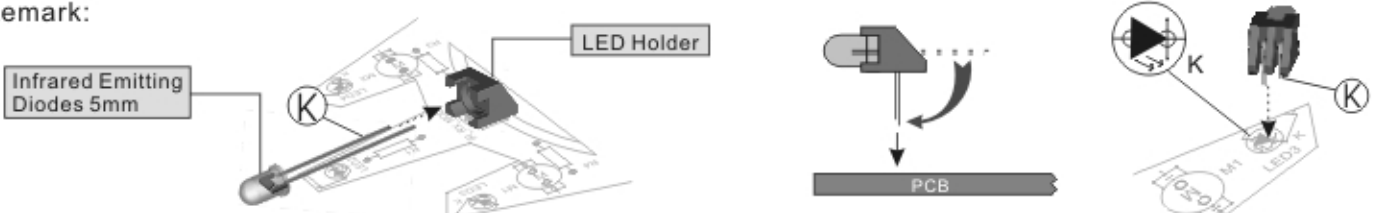
Part I.D.	Description	Qty
IC 1	IC Socket 	1 pc
BAT.	Housing 	1 pc
SW.	Slide Switch 	1 pc
BZ1	Buzzer 	1 pc
M1(+ -)	Pins 	4 pcs
M2(+ -)		



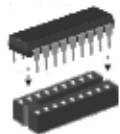
Step4:Mount and soldering LED 5mm red,IR-LED3mm,IC 1602BP.

Part I.D.	Description	Qty
LED 1	LED 5mm (red)	1 pc


LED 2 / 3 / 4	IR-LED 5mm (clear)	3 pcs
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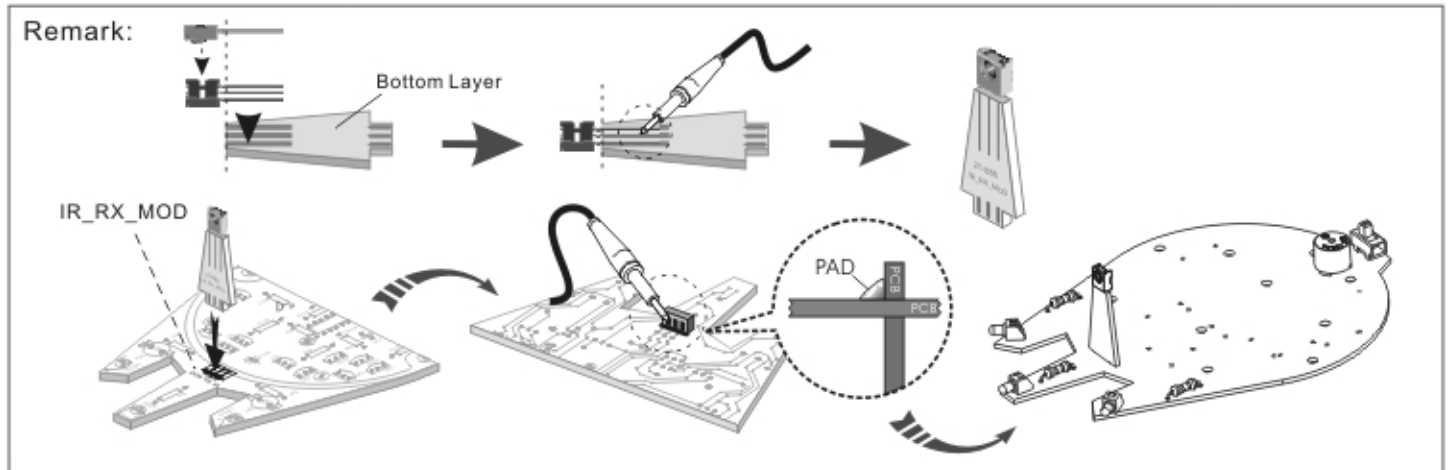
Remark:



IC 1	78P156 ID  IC Socket ID 		1 pc
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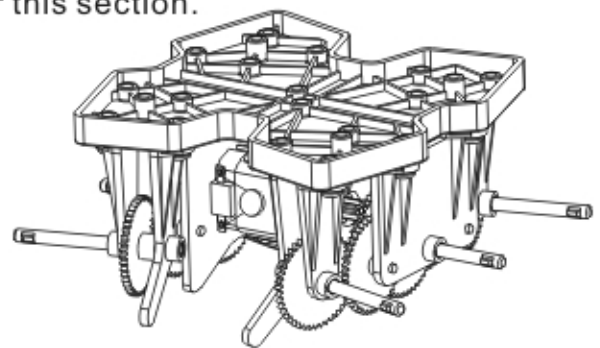
Step5:Mount and soldering Infrared Receiving Module.

Part I.D.	Description	Qty
IR_RX_MOD	Infrared Receiving Module 	1 pc

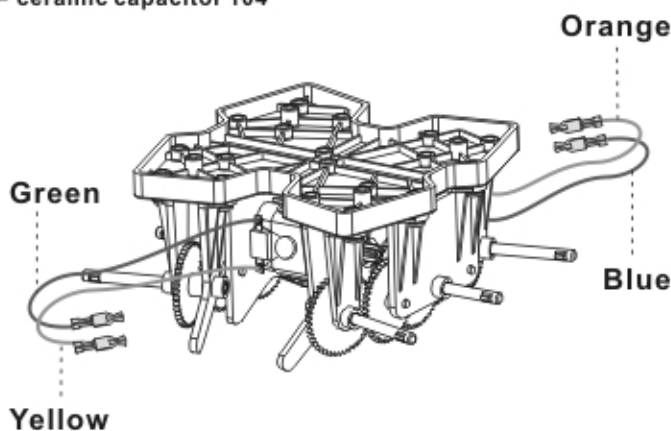
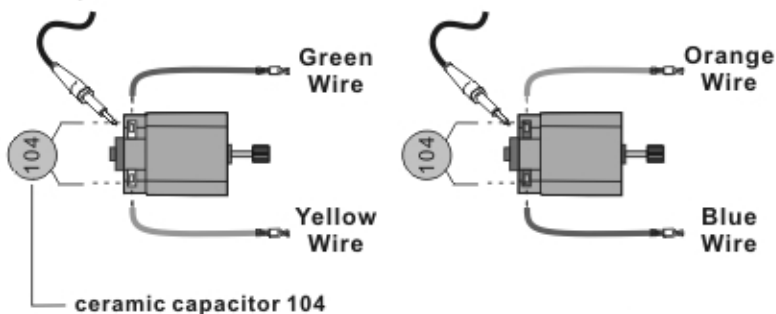


6. Mechanical Assembly:

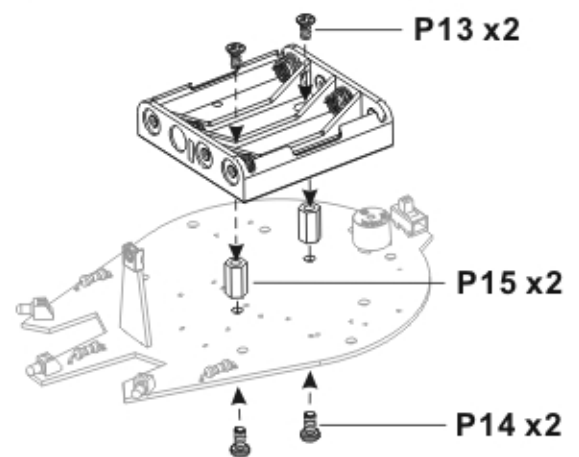
1 Assemble the gearbox first before go ahead for this section.
(Refer to the gearbox instruction manual.)



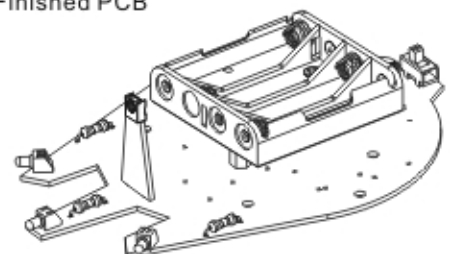
2 Toward the shaft of motor to the same way as below drawing to solder wires and ceramic capacitor.



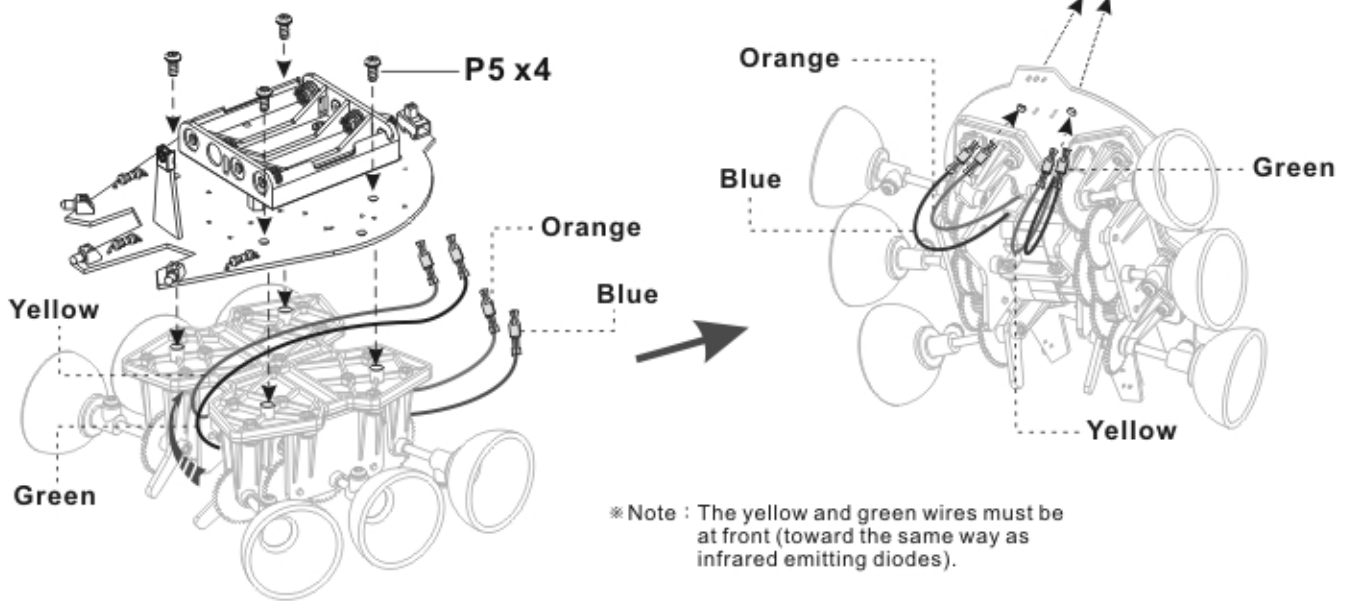
3 Battery Holder Assembly



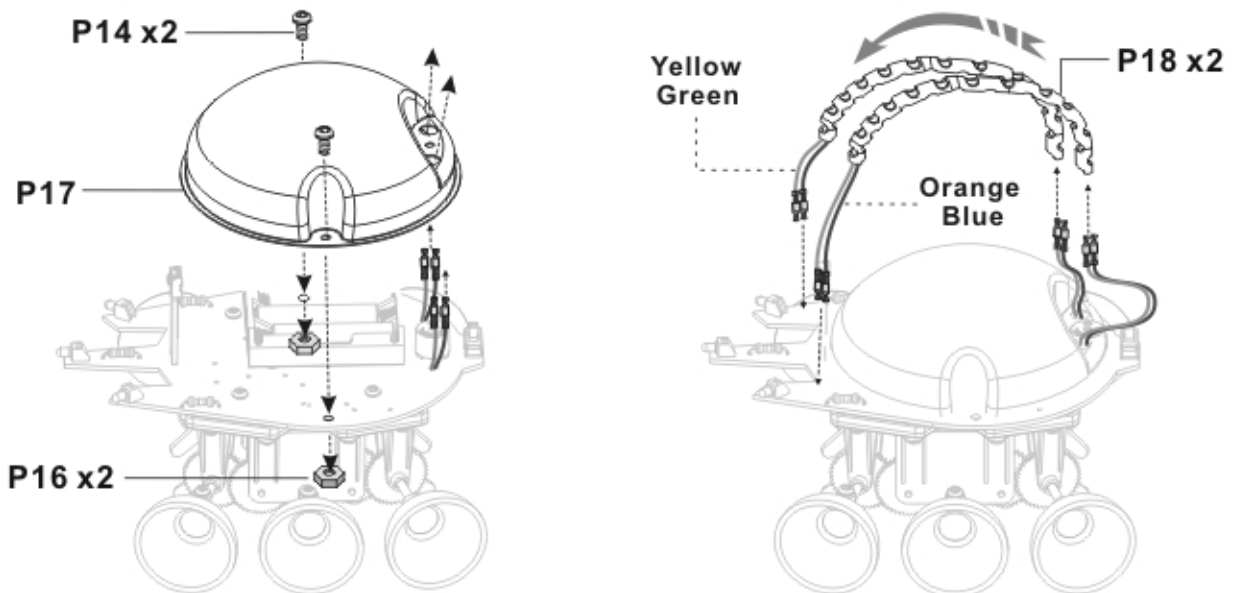
Finished PCB



4 PCB & Gearbox Assembly

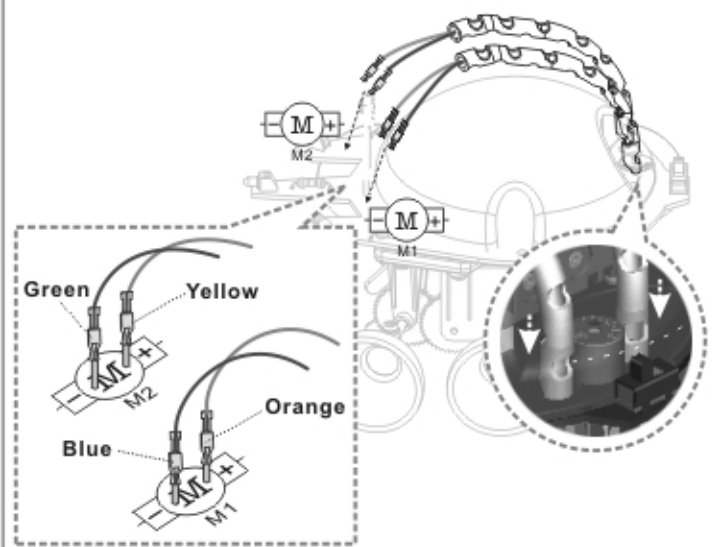


5 Body & Hosepipe Assembly

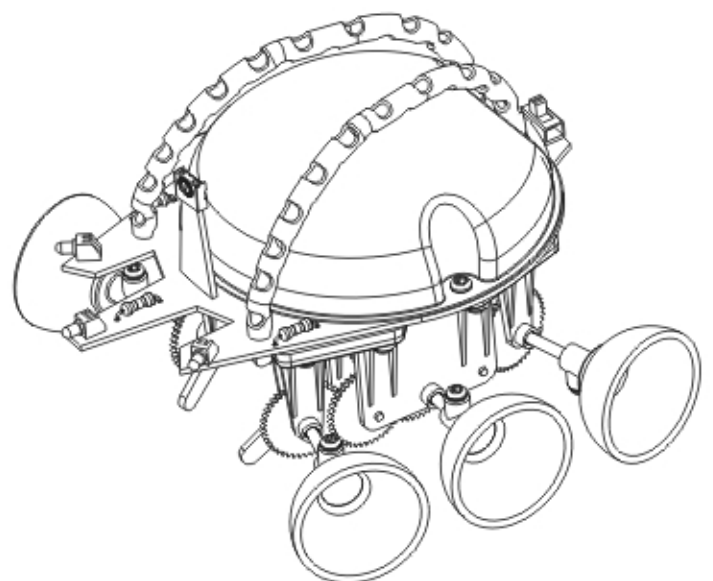


6 Wiring Assembly

	M1(+)	M1(-)	M2(+)	M2(-)
	Orange	Blue	Yellow	Green



7 Finished Product



7. How it works:

1. Switch power to "ON". The LED 1 will light up and the unit will emit 3 beeps as it starts running.
2. When the unit starts running, the emitting diodes LED2, LED3 and LED4 will send out signals sequentially to detect obstacles along its path.
Once an obstacle has been detected, the signal received will be transmitted to the receiving module which will then instruct the Escape Robot to take evasive actions.
 - a) When the emitting diode on the right detects an obstacle, the unit will emit a "beep" sound, and the left motor will go into reverse mode.
 - b) When the emitting diode on the left detects an obstacle, the unit will emit a "beep" sound and the right motor will go into reverse mode.
 - c) When the emitting diode in the middle detects an obstacle, the unit will emit two "beeps" followed by the two motors going into reverse mode. Then, the operation of (a) above is repeated.
 - d) If all three emitting diodes detect obstacles, the unit will emit three "beeps" and the movement that follows will be the same as in (c) above. However, the turning will take a little longer.

8. Trouble shooting:

1. Ensure that all components on the PCB are in order. Take note especially of the polarity of the infrared emitting diode.
2. Different environment and battery power may affect the detecting sensitivity, try to adjust the Infrared Receiving Module's angle to find the best position.



9. Circuit Diagram:

