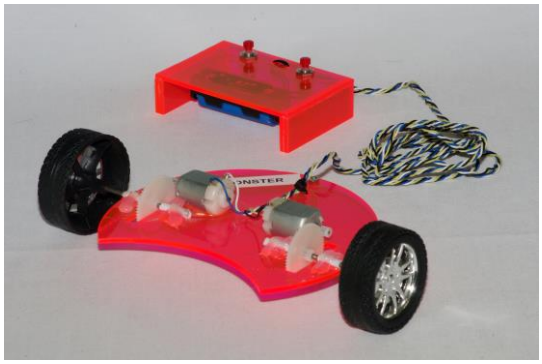
OVERVIEW

MARK'S MONSTER – NO SOLDER
(Code: MARK-NS)

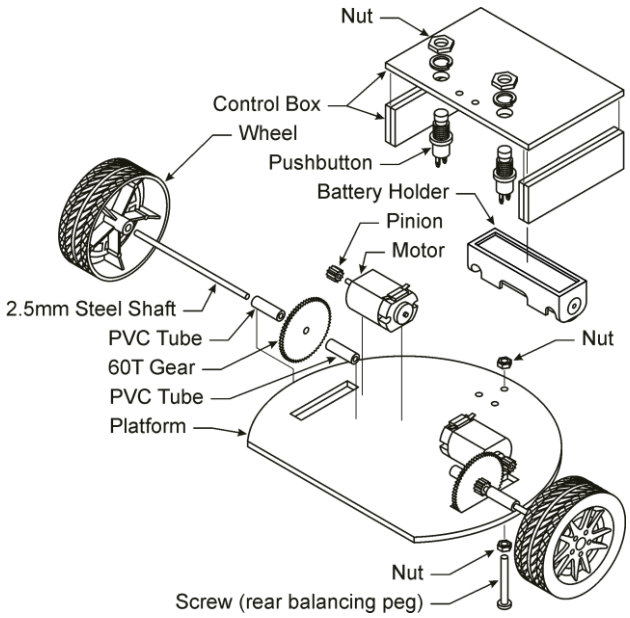
DESCRIPTION

MARK'S MONSTER is a small agile vehicle that responds to a wired hand held controller, which is used to steer the vehicle, using two push buttons to move forwards, left or right.

MARK'S MONSTER has two independent motors and gear-drives, each controlled by its own push button switch. If both buttons are pushed simultaneously the vehicle travels forward in a straight line, but if only one push button switch is pushed the car turns in the desired direction.



LEVEL:	Intermediate
HOURS TO CONSTRUCT:	8 - 10 hours
SKILL DEVELOPMENT:	• Planning and Design • Manufacturing • Mechanical • Electrical • Testing



* a solder version is available – code: *MARK*

OVERVIEW – Mark's Monster – No Solder

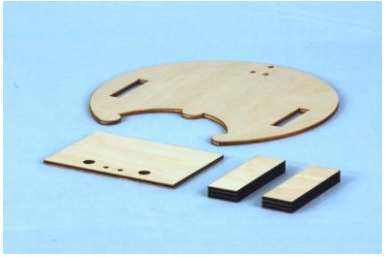
WHAT'S IN THE KIT?

- ☐ All the mechanical and electrical components required to make the *MARK'S MONSTER* work including the battery holder, motors, screw-on connectors and switches.
- ☐ A detailed teaching unit with a complete parts list, design suggestions, general construction guidelines and suggestions for testing and possible applications.

WHAT ELSE IS NEEDED?

The following items are required in addition to the kit and must be supplied by the maker – some are available from Scorpio Technology, but need to be ordered separately:

ADDITIONAL REQUIREMENTS	ORDERING CODE
Multi strand hook-up wire in 3 different colours (recommend approx. 1 to 1 ½ metre each colour per kit)	WIREHU10
1 x AA battery	BATTAA or BATTALK40
Double-sided adhesive tape (optional – can be used instead of hot glue at several stages of assembly)	TAPEDS
Hot glue	GLUESTK
Single sided adhesive tape	TAPESS
Various sized gears (optional - to provide different speeds, or for use as locators)	
Cable ties – 100mm, to hold twisted wires together	CABTIE100A
Material for the platform (PVC or acrylic sheet, plywood, etc.) – approx. 3mm thick 100x200mm & for handheld control unit *OR* Mark's Monster plywood body parts	--- *OR* MMPLYBP
If experimenting with different applications, the following might be required: ○ Battery holder for 2 x AA batteries (BH2AA) ○ Bamboo skewers, balloons, pins, different sized gears, tennis ball / table tennis ball	



Mark's Monster plywood body parts (MMPLYBP)

RECOMMENDED SPARES

We recommend the following spares when buying class sets of kits to replace parts damaged or lost by students:

ITEMS	ORDERING CODE
Wheels – 52mm diameter (chrome) (pack of 40)	W52C2
Steel rod and Plastic guide tube	SRGTW – 5 of each in a pack
All Spur gears (packs of 10 or packs of 50 available)	GEAR60/10/2.4
All Pinion gears (packs of 10 or packs of 50 available)	GEAR8/1.9
Screw-On connectors (Pack of 100)	CONN-SC
Motors with wires (Pack of 5)	MOT12W
Pushbutton momentary switch with wires (Pack of 5)	PUBUTMW

TOOLS REQUIRED

The following tools are required. Some are available from Scorpio Technology, and can be ordered separately if required:

REQUIRED TOOLS	ORDERING CODE
Assorted hand tools (depending on materials used)	-
Hammer	HAMMERCP/HAMMERCL
Ruler and pen	-
Craft knife	CRKNF
Scroll saw or hand saw (optional depending on shape and material)	-
Wire strippers	WIRESTR
Side cutters	SIDECUT or SIDECUTMIN
Mini Bolt Cutters	BOLTCUTM
Hot glue gun (unless using double & single sided tape)	GLUEGUN
Glue sticks – 11mm – Pack of 5 (if using hot glue gun)	GLUESTK
Flat smooth cut file (for de-burring steel rod ends)	-
Vice or clamp	-
Drill (either powered or a hand drill)	-
Drill bits: ○ 3.5mm ○ 7.0mm	DB3.5
Nails (optional)	-
Philips Head Screwdriver #2 point for bolts	SCREWDRPH2/100
Spanner or Multitool for 3mm nuts	- or MULTITOOL

ADDITIONAL / USEFUL EQUIPMENT

Heat gun (if using hot glue gun) – for softening hot glue for repositioning or removal of components **or** Hairdryer	TH1609 **or** -

Sand paper (if using hot glue)	-

ABOUT THE PROJECT

The major features of this project are the planning, design, construction and assembly stages of a small multidirectional vehicle.

DESIGN PHASE

☐ Create your own unique *MARK'S MONSTER* design based on our drawings. Focus on component relationships, rather than dimensions. This provides scope for students to individualise their *MARK'S MONSTER* design and increase their engagement in the project.

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

- ☐ Determine intended use / application of this vehicle (eg. Soccer, balloon killer wars)
- ☐ Evaluate the suitability of various materials, such as PVC, acrylic, plywood or balsa wood
- ☐ Determine whether a body will also be constructed for this vehicle – if so, evaluate the suitability of various materials
- ☐ Determine whether to use different sized gears from those provided to experiment with different gear ratios
- ☐ Evaluate available technologies that can be used, for example:
  - 3D printer
  - laser cutter (which allows more interesting shapes than usual)
  - vacuum former
- ☐ Take into account weight distribution and ease of operation
- ☐ Consider the practical aspects of construction and assembly. For example, clearance for the wheels, length of wires for the remote control (to avoid tangling)

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 *MARK'S MONSTER* platform they have designed
- ☐ Assemble and mount the wheel assembly, battery holder and motor on to the platform
- ☐ Make and assemble the handheld control unit
- ☐ Wire up and connect the battery holder, motors and switches
- ☐ Test and adjust the *MARK'S MONSTER*
- ☐ Troubleshoot any problems!

DOES THE TEACHING UNIT INCLUDE ANY THEORY?

The Teaching unit does not have a THEORY section.

For more information and ideas, go to our website:
https://www.scorpiotechnology.com.au/kits-in-action

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