

## **OVERVIEW**

# ROBOBUG (Code: ROBOBUG)

#### DESCRIPTION

The *ROBOBUG* is a small, light-sensing robot that can be controlled (steered) by shining a light source from a small torch or your mobile phone on to its sensors.

When light is shone onto one of the sensors, the motor controlled by that part of the circuit starts, causing the robot to change direction. If light is shone onto both sensors the robot will move forward in a straight line.



LEVEL:	Intermediate
HOURS TO CONSTRUCT:	10 -14 hours
SKILL DEVELOPMENT:	<ul> <li>Planning and Design</li> </ul>
	Manufacturing
	Soldering
	Mechanical
	Electrical





## **OVERVIEW** - **ROBOBUG**

#### WHAT'S IN THE KIT?

- □ All the mechanical and electronic components required to make the *ROBOBUG* work including the PCB, motors, battery holder and switch.
- A detailed teaching unit with a complete parts list, design suggestions, step by step instructions for soldering components onto the PCB, and general construction guidelines.



#### WHAT ELSE IS NEEDED?

The following items are required and are available from Scorpio Technology, but need to be ordered separately:

- □ 2 x Battery AA (BATTAA)
- □ Multi strand hook-up wire in a variety of colours (WIREHU10)

The following material is to be supplied by the student / teacher:

- □ Material for the platform (PVC or acrylic sheet, plywood, etc.)
- □ Material (Wire) for the balancing peg (copper, brass or steel)

## **TOOLS REQUIRED**

The following tools are required:

REQUIRED TOOLS	ORDERING CODE
Assorted hand tools – depending on the choice of materials to be used	-
Ruler and pen	-
Craft knife	CRKNF
Soldering Iron and Soldering iron stand: – a good quality soldering iron, with a fine tip or	SOLDIRN SOLDIRNSTD
Soldering station	SOLDSTN
Solder: – 0.71mm 60/40 solder is recommended	SOLD250/SOLD500
Wire strippers	WIRESTR
Side cutters	SIDECUT or SIDECUTM
Drill Bit – 2.3mm	DB2.3
Drill Bit – 3.5mm	DB3.5

In addition, the following tools are useful to have and are available from Scorpio Technology, but need to be ordered separately if required:

- □ Component lead forming tool (for resistors, diodes etc.) (COMPLFT)
- □ PCB Holder (PCBHOLD)



### ABOUT THE PROJECT

The major features of this project are the planning, design, construction and assembly stages of a simple robotic device.

#### DESIGN PHASE

□ Create your own unique *ROBOBUG* design based on our drawings which focus on component relationships, rather than dimensions. This provides scope for students to individualise their *ROBOBUG* design and increase their engagement in the project.



During the **Design phase**, students will need to:

- □ Evaluate the suitability of various materials, such as PVC, acrylic, plywood or balsa wood
- □ Evaluate available technologies that can be used, for example:
  - 3D printer see example of a Ladybird beetle
  - laser cutter (which allows more interesting shapes than usual)
  - vacuum former (if making an oval platform you could form a body to suit, eg. a football shape)
- □ Take into account weight distribution and ease of operation
- □ Consider the practical aspects of construction and assembly. For example, where to drill holes for the wires to the motors

#### MAKING / CONSTRUCTION

Once the Design process has been completed, the students will be able to start **building their design**. They will:

- □ Make and assemble the *ROBOBUG* structure they have designed (platform, motor mounts and balancing peg)
- $\hfill\square$  Assemble and solder the PCB and its components
- □ Mount the PCB and motors on to the structure
- $\hfill\square$  Wire up the PCB and motors
- □ Test and adjust the *ROBOBUG*
- □ Troubleshoot any problems!



### DOES THE TEACHING UNIT INCLUDE ANY THEORY?

The Teaching unit has a THEORY section, that covers how the *ROBOBUG*'s circuit works when light falls on the Light Dependent Resistors (LDRs).

## **3D PRINTING**

If you have a 3D printer, you can embellish your *ROBOBUG* by designing your own base and cover and printing them out as shown in the Ladybird beetle example below.



Teachers can obtain the STL files for this design from Scorpio Technology by emailing us and requesting a copy of the files.

