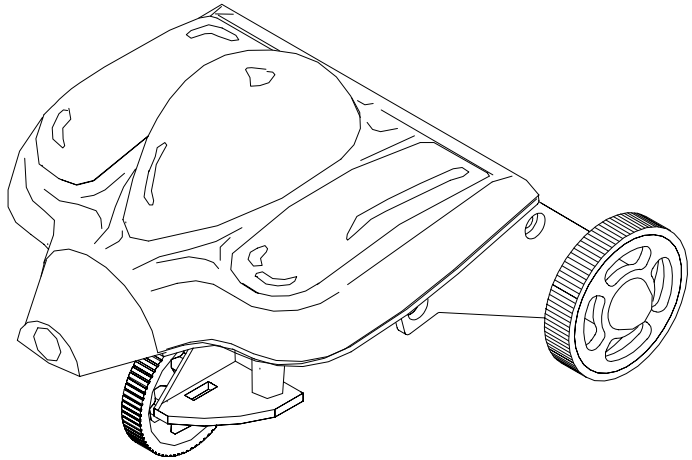
Sound Tracker



Model: MR-1001

A division of Instruments Direct Limited

Manufactured by Instruments Direct Limited

READ BEFORE PROCEEDING

Read this manual carefully before getting started on your robot. Ask someone to help you read the instructions. Keep this manual for future reference.

- Take care when using sharp tools such as, knives or screwdrivers.
- Keep the robotic parts away from small children. Don't assemble the robot where small children can reach it.
- Keep fingers out of the working parts such as the motors and gears.
- Do not force the robot to move/stop; this could cause the motors to overheat.
- The Specification and anything contained within this manual are subject to change without notice.
- When using batteries:

  -Use the batteries in the correct polarity (+ -)

  -Never short circuit, disassemble, heat, or dispose of batteries in a fire.

  -When the robot is not in use the batteries should be removed.

  -If the batteries or robot become wet, remove the batteries from the hold and dry the robot.

  -Do not mix old and new batteries. Do not mix alkaline, standard (carbon-zinc) or rechargeable (nickel-cadmium) batteries. We recommend the use of alkaline batteries for extended life.

Product Information

Sound Tracker
Model: MR-1001

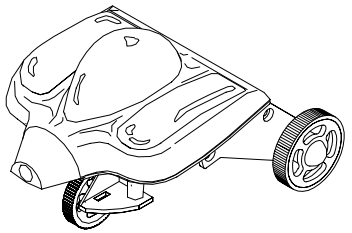
About
This robot reacts to sound impulses and objects in its path. It will reverse away from the sound or obstacle, then race forward.

Specification

Power source	Electronic circuit:	7mA
	Mechanical section:	230mA
Power voltage	Electronic circuit:	DC 3V
Power consumption	Electronic circuit:	Approx. 400mA

Height	95mm
Length	125mm
Width	140mm

Completed Sound Tracker



History of Robots

A brief review of robot development is important as it puts the current machines and interest in them into an historical perspective. The following list highlights the growth of automated machines that led to the development of the industrial robots currently available today.

1801
Joseph Jacquard invents a textile machine that is operated by punch cards. The machine is called a programmable loom and goes into mass production.

1830
American Christopher Spencer designs a cam-operated lathe.

1892
In the United States, Seward Babbitt designs a motorised crane with gripper to remove ingots from a furnace.

1921
The first reference to the word robot appears in a play opening in London. The play, written by Czechoslovakian Karel Capek, introduces the word robot from the Czech robota, which means a serf or one in subservient labour. From this beginning the concept of a robot takes hold.

1938
Americans Willard Pollard and Harold Roselund design a programmable paint-spraying mechanism for the DeVilbiss Company.

1948
Norbert Wiener, a professor at M.I.T., publishes Cybernetics, a book which describes the concept of communications and control in electronic, mechanical, and biological systems.

1954
The first programmable robot is designed by George Devol, who coins the term Universal Automation. He later shortens this to Unimation, which becomes the name of the first robot company.

1959
Planet Corporation markets the first commercially available robot.

1960
Unimation is purchased by Condec Corporation and development of Unimate Robot Systems begins. American Machine and Foundry, later known as AMF Corporation, markets a robot,

1962
General Motors installs the first industrial robot on a production line. The robot selected is a Unimate.

1968
SRI builds and tests a mobile robot with vision capability, called Shakey.

1970
At Stanford University a robot arm is developed which becomes a standard for research projects. The arm is electrically powered and becomes known as the Stanford Arm.

1973
The first commercially available minicomputer-controlled industrial robot is developed by Richard Hohn for Cincinnati Milacron Corporation. The robot is called the T3, “The Tomorrow Tool”.

1974
Professor Scheinman, the developer of the Stanford Arm, forms Vicarm Inc. to market a version of the arm for industrial applications. The new arm is controlled by a minicomputer.

1976
Robot arms are used on Viking 1 and 2 space probes Vicarm Inc. incorporates a microcomputer into the Vicarm design.

1977
ASEA, a European robot company, offers two sizes of electric powered industrial robots. Both robots use a microcomputer controller for programming and operation. In the same year Unimation purchases Vicarm Inc.

1978
The Puma (Programmable Universal Machine for Assembly) robot is developed by Unimation from Vicarm techniques and with support from General Motors.

1980
The robot industry starts its rapid growth, with a new robot or company entering the market every month.

A brief overview
When, in 1954 George C. Devol filed a U.S. patent for a programmable method for transferring articles between different parts of a factory, he wrote:
"The present invention makes available for the first time a more or less general purpose machine that has universal application to a vast diversity of applications where cyclic control is desired."

In 1956 Devol met Joseph F. Engelberger, a young engineer in the aerospace industry. With others, they set up the world's first robot company, Unimation, Inc., and built their first machine in 1958. Their initiative was a great deal ahead of its time; according to Engelberger, Unimation did not show a profit until 1975.

The first industrial robot saw service in 1962 in a car factory run by General Motors in Trenton, New Jersey. The robot lifted hot pieces of metal from a die-casting machine and stacked them.

Japan, by comparison, imported its first industrial robot from AMF in 1967, at which time the United States was a good 10 years ahead in robotics technology.
By 1990, there were more than 40 Japanese companies that were producing commercial robots. By comparison, there were approximately one dozen U.S. firms, led by Cincinnati Milacron and Westinghouse's Unimation.

The Future of Robots
Robots and the robotics industry will continue to grow at a rapid rate. As technology advances so will the robots that rely so heavily upon these advances. Robots will become more technical until one day they will become as powerful as we are.

Assembly of Parts

Tools needed for assembly

+ Screwdriver (M3) 	Long-nose pliers  Used to handle small parts	Cutting pliers  For cutting plastic parts
Small mallet/hammer  Used for installing pinion gears		Power supply  AA Battery x 2pcs

Helpful Hints prior to assembly

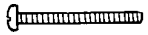
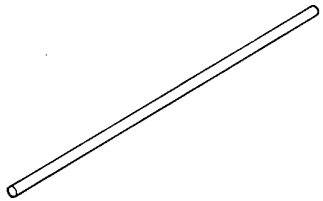
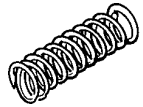
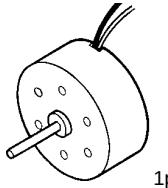
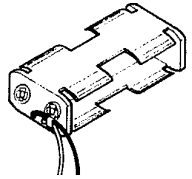
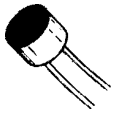
Removing parts from plastic frame
Use the cutting pliers to remove the individual parts from the plastic frame, remove any burrs or flashing left on the parts.

Tapping screws
Tapping screws make threads like screws do in wood. The best way to screw a tapping screw is to screw in a couple of turns and then unscrew half a turn, repeat this until the screw is in flush to the surface.

Tightening of nuts and screws
Make sure nuts are tightened securely to the bolts; if not they may work loose and cause the robot to malfunction. Also make sure the nuts are not too tight and cause the parts to function incorrectly.

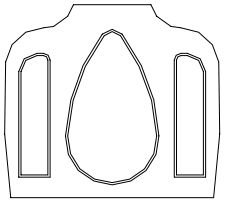
Screw sizing
The size of the screws is expressed by the thickness and length. A screw marked M3 x 10, it is 3mm thick and 10mm long. Nuts are measured in a similar way corresponding to the size of the screw. A M3 nut is used on an M3 bolt/screw.

Parts List

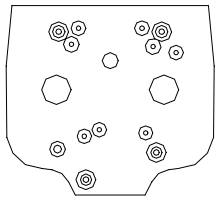
Tapping Screws Screw B 2.6 x 6 12pcs  Screw C 2.6 x 8 4pcs 	Screws Screw A M3 x 24 2pcs  Screw D M2.5 x 3 2pcs 	Washer  4pcs
Pipe spacer  2pcs	Nut M3 x 2.3  2pcs	Stud Ø7 x 2.3  2pcs
Shaft Ø3 x 112  1pc	Spring Ø5 x 18  1pcs	Pinion Gear  1pc
3v Motor  1pc	Battery holder  1pc	Microphone  1pc

Parts List

Body and Frame Set

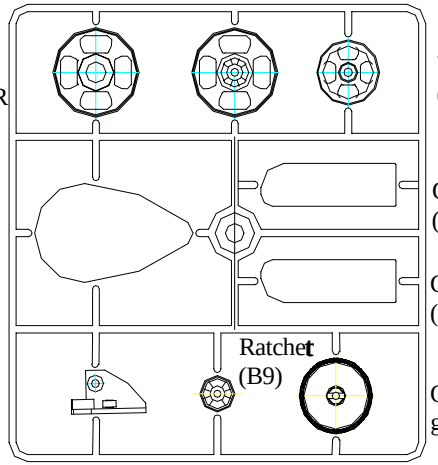


Body (A1)

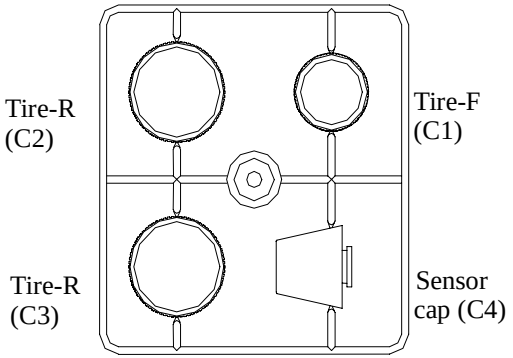


Frame (A2)

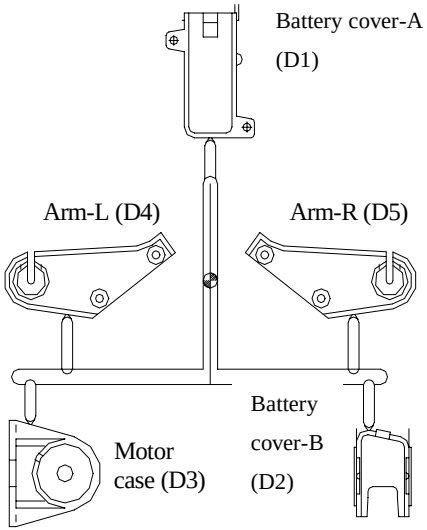
Wheel and cover set



Tire set

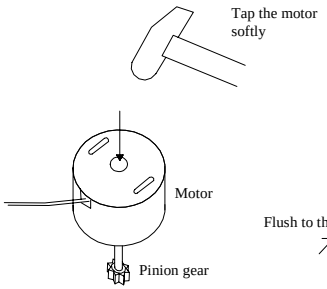


Arm set

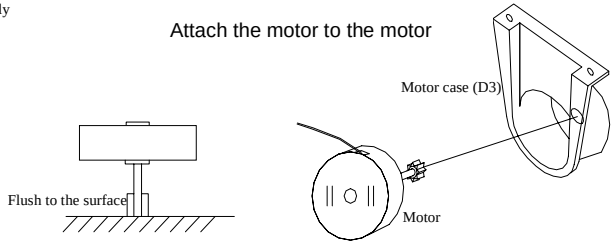


1. Assembly of motor section

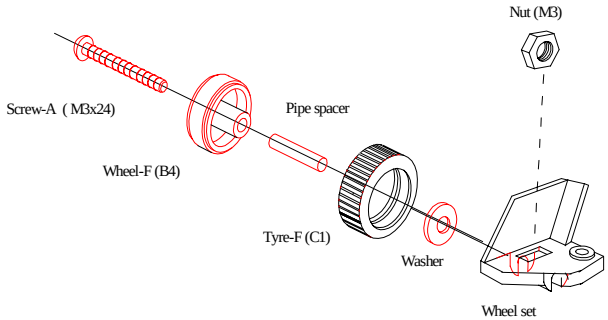
Attach pinion gear to motor



Attach the motor to the motor

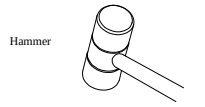


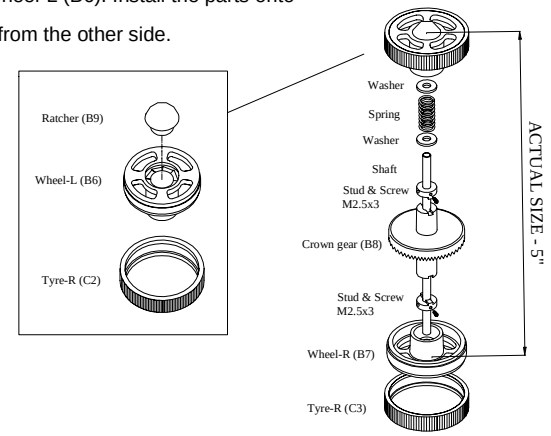
2. Assembly of front wheel section

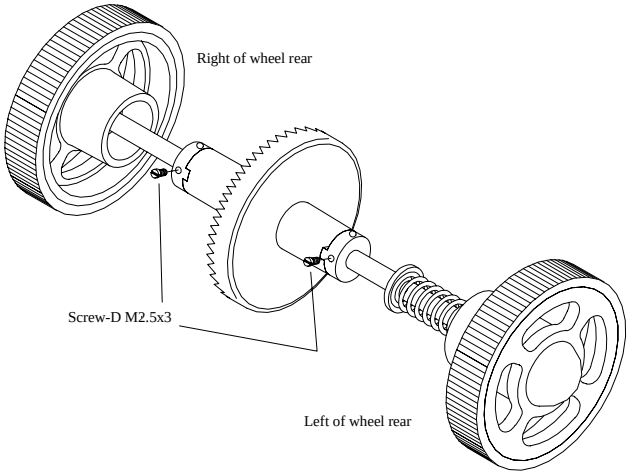


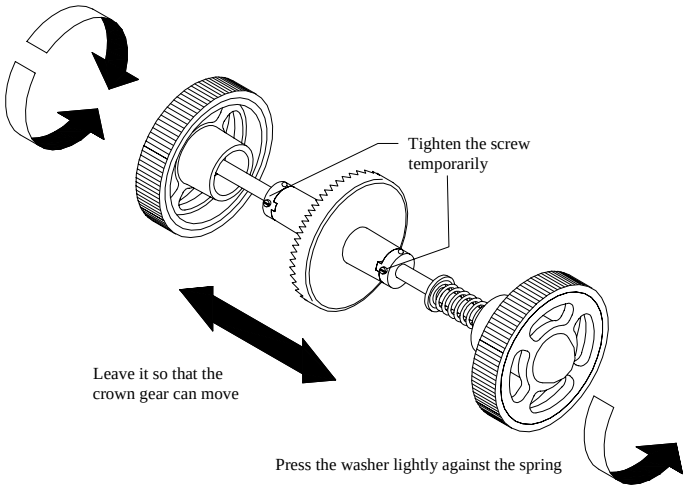
3. Assembly of rear axle

When inserting the wheel on the shaft, use the small hammer, being careful not to scratch the ratchet or wheel. Press fit the ratchet onto the shaft and insert the shaft through wheel-L (B6). Install the parts onto the shaft from the other side.

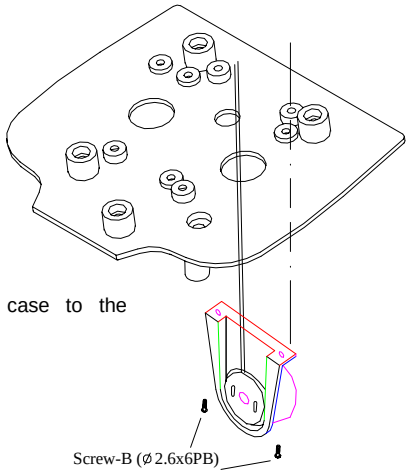






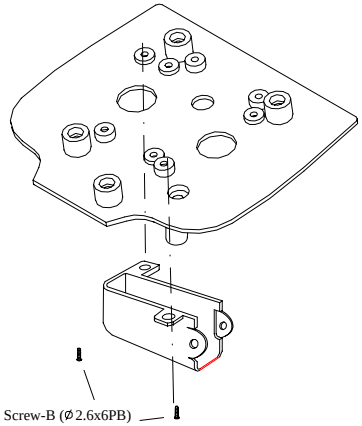


4. Attaching motor base to the frame

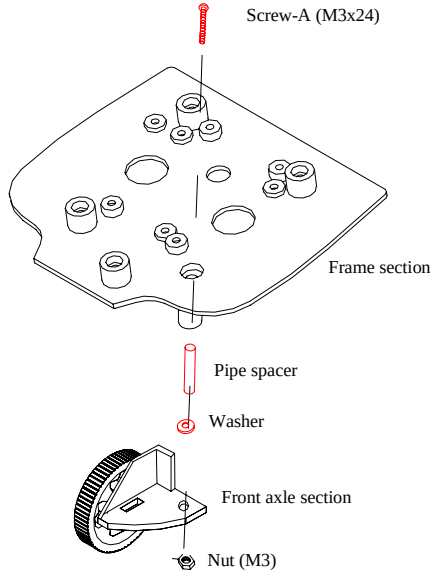


Attach the motor case to the
-

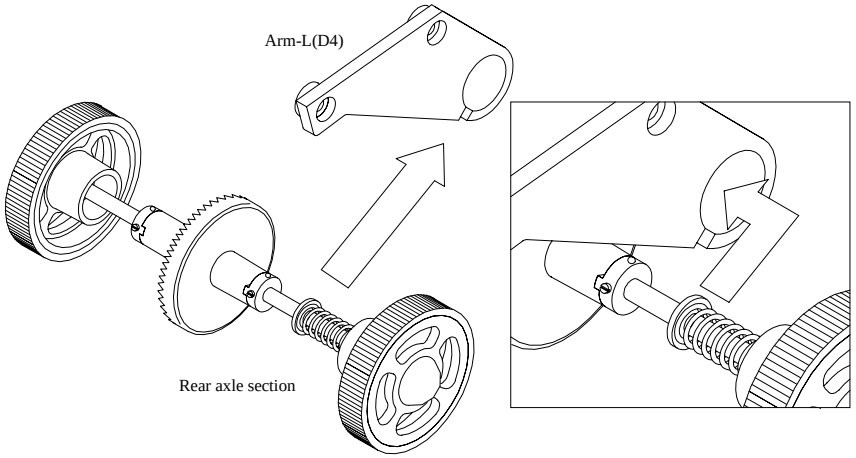
5. Attaching battery cover to the frame



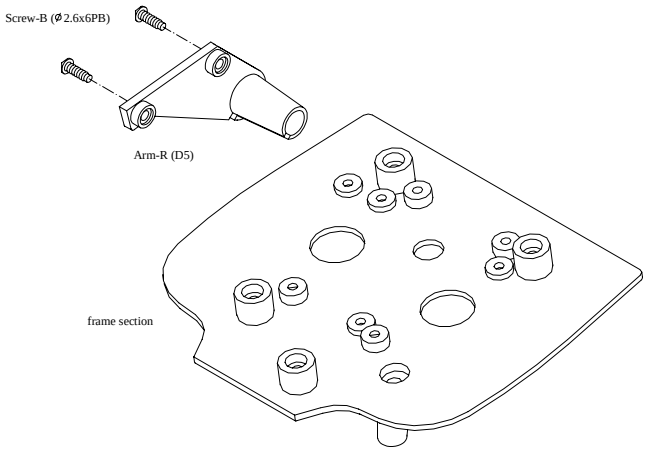
6. Attaching front axle section to the frame



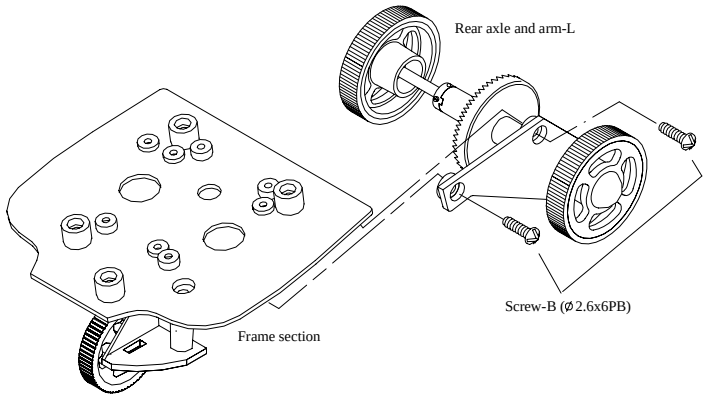
7. Attaching the left arm (D4) to the rear axle section



8. Attaching the right arm (D5) to the frame section

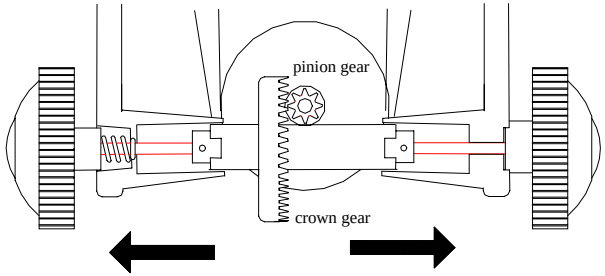


9. Attaching the rear axle and left arm to the frame section



Gear adjustment

If the Pinion gear and crown gear do not engage each other, or they do not engage strongly enough then perform gear adjustment. Minor adjustments can be made by loosening the stud screw and moving the crown gear.

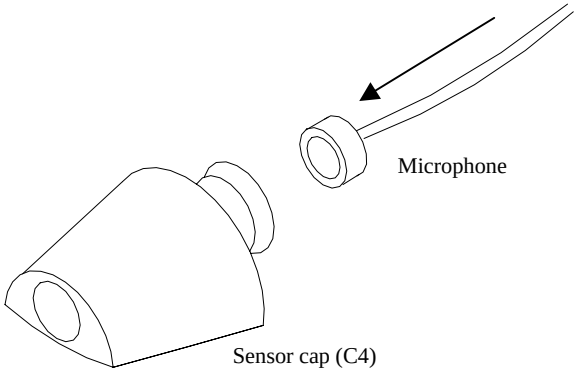


If it does not move powerfully, separate the crown gear and pinion gear slightly

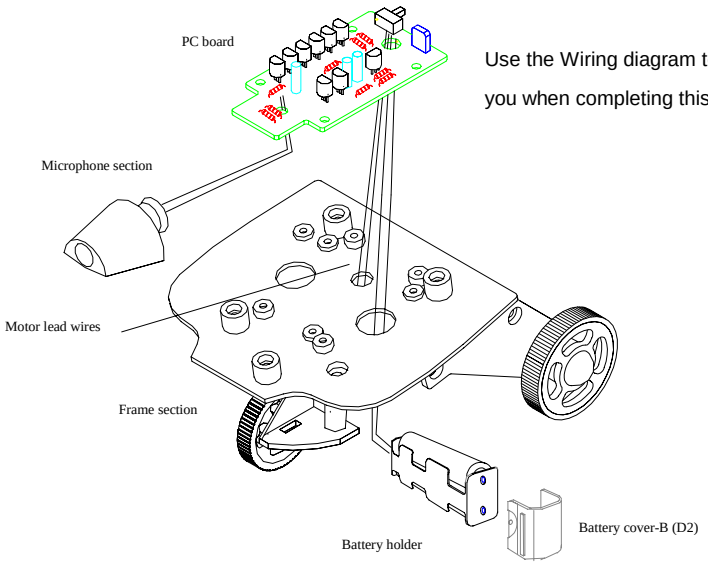
If the gears spin in the air, move the crown gear and pinion gear closer to each other

10. Attaching the microphone to the sensor cap

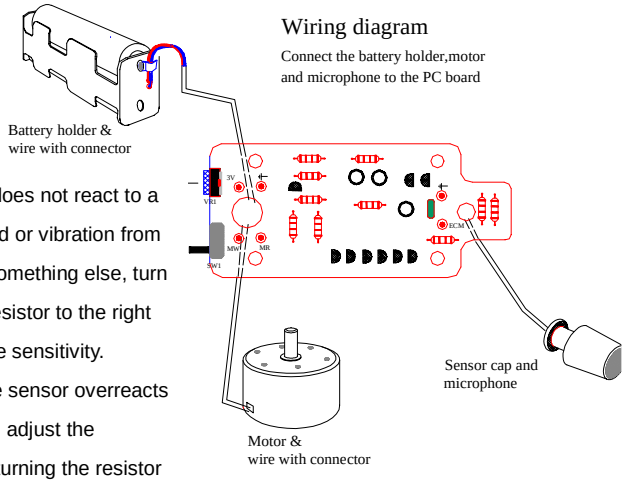
Note: These two parts simply push fit together



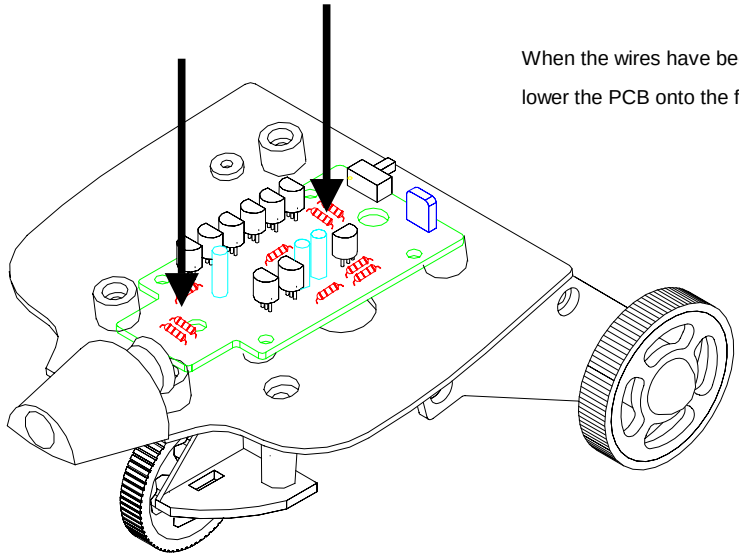
11. Attaching the battery holder, microphone and wires to the frame section



Use the Wiring diagram to help you when completing this stage.

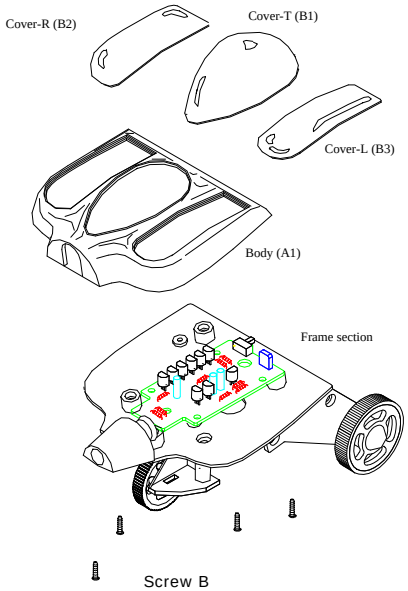


If the sensor does not react to a clapping sound or vibration from contact with something else, turn the variable resistor to the right to increase the sensitivity. However if the sensor overreacts to the sounds, adjust the sensitivity by turning the resistor to the left.

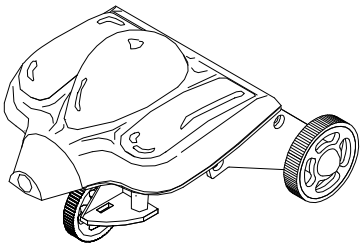


When the wires have been attached, lower the PCB onto the frame section

12. Attaching the body parts and covers to the frame section



Completed Sound Tracker



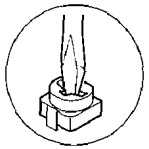
Please note: Be sure to grease the crown and pinion gear to ensure smooth running of your Sound Tracker.

How to operate the Sound Tracker

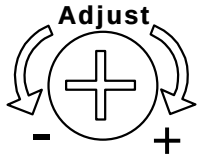
1. Install both the “AA” batteries in the battery holder.
2. Check that the motor runs when the robot is switched on.
3. Clap your hands near the microphone and see the robot reversing.

If your robot does not function correctly, firstly adjust the sensitivity:

The range of the detectable sensor can be easily adjusted using a small screwdriver to adjust the variable resistor.



Care should be taken not to over tighten the variable resistor



Use this chart to diagnose problems:

Problem	Solution
The motor is not spinning	~ Check that the wiring is correct ~ Insert new batteries
The robot does not react to sound but it does move	~Check the wiring of the microphone ~Check all wiring
Moves backwards	~Check that wires are inserted correctly
Robot stutters back and forth	~Lower the sensitivity

We hope that you have enjoyed building this robot as much as we have designing it. We are particularly interested to hear your comments about this robot and any suggestions that you might have about improving our designs or instruction manual.

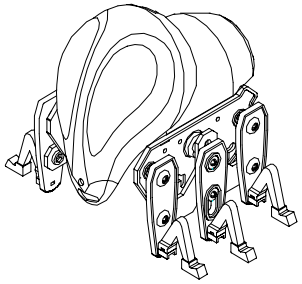
We will be developing more and more exciting and innovative robots to add to the iBOTZ range for you to build and programme. If you experience any difficulty building this robot please contact us on 020 8560 5678.

Also if any components are missing or have been lost by you, don't worry! We will send them to you for free! All we ask is that you tear off the form across the page and send it to us together with a stamped self-addressed envelope.

All the best

S. Devonshire
Head Developer, iBOTZ

Other robots in the iBOTZ range:



Antoid-MR-1002

Spare Parts How to use the spare parts service

1.Tick the spare parts you require
2.Cut off this page along the scissor line
3.Send the form along with a stamped self-addressed envelope to:

IBOTZ
Division of Instrument Direct Limited
Spares Department
Unit 14 Worton Court
Worton Road
Isleworth TW7 6ER
UK

10 Brent Drive
Hudson, MA 01749
U.S.A.

Part No.	Description	
Plastic Parts		
1001-001	Body (A1)	
1001-002	Frame (A2)	
1001-003	Wheel L (B6)	
1001-004	Wheel R (B7)	
1001-005	Cover T (B1)	
1001-006	Wheel set (B5)	
1001-007	Wheel F (B4)	
1001-008	Cover R (B3)	
1001-009	Cover L (B2)	
1001-0010	Crown gear (B8)	
1001-0011	Ratchet (B9)	
1001-0012	Tyre R (C2)	
1001-0013	Tyre R (C3)	
1001-0014	Tyre F (C1)	
1001-0015	Sensor cap (C4)	
1001-0016	Battery cover A (D1)	
1001-0017	Arm L (D4)	
1001-0018	Arm R (D5)	

Part No.	Description	
1001-0019	Motor case (D3)	
1001-0020	Battery cover B (D2)	
1001-0021	Battery cover A (D1)	
Small parts		
1001-0022	Tapping screw B 2.6 x 6	
1001-0023	Tapping screw C 6 x 8	
1001-0024	Screw A M3 x 24	
1001-0025	Screw D M2.5 x 3	
1001-0026	Washer	
1001-0027	Pipe spacer	
1001-0028	Nut M3 x 2.3	
1001-0029	Stud Ø7 x 2.3	
1001-0030	Shaft Ø3. 112	
1001-0031	Spring Ø5 x 18	
1001-0032	Pinion gear	
1001-0033	3v Motor	
1001-0034	Battery holder	
1001-0035	Microphone	
1001-0036	PC Board	
Sets		
1001-0037	Body set	
1001-0038	Wheel & Cover set	
1001-0039	Tire set	
1001-0040	Arm set	
1001-0041	Wire set	

IMPORTANT: If you have a problem, please don't contact your local shop but call our technical support line on 978-568-0484