Tracing Car Kit – Builders Notes

Bill of Materials (BOM)

QTY	Reference	Description	Markings
1	IC1-Socket	8 pin DIP Socket	
1	IC1	IC LM393 Dual op amp	
2	C1, C2	Electrolytic Capacitor 100uF	
2	R1, R2	Resistor Trimmer 10K	103
2	R3, R4	Resistor 3.3K Ohm	Orange-Orange-Black-Brown-Brown(1%) Orange-Orange-Red-Gold (5%)
4	R5, R6, R11, R12	Resistor 51 Ohm	Green-Brown-Black-Gold-Brown (1%) Green-Brown-Black-Gold (5%)
2	R7, R8	Resistor 1K Ohm	Brown-Black-Black-Brown-Brown (1%) Brown-Black-Red-Gold (5%)
2	R9, R10	Resistor 10 Ohn	Brown-Black-Black-Gold-Brown (1%) Brown-Black-Black-Gold (5%)
2	R13, R14	CDS Photocells	
2	D1, D2	LED Red	Red Cap
2	D4, D5	LED Infrared	Clear Cap
2	Q1, Q2	Transistor 8550	S8550
1	S1	Switch Push Toggle DPDT	
2	M1, M2	Motor Assemblies	
4		Wire Approx 3" (75mm) long	
1	BT1	Battery Holder Aax2	
1		PCB	
2		Screw M2.2x7	
1		Bolt M5x30	
1		Hex Nut M5	
1		Cap Nut M5	
1		Chinese Instruction Sheet	Oval Track on back side

1) [ ] Insert electronic parts onto top side of PCB according to BOM above. Do not install bottom side parts yet (LED's D4 and D5 and photo resistors R13 and R14).
   - Observe polarity when installing C1 and C2, the shaded part on the PCB should match up with the white stripe on the capacitor (negative).
   - Observe the position of the IC. The notch indicates pin 1 is on the left side near the notch, some IC's will have a notch, some a dot to mark pin 1 (and some have both).
   - Match the silkscreen of Q1 and Q2 with the shape of the transistor.
   - Match the silkscreen to the flat side of the Red LED D1 and D2. This can be subtle and the flat sides are toward the outside of the PCB.
   - Adjust R1 and R2 trim pots to mid position.

2) [ ] Peel the backing from the AA holder tape and apply the battery holder on the top side of the PCB (match the silk screen). The leads should be sticking out to the right of the facing forward car (forward is the curved end of the PCB). Push the battery wires through the hole in the bottom right corner. Trim the battery wires, if needed, then strip and solder to the pads marked BT1 on the bottom of the PCB. Note the + is the pad nearest to the board edge. Tip: Tin both the wire leads and PCB pads before soldering together.

Tracing Car Kit – Builders Notes

3) [ ] Strip and solder 2 wires to one of the motor assemblies. Position the motor over the motor area silkscreen on the bottom of the PCB so the tape side is toward the board and the wheel shaft sticks away from the PCB. Trim and strip the wires to length next to the "M" pads at the end of the motor. Solder leads to pads (see TIP above about tinning). Peel the backing from the tape and stick the motor onto the PCB within the silkscreen area. Repeat for the other motor. The polarity should look as follows with the car upside down (motors up) and the front facing toward you:
   - Left motor Top connection to left side pad closest to front of car. (Orange Wire)
   - Left motor Bottom connection to left side pad closest to rear of car. (Yellow Wire)
   - Right motor Top connection to right side pad closest to front of car. (Purple Wire)
   - Right motor Bottom connection to right side pad closest to rear of car. (Grey wire)
   - (Your supplied wire colors may vary)

4) [ ] Pass the M5 bolt through the top of the PCB at the front of the PCB. Secure on the bottom side with the M5 hex nut. Screw the M5 cap nut on to the bottom.

5) [ ] Photo diode/resistor assembly – This is the hardest part of the assembly!
   [ ] Solder in R3 and R4 from the bottom side of the PCB. Leave the leads long so that the photoresistor is about 5mm (.2") from the end of the cap nut. Tip: 5mm is at about where the cap turns into a hex nut. Try to keep the leads straight.
   [ ] Solder in D4 and D5 from the bottom side of the PCB. Leave the leads long so thetop of the LED aligns with the photoresistors. The silkscreen is subtle but the flat edge of the LED's are on the edge of the PCB.

6) [ ] Add wheels aligning the notched side of the wheels to the motor shaft. Secure with the M2.2x7 screws.

7) [ ] Add batteries, turn upside down, and turn on. Place your finger over each sensor, as you do so notice the opposite wheel turns. Also check to make sure the wheels are turning so the car moves in a forward direction. You may find swapping a motor wire is needed. If you find the motors do not switch properly adjust R1 and R2 to fine tune, remember if you can't get it adjusted set R1 and R2 back to mid position and try again.

8) [ ] Place on a black track (or the included sheet in the kit) and enjoy.