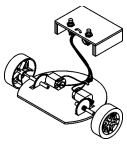
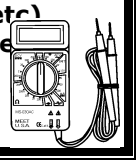
2012 *TECHNOLOGY* CATALOGUE



CONTENTS:



TECHNOLOGY KITS FOR SCHOOLS

TO HELP YOU, the teacher, we have developed a large variety of electrical / mechanical devices to learn with, and appeal to students. The devices are used to introduce various technologies, and they can then build on that knowledge. The kits are designed to be interesting and fun, both in and out of class, and meet the requirements of the Design, Creativity and Technology elements of teaching requirements, and suit all year levels – from senior primary through to senior secondary.

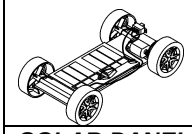
THE KITS INTRODUCE technology through simple electronic and mechanical systems, and progressing through the choice of kits, to higher level systems and electronics, thus increasing the complexity and time required. Some Intermediate and Advanced kits use PCBs and Electronics components and Picaxe technology.

NEW in 2012 !!!

In this Catalogue we have introduced a range of entry level kits – to suit younger or less experienced students. These allow the student to assemble the kits, without the need to solder anything! These are all "NO SOLDER" variants of existing kits: *Have a look* - one might be what you need to introduce technology to new students.

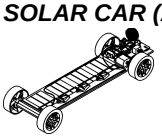
SOLAR KITS

SOLAR CAR v2 / SOLAR CAR v2 - NO SOLDER



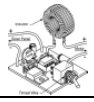
This is a basic four-wheeled vehicle and is driven by an electric motor, which is powered by a solar panel. The Solar panel has two arrays, which can be connected in series or parallel. An on/off switch controls the driving.

SOLAR CAR (ADVANCED)



The electric motor is powered by a complex solar panel. The Solar panel consists of 4 off 1.5 Volt arrays, which can be connected in series, parallel or a combination of both, and set up to run with advanced electronics (SPPC), to improve performance.

SOLAR PANEL POWER CONTROLLER (SPPC) - Multiplies starting current

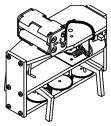


The *SPPC* kit is useful, as powering an electric motor directly from a solar panel can be inefficient. The *SPPC* circuit holds the output of the solar panel at a preset power voltage point, and substantially boosts the starting current available to the motor. The Kit comes unassembled, and consists of the PCB and electronic components. *Weight approx. 45 grams.* Note: formerly called *SOLAR SWITCH* or *SOLAR MAXIMISER*

The *SOLAR PANEL POWER CONTROLLER* is available in 2 variants:
SSOLLV**:** This version is the Low voltage unit (VOC 6.5-12V), and is used in the Solar Boat challenge, and the *ADVANCED SOLAR CAR.*
SSOLAR**:** This version is the Standard voltage unit (VOC 13-23v), and is designed for use in the Solar Model car challenge

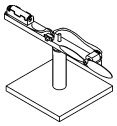
TECHNOLOGY KITS

ANT



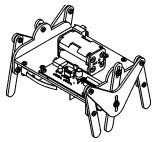
The *ANT* is a four-legged walking device. The walking motion is achieved by the use of electric motors, driving gears and a crank mechanism, to move each leg forward and backwards, also raising and lowering them.

BALANCE PLANE / BALANCE PLANE - NO SOLDER



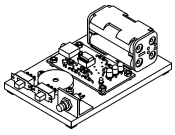
This model balances a beam at its centre of balance. The challenge is to accurately locate that point. When balanced, the beam is powered by an electric motor driving a propeller, and rotates about the equilibrium point.

BEETLE



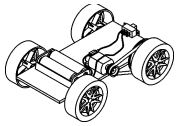
BEETLE is a six-legged, user programmable device. When it hits an object it backs away, turns around and goes in another direction, or it changes direction if it doesn't hit anything for a time. *BEETLE* is controlled by a PICAXE-08M microcontroller.

BEEPA



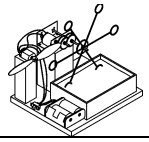
BEEPA project provides an introduction to microcontrollers, programming and electronics. *BEEPA* can be programmed to light three LEDs, produce sound from a piezo transducer, respond to pushbutton presses and respond to the light level. Instructions for 19 different projects.

BELT DRIVEN CAR / BELT DRIVEN CAR - NO SOLDER



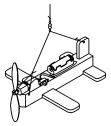
This is a four-wheeled vehicle at its simplest. Power is provided to one axle by an electric motor driven belt. These vehicles can be raced, and can be added to. Also, car bodies can be built, and decorated in the Art class!

BUBBLE BLOWER / BUBBLE BLOWER - NO SOLDER



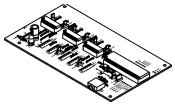
This device takes the "puff" out of bubble making! A number of hoops rotates through bubble bath liquid, generating a non-stop stream of bubbles. The *BUBBLE BLOWER* needs experimentation in a number of areas.

CAPTIVE AEROPLANE/ CAPTIVE AEROPLANE-NO SOLDER



This electric motor driven, propeller powered plane is suspended from a fixed point, and flies in a never-ending circle! or along a wire between 2 points. This also suits a flying pig, a witch on a broomstick, bird, vampire etc.

CONTROLLER



The *CONTROLLER* can control up to six motors, using position feedback. The central control element for the *CONTROLLER* is a Picaxe -40X microcontroller. Other devices may also be connected to the unused inputs and outputs.

SCORPIO TECHNOLOGY VICTORIA PTY. LTD.
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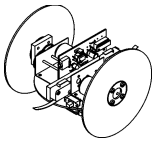
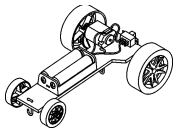
2nd November 2011 www.scorpiotechnology.com.au E-mail: sales@scorpiotechnology.com.au

DIZZY



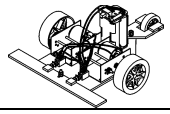
DIZZY is a programmable two-wheeled vehicle. When it hits an object it backs away, spins around and goes in another direction. It changes direction if it hasn't hit anything for a while. *DIZZY* has a student programmable PICAXE-08M microprocessor.

DRAGSTER / DRAGSTER - NO SOLDER



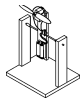
The *DRAGSTER* is a basic battery powered vehicle, with a choice of gearing. It is an introduction to electro-mechanical devices. For racing a number of *DRAGSTERs* students can experiment with different gear ratios, to see the effect on speed and acceleration.

EXPLORER



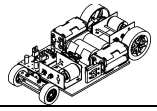
The *EXPLORER* is a vehicle that, when it bumps into an object, changes direction. The *EXPLORER* has a bumper bar, to actuate one or both of the Push slide switches (which actuate the electric motor driven gearboxes which drive the wheels).

FERRIS WHEEL / FERRIS WHEEL - NO SOLDER



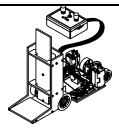
The kit builds a propeller driven *FERRIS WHEEL*. It has a central arm, with an electric motor driven propeller. It rotates about a shaft at the centre of gravity.

FOLLOW THE WHITE LINE VEHICLE



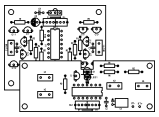
The *FOLLOW THE WHITE LINE VEHICLE* follows a white line taped to a dark surface. Light Dependent Resistors determine the position of the vehicle relative to a white line, and steer it along that.

FORKLIFT



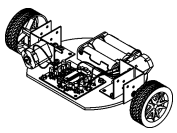
The *FORKLIFT* is a motorised vehicle that can drive, steer and lift a load. It is based on an industrial forklift. Function of the three motion directions is controlled by a tethered control box.

INFRA-RED CONTROL UNIT – 4 BAND (IRCU)



The INFRA-RED CONTROL UNIT has four (4) channels, allowing 4 devices to be used at the same time. On each band the Transmitter can send up to four signals, to eg control 2 electric motors to go forward and reverse. The *IRCU* consists of the Transmitter and the Receiver PCB assemblies, all the switches and the battery holders.

THE JOUSTER



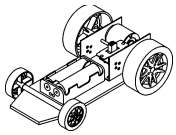
THE JOUSTER is a small agile vehicle, driven by 2 motors, each with forward and reverse motion. It is controlled by Infra red remote controls, and the motors respond to the inputs from 4 push button switches. This device has 4 switchable bands, to allow 4 *JOUSTERS* to operate at the same time.

INFRA-RED REMOTE CONTROL UNIT is available in two (2) variants:

S-IR-A: This version has the Transmitter and Receiver with all the PCB components fully assembled to the PCBs.

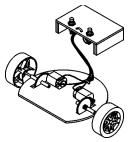
S-IR-U: This version has the Transmitter and Receiver PCBs and their components unassembled, with each set in a separate plastic bag

LO-RIDER



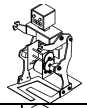
LO-RIDER is a basic four-wheeled vehicle, with front and rear wheels on fixed axles. It can go forward and back, and comes with a pre-assembled gearbox with a choice of two gearbox ratios. It can be used for various experiments or paired with another vehicle for racing and performance tests.

MARK'S MONSTER / MARK'S MONSTER - NO SOLDER



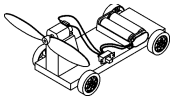
MARK'S MONSTER is a small agile vehicle that responds to two push buttons to move forwards, left or right. Each motor is controlled by one push button switch. If both buttons are pushed simultaneously the vehicle travels forwards, if only one is pushed, the car turns in a circle in the desired direction.

MR. WALKER

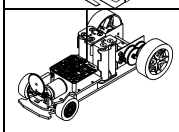


MR. WALKER is a robot / mechanical man, who will keep on marching. He has moving arms and legs and glowing red eyes.

PROPELLED CAR / PROPELLED CAR - NO SOLDER



This is a simple four-wheeled vehicle with a difference! The motive power is a motor driven propeller. This can be developed further, – e.g. by making a body,



RADIO CONTROLLED VEHICLE (RCV)

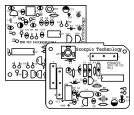
The *RADIO CONTROLLED VEHICLE (RCV)* is controlled by a 2 Band Radio control. This allows 2 cars (RCVs) to run at the same time. The RCV has forward and reverse motion, can be steered either left or right, and has a „Turbo" button (to increase the speed). It is driven through a *MULTI-RATIO GEARBOX* – the student has to work out the ratio and assemble the gearbox & motor.

There are **two** variants of the *RCV* kit available: - the user needs to decide if they want the *RADIO CONTROL* receiver and transmitter PCBs in assembled or un-assembled form (refer below).

RADIO CONTROLLED VEHICLE is available in 2 variants:

SRCV-A: This version has the Transmitter and Receiver with all their components fully assembled to the PCBs.

SRCV-U: This version has the Transmitter and Receiver PCBs and their components unassembled, with each set in a separate plastic bag



RADIO CONTROL UNIT – 2 BAND:

The *RADIO CONTROL UNIT (RC)* can be used to control a variety of mechanisms / devices. The *RC* operates on a frequency of 27MHZ and comes in **two switchable bands**, to allow 2 units to be used at the same time, by selecting the desired band. It has a transmission distance up to 25+ metres.

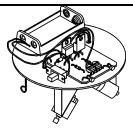
The *RC* kits contain the Receiver & Transmitter PCBs, all the switches and the battery holders.

RADIO CONTROL UNIT – 2 BAND KIT is available in 2 variants:

SRC-A: This version has the Transmitter and Receiver with all their components fully assembled to the PCBs.

SRC-U: This version has the Transmitter and Receiver PCBs and their components unassembled, with each set in a separate plastic bag

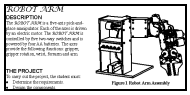
SUGGESTION: If buying a class set of *RCVs*/RCs, we recommend buying one set of assembled PCBs, for testing of student assembled PCBs.



ROBOBUG

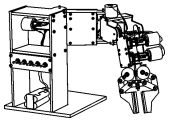
The *ROBOBUG* is a light-sensing device activated by shining a torch on to its sensors. It is driven by two DC motors and is controlled by two Light Dependent Resistors.

ROBOT ARM INSTRUCTIONS



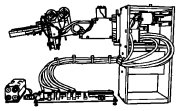
The *ROBOT ARM* needs accurate manufacture, and requires a set of instructions and drawings to be purchased. Worth purchasing before you start, to familiarise yourself with the project.

ROBOT ARM



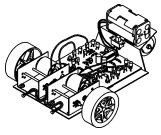
The *ROBOT ARM* is a five-axis pick-and-place manipulator. Each axis is driven by an electric motor, and controlled by a switch. These provide different functions: gripper, gripper rotation, wrist, forearm and arm. A low cost entry into robotics.

ROBOT ARM CONTROLLER



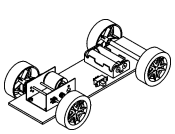
This is a CONVERSION KIT, for the *ROBOT ARM*. This uses a Picaxe, and allows the *ROBOT ARM* to be PROGRAMMED. You can convert an existing *ROBOT ARM*, or use this with the Robot Arm instructions, to build a programmable Robot Arm.

SEEKER



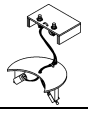
The *SEEKER* is a three-wheeled vehicle: both front wheels are driven by separate gearboxes & motors. Its travel direction is controlled by Light Dependent Resistors. When it approaches an object or enters shade it reverses and changes its direction.

SIMPLE VEHICLE

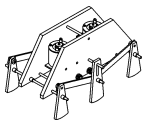


The *SIMPLE VEHICLE* is a very basic vehicle, with a choice of 4 gearbox ratios at the construction stage. It can travel forward and in reverse.

SOCCER BOT / SOCCER BOT - NO SOLDER

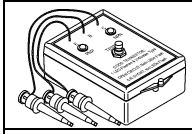


The student needs to design and make the *SOCCER BOT* and a hand held controller. When made, the *SOCCER BOT* is used to play against other students, by catching and pushing a tennis ball around!



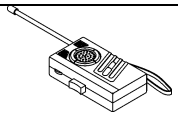
STOMPER – SIX LEGGED STALKER

The *STOMPER* is a six-legged device, driven by two electric motors through a series of gears. There is a lot of scope in the design of the body and legs, the size, and of the driving links.



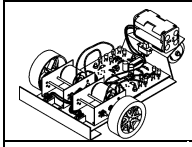
TRANSISTOR TESTER (IN CIRCUIT)

This kit is for building a transistor tester and fault-finder. It tests transistors without having to unsolder them from their circuit.



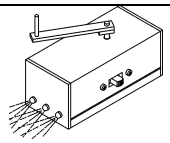
WALKIE-TALKIE

The *WALKIE TALKIE* is a transceiver which transmits speech and Morse code on a FM frequency of 27.145 MHz. Its range is approx. 100 metres. Each kit has components for one walkie-talkie handpiece.



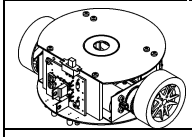
WANDERER

The *WANDERER* is a three-wheeled vehicle, with 2 motor/ gear-boxes controlled by two push button switches behind a bumper bar. When it encounters an object it reverses and changes direction.



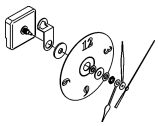
WIND-UP TORCH

The *WIND-UP TORCH* uses 3 super bright LEDs, and has a 3 stage gearbox. It has a small DC generator, turned by hand, to charge a small battery. The battery provides power for two levels of brightness.



WOMBAT

The *WOMBAT* is a line-following device. An electronic circuit senses the line and changes the speed of each wheel, so that *WOMBAT* follows the line. (As in "Picaxe - SES Introduction to Microcontrollers".



CD CLOCK

Recycle your old CD's, to make a clock, and add your own artwork to the clock face using our clock components. There is no kit - for the various clock components, refer to our CLOCK CATALOGUE.

...AND …THERE'S ROOM FOR MORE KITS – DO <u>YOU</u> HAVE ANY IDEAS?? If you can develop other ideas for projects to make, we would be happy to get your ideas (we pay royalties to the kit designers). Please feel free to discuss YOUR needs and ideas with us.

Complete Teaching units for the various kits can be obtained from our website. Otherwise, you can phone or e-mail us, to send you a FREE copy of the Teaching unit (description and instructions) for any kits that you may be interested in.

TECHNOLOGY KIT SELECTION CHART

The charts below show how we have graded the kits. These are to be used as a <u>guideline only</u> – construction times can vary considerably, depending upon the student's existing knowledge, skills and experience, as well as the amount of design input expected of them.

TECHNOLOGY KITS CONTENTS:

Each device's kit contains <u>all</u> the <u>electrical</u>, <u>electronic</u> and <u>mechanical</u> components needed to build the device, and each order includes <u>comprehensive instructions</u> /Teaching unit. The teachers only need to supply readily available material (wire, solder, plastic sheets, etc).

FEATURES / REQUIREMENTS

KIT NAME	Mechanical	Electrical	Hours to construct	Standard kit CODE No.	Standard kit Quantity & price	„No solder required" kit CODE No.	„No solder required" kit Quantity & price
				Quantity & Price (each)			
INTRODUCTORY KITS / „NO SOLDER" VARIANTS							
Balance Plane	●	●	5-8	SBALAN	1-19: $4.26; 20+: $4.10	SBALAN-NS	1-19: $4.78; 20+: $4.63
Bubble Blower	●	●	8-10	SBUBB	1-19: $6.76; 20+: $6.60	SBUBB-NS	1-19: $7.33; 20+: $7.12
Captive Aeroplane	●	●	5-7	SCAPT	1-19: $3.90; 20+: $3.56	SCAPT-NS	1-19: $4.52; 20+: $4.11
Car - Belt Driven	●	●	6-8	SBELT	1-19: $4.11; 20+: $3.90	SBELT-NS	1-19: $4.63; 20+: $4.42
Ferris Wheel	●	●	5-7	SFERR	1-19: $4.47; 20+: $4.37	SFERR-NS	1-19: $4.99; 20+: $4.89
Soccer 'Bot	●	●	7	SSOCER	1-19: $4.68; 20+: $4.32	SSOCER-NS	1-19: $5.20; 20+: $4.84
Solar Car (v2)	●	●	10-15	SSOLAR	1-19: $10.65; 20+: $10.35	SSOLAR-NS	1-19: $10.75; 20+: $10.45
Propelled Car	●	●	5-7	SPROP	1-19: $4.26; 20+: $4.16	SPROP-NS	1-19: $4.78; 20+: $4.68
INTERMEDIATE KITS / „NO SOLDER" VARIANTS							
Dragster	●	●	10-14	SDRAG	1-19: $6.08; 20+: $5.82	SDRAG-NS	1-19: $6.60; 20+: $6.34
Mark's Monster	●	●	8-10	SMARK	1-19: $5.98; 20+: $5.72	SMARK-NS	1-19: $6.50; 20+: $6.24
The "NO SOLDER" kits have the electric motor and the switch with wires already pre-soldered to them. Thus these kits could be assembled without the need for soldering – simply by twisting the wires together, and insulating those ends.							

FEATURES / REQUIREMENTS

CODE No.	KIT NAME	Mechanical	Electrical	Electronic	PCB	Picaxe	Hours to construct	Qty & Price
INTRODUCTORY KITS								
SLORID	Lo-Rider	●	●				2-4	1-19: $5.82; 20+ $5.67
SSIMP	Simple vehicle	●	●				10-15	1-19: $7.70; 20+: $7.38
INTERMEDIATE KITS								
SANT	Ant	●	●				16-20	1-19: $8.27; 20+: $7.96
SEXPL	Explorer	●	●	●			22-24	1-19: $12.06; 20+: $12.01
SMRWA	Mr. Walker	●	●				14-18	1-19: $5.30; 20+: $4.99
SINFRA	Infra-red control Unit - 4 Band (with Assembled PCBs)		●	●	●		2-4	1-19: $8.89; 20+: $8.68
SINFRU	Infra-red control Unit - 4 Band (with Un-assembled PCBs)		●	●	●		4-6	1-19: $8.89; 20+: $8.68

CODE No.	KIT NAME	Mechanical	Electrical	Electronic	PCB	Picaxe	Hours to construct	Qty & Price
SJOUST	The Jouster	●	●	●	●		9-11	1-19: $13.10; 20+: $12.90
SROBO	Robobug	●	●	●	●		10-14	1-19: $10.82; 20+: $9.98
SSOLDV	Solar Car (Advanced)	●	●				15-20	1-19: $18.65; 20+: $18.40
SSOLLV	Solar Panel Power Controller			●	●		3-5	$9.62 (Low Voltage-VOC 6.5-12V)
SSOLAR	Solar Panel Power Controller			●	●		3-5	$9.62 (Standard unit-VOC 13-23V)
SSTOM	Stomper	●	●				16-22	1-19: $9.46; 20+: $8.79
STRAN	Transistor tester			●	●		3-6	1-19: $15.91; 20+: $15.39
SWIND	Wind-up Torch	●		●	●		20-26	1-19: $12.27; 20+: $11.85
---	Gearboxes (various ratios)	●	●				---	Refer "Sub-systems"
ADVANCED KITS								
SBEEP	Beepa	●	●	●	●	●	30	1-19: $20.48; 20+: $20.07
SBEET	Beetle	●	●	●	●	●	20-30	1-4: $32.40; 5-19: $31.98; 20+: $31.51
SCONT	Controller	●	●	●	●	●	30	1-19: $50.18; 20+: $48.10
SDIZZ	Dizzy	●	●	●	●	●	20-30	1-4: $32.40; 5-19: $31.98; 20+: $31.51
SFOLL	Follow White Line Vehicle	●	●	●	●		35-45	1-19: $19.08; 20+: $18.61
SFORK	Forklift	●	●	●	●		40-50	1-4: $42.56; 5-19: $42.17; 20+: $41.86
---	*Radio Controlled Vehicle (RCV)*						---	1-19: $19.39; 20+: $18.67
SRCV-A	RCV-with RC PCBs assembled	●	●		●		30-35	*As above*
SRCV-U	RCV- RC PCBs nee+d assembly	●	●	●	●		33-38	*As above*
SRC-A	Radio Control Unit – 2 Band			●	●		2-5	$13.57 (with Assembled PCBs)
SRC-U	Radio Control Unit – 2 Band			●	●		5-10	$13.57 (with Un-assembled PCBs)
SROBI	Robot Arm - Instructions						---	$4.68 each
SROBA	Robot Arm	●	●				50-60	1-4: $37.85; 5-19: $36.50; 20+: $36.14
SROBC	Robot-Arm Controller	●	●	●	●	●	30+	1-19: $52.36; 20+: $50.28
SSEEK	Seeker	●	●	●	●		22-28	1-19: $20.75; 20+: $20.33
SWALK	Walkie talkie			●	●		15-18	1-19: $13.62; 20+: $13.21
SWAND	Wanderer	●	●	●	●		23-29	1-19: $20.17; 20+: $19.39
SWOMB	Wombat	●	●	●	●		18	1-19: $16.80; 20+: $16.33

SUB SYSTEMS – incl. ELECTRIC MOTORS & GEARBOXES

ELECTRIC MOTORS








SPECIFICATIONS / CODE		SM12	SM12W #	SMJ2	SMJ2W #	SM17	SM22	SM30	SGEN
Operating range (Volts)		1.5-4.5	1.5-4.5	1.5-6.0	1.5-6.0	3.0-12.0	1.5-4.5	4.5-6.0	1.5-9.0
No load current	RPM	15,500	15,500	6,700	6,700	11,800	9,000	13,600	2,600
	Amps	0.32	0.32	0.12	0.12	0.30	0.16	0.28	0.025
Under load at Max efficiency	RPM	11,900	11,900	4,450	4,450	9,350	7,350	11,350	2,100
	Amps	1.01	1.01	0.27	0.27	1.04	0.83	1.38	0.089
	Torque-g.cm	10.0	10.0	8.1	8.1	17.5	13.6	29.7	11.0
Testing voltage		3.0V	3.0V	3.0V	3.0V	3.0V	3.0V	4.5V	6.0V
DIMENSIONS									
Body size (O.D.) mm/ across flat		23.8 / 14.5	23.8 / 14.5	23.8 / 14.5	23.8 / 14.5	23.8	24.0	30.0	32.0
Body length (mm)		25.0	25.0	26.9	26.9	26.9	26.9	24.0	20.0
Shaft dia. & length (mm)		2.0 / 7.7	2.0 / 7.7	2.0 / 7.7	2.0 / 7.7	2.0 / 6.9	2.0 / 6.3	2.0 / 10.0	2.0/11.0
Weight (grams)		17	20	17	20	28	21	41	43
Price each (supplied in multiples of 5)	5-20	$1.56	$1.66	$1.56	$1.66	$1.68	$1.66	$2.57	$2.44
	25-50	$1.54	$1.64	$1.54	$1.64	$1.66	$1.64	$2.40	$2.24
	55-100	$1.52	$1.62	$1.52	$1.62	$1.64	$1.62	$2.24	$2.13
	100+	$1.50	$1.60	$1.50	$1.60	$1.62	$1.60	$2.08	$2.04

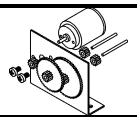
SM12W and SMJ2W have 120mm long wires ## **For More POWERFUL motors refer to the SOLAR CHALLENGE Catalogue**

GEAR BOX & MOTOR KITS

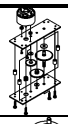
Code	Gearbox	Motor	Gear reduction / ratio First	Second	Third	Fourth	Price each 1 - 4	5 - 19	20+
SBASIC	Basic Gearbox & Motor kit	SM17	50:12	21:12	---	---	$3.80	$3.69	$3.64
SINTER	Intermediate Gear box kit	SM17	1:4	1:16	1:64	1:256	$4.94	$4.78	$4.63
SGRED	Gearbox and Motor / Generator kit	DC generator	---	---	---	60:1	$4.78	$4.63	$4.47
SMULTI	Multi ratio gear box kit	#	1:5	1:25	1:125	1:625	$4.16	$4.00	$3.85
SVERS	Versatile Gearbox kit	SM22	1:22	1:48	1:88	1:290	$3.65	$3.55	$3.50
SSHALL	Shallow Gear box kit	SM17	1:30	1:125	---	---	$3.80	$3.69	$3.64

Depending on the selected application, this gearbox kit must be used with either the standard SM17 or the high-performance SM30 motors - the motor needs to be purchased separately

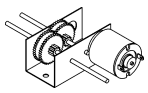
BASIC GEARBOX & MOTOR KIT
Components to make a Gearbox assembly. Easy assembly, detailed instruction. 2 different gear ratios available, either 50:12 or 21:12.



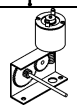
GEARBOX & MOTOR/ GENERATOR KIT
Gear reduction and motor / generator kit, as used in the Wind-up Torch.



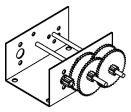
INTERMEDIATE GEARBOX & MOTOR KIT
Components to make an Intermediate Gearbox assembly. Easy assembly, detailed instruction. 4 different ratios to make: ranging from 1:4 up to 1:256



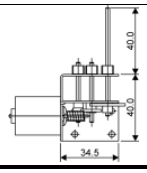
SHALLOW GEARBOX & MOTOR KIT
This gearbox provides a choice of 2 gear ratios, and the shallow gear case allows the designer to utilise narrow spaces.



MULTI-RATIO GEAR BOX
With the components for this gearbox, a choice of 4 usable gear ratios is available. Two different motors are available for these kits (the basic SM17 and the higher powered SM30) – the motor must be selected before starting assembly and must be purchased separately.



VERSATILE GEAR BOX KIT
The *Versatile gearbox kit* provides a broad range of ratios, in one of two different configurations – the pre-assembled JOUSTER and BUBBLE are 2 of the possible variants.

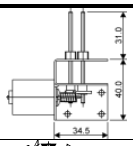


ASSEMBLED GEAR BOX & MOTOR

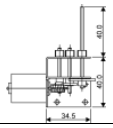
			Gear reduction / ratio				Price each		
Code	Gearbox	Motor	First	Second	Third	Fourth	1 - 4	5 - 19	20+
STWOR	Two ratio Gear box kit	SM17	1:5	1:25	---	---	$5.20	$5.04	$4.89
SFOUR##	Gearbox with 4 ratios – changeable	3.0V	1:12	1:32	1:84	1:236	$5.25	$5.10	$4.95
SVJOU	Versatile (Jouster version)	SM22	1:22	1:48	---	---	$3.65	$3.55	$3.50
SVBUB	Versatile (Bubble version)	SM22	1:290	---	---	---	$3.65	$3.55	$3.50
SWIND	Wind up gearbox	Spring driven	---	---	---	---	Refer below		

This Gearbox is fully assembled, and available in all 4 ratios - the required ratio must be specified.

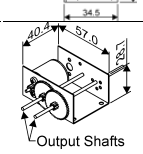
JOUSTER GEARBOX
This gearbox comes fully assembled, including the motor. This gearbox has a choice of 2 ratios, and one of the output shafts needs to be cut shorter.



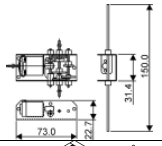
BUBBLE GEARBOX
This gearbox comes fully assembled, including the motor. This gearbox has one 2 ratio available.



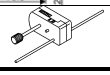
TWO-RATIO GEAR BOX & MOTOR
The preassembled gearbox has a choice of 2 ratios, and the motor has to be assembled to the gearbox, by the user. Note: with this gearbox only the supplied SM17 motor can be used.



GEAR BOX WITH 4 RATIOS
This pre-assembled Gearbox / Motor is available in all 4 ratios listed. It has the advantage that any of the other ratios can be obtained by moving some of the gears. The axle shaft width is 150mm.

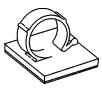


WIND-UP GEARBOX Spring driven, wind-up plastic gearbox with 1.2 mm dia. x 90 mm long output shaft.
Supplied in multiples of 5. Price each: 5 – 20 -$1.26; 25 – 50 $1.22; 55 – 100 $1.17; 100+ $1.14



MISCELLANEOUS

SEMCL – ***ELECTRIC MOTOR MOUNTING CLIP***
Self-adhesive electric motor mounting clip. Securely holds our SM12 to SM30 motors. Supplied in multiples of 5. Price ea. 1 – 5 $1.09; 6 – 20 $0.98; 21+ $0.94



SFRON – ***FRONT WHEEL AND STEERING LINKAGE***
Front wheel and steering linkage for a vehicle. (Same components as used in the Radio Controlled vehicle). Price ea. $2.96.

SOLAR PANELS (Small Hobby panels)

Below is part of our range of popular SOLAR PANELS. For information on the rest of the range (designed for various SOLAR CHALLENGES), have a look at our website, or call us for a *SOLAR CATALOGUE*.

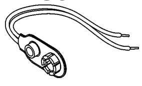
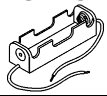
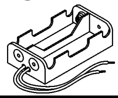
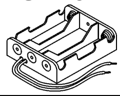
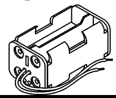
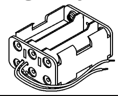
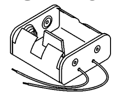
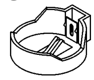
Number#	Panel #1	Panel #2	Panel #3	Panel #4	Panel #5 *	Panel #8
Size (mm)	86x55mm	86x133mm	86x82mm	86x172mm	22x84mm	86x147mm
Watts	0.4	1.2	0.68	1.6	0.18	1.4
Volts/Amps (nom)	0.5V/0.8A	1.5V/0.8A	2.0V / 0.34A	2.0V / 0.81A	0.5V / 0.37A	2.0V/0.63A
Price (each)	$4.16	$7.12	$4.95	$8.27	$2.65	$6.88

Number#	Calibrated (#10) **	Panel #11	Panel #13	Panel #14	Panel #23	Panel #29
Size (mm)	52x56mm	91x104mm	68x216mm	60x78mm	86x188mm	162x250m
Watts	100% sun=100mA	2 x 0.3	4 x 0.3	0.45	1.7	4.9
Volts/Amps (nom)	1.5V/0.1A	2x 1.5V/0.3A	4 x1.5V/0.2A	1.5V/0.3A	2 x 1.0V/0.85A	7.0V - 0.7A
Price (each)	$8.85	$5.15	$9.95	$3.80	$8.50	$75.90

* This panel has 100mm long wires.
** Panel#10 is a calibrated panel, for measuring the intensity of the sunlight. When connected to a digital multi-meter, it will show the sun's intensity in percentage (%), at the time of testing. This panel has 100mm long wires.

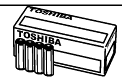
BATTERIES & BATTERY HOLDERS

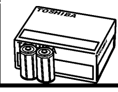
BATTERY HOLDERS				Price each			
Code	For….	Wires	Sold in multiples of:	5-20	25-50	55-100	100+
SCLIP	9V	Yes	5	$0.50	$0.47	$0.45	$0.43
SBH-S	1 x AA	Yes	5	$0.81	$0.79	$0.77	$0.74
SBH-2B	2 x AA	Yes	5	$0.83	$0.81	$0.79	$0.77
SBH-3B	3 x AA	Yes	5	$0.94	$0.91	$0.87	$0.84
SBH-4B	4 x AA	Yes	5	$1.03	$1.00	$0.95	$0.91
SBH-6B	6 x AA	Yes	5	$1.13	$1.09	$1.05	$1.02
SBH-2C	2 x C	No	5	$1.58	$1.51	$1.48	$1.45
SBH-LIR	3.6V Lithium ion	No	5	$1.55	$1.50	$1.46	$1.44

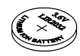
SCLIP	SBH-S	SBH-2B	SBH-3B	SBH-4B	SBH-6B	SBH-2C	SBH-LIR
							

BATTERIES

Code	For….	Type	Price per pack
SPB(AA)	AA (Toshiba)	Heavy duty	$2.03 (for 4)
SNBATT	'N' Type (11mm dia. X 28mm long)	Super Heavy duty	$3.17 (for 2)
SLIR-2032	3.6V Lithium ion	Rechargeable	$3.83 (each)



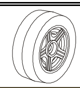
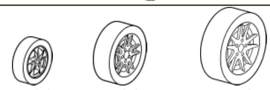


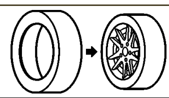
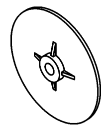


COMPONENTS - TECHNOLOGY

PLASTIC & RUBBER WHEELS

CODE	Wheel dimensions: Dia. (mm)	Width (mm)	Hole dia. (mm)	Tyre material	Hub Colour	Price: Qty. Per pack	Price per pack
WHEELS – WITH RUBBER TYRE							
W35W	35	12	2.4	Soft Rubber	White	40	$10.50
W35C	35	12	3.1	Soft Rubber	Chrome	40	$11.60
WHEELS – WITH CHROME HUB							
W30C	30	9	2.4	Plastic	Chrome	40	$7.02
W38C	38	13	2.4	Plastic	Chrome	40	$8.53
W52C**	52	18	2.4	Plastic	Chrome	40	$10.82
RUBBER TYRE							
TY54 **	54	18	Tyre Only	Rubber	n/a	40	$10.40
** TY54 is a rubber tyre, designed to replace the hard plastic tyre on the W52C wheel							
WHEELS – WITH LOW ROLLING RESISTANCE							
SS70A	70	2	7.0	Moulded Nylon	Yellow	10	$ TBA
SS70B	70	2	3.0	Moulded Nylon	Yellow	10	$ TBA
SS70D	70	2	2.4	Moulded Nylon	Blue	10	$29.50
SS70E	70	2	10.0	Moulded Nylon	Yellow	10	$29.50

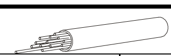



GENERAL NOTES:

- All wheels with a 2.4mm hole are designed to be a press fit on to the 2.5mm steel rod (as below)
- The SS70A & SS70E wheels are designed to be used with bearings (ball races), and are grroved, to use the 60mm "O" as a tyre, to increase traction – refer to the *SOLAR CHALLENGE* Catalogue

PROPELLER SHAFTS, AXLES AND GUIDE TUBES

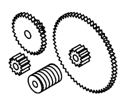


Item	Steel Rod	Steel rod & Guide tube	Carbon fibre rod	Guide Tube	Guide Tube	Steel rod & Guide tube	Steel rod & Guide tube	Carbon fibre rod & Guide tube
Usage	Axle, Prop.shaft	Axle/shaft & Guide tube	Axle, Prop.shaft	Prop.shaft Guide tube	Axle, Prop.shaft	Prop.shaft Guide tube	Prop.shaft Guide tube	Prop.shaft Guide tube
Code	**SSTR**	**SSSTR**	**SSCFR**	**SSGUIDW**	**SSGUIDY**	**SSGT**	**SSGTY**	**SSCFTY**
Rod OD	2.5mm	3.0 mm	2.5mm	n/a	n/a	2.5 mm	2.5mm	2.5mm
Length	500 mm	500 mm	500 mm			500 mm	500 mm	500 mm
Tube ID	n/a	n/a	n/a	2.7mm	4.5 mm	2.7mm	4.5mm	4.5mm
Length				500 mm	500 mm	500 mm	500 mm	500 mm
Price -5 of ea	n/a	n/a	n/a	n/a	n/a	$12.06	$14.56	$ TBA
Price for 20	$9.31	$15.47	$ TBA	$17.31	$25.27	n/a	n/a	n/a

#1 This guide tube has a larger inner diameter, so that drive line bearings can be used for the steel rod

GEARS and GEAR RACK (0.5 MODULE)

NOTE: not all gears are available in all packs



The GEARS have a number of different hole sizes, to suit different usages:

- The gears with the 1.9 mm dia hole are a press fit on to the 2.0mm dia.) electric motor shaft.
- The gears with the 2.4 mm dia hole are a press fit on to the 2.5mm dia. Steel rod.
- The gears with the 2.6 mm dia hole are free spinning, on the 2.5mm dia. Steel rod – coloured yellow ("press fit" gears are white)
- Spur gears have a second (smaller) gear. For clarity all spur gears have both larger and smaller gears number of teeth listed.
- 12T / 2.4 mm hole Pinion gears are very useful to use as retainers on a 2.5mm rod.

SGEAR 130

A pack of 130 gears, containing a good range of general purpose gears.
- Price for a pack: $30.78

Gear Type	Worm	Pinion	Spur	Spur	Spur	Spur	Spur	Crown
Teeth	---	12	30/10	40/10	50/10	50/14	60/10	20
Diameter	6	7	16	21	26	26	31	11.3
Hole size	1.9	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Quantity	10	60	10	10	10	10	10	10

Individual gears are **available in bags of 10 gears and 50 gears**. Please choose from the chart, and specify which type and quantity you require.

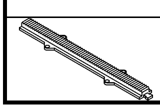
SGEAR 10 *(A pack of 10 gears)*

Price for a pack of 10 $7.09

SGEAR 50 *(A pack of 50 gears)*

Price for a pack of 50 gears $17.42

GEARS 1.9 mm hole	GEARS 2.4 mm hole		Spur 60/12 T
Worm Gear	Pinion 12 T	Spur 40/10 T	Crown Gear 20 T
Pinion 8 T	Spur 22/10T	Spur 50/10 T	**GEARS 2.6 mm hole**
Pinion 10 T	Spur 30/10 T	Spur 50/14 T	Spur 50/10 T
Pinion 12 T	Spur 30/12 T	Spur 60/10 T	Spur 50/14 T

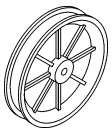


GEAR RACK *(0.5 MODULE)* - *Code:* ***SGEAR RACK***

This GEAR RACK meshes with the 0.5 Module gears listed. It is 100.6 mm long and two or more racks can be interlocked to make a longer rack. - Supplied in multiples of 5 - ea. $2.03

MISCELLANEOUS COMPONENTS

PULLEY



Code	Hole dia.	Outer dia	Price ea (10)
SPU5.5	1.9mm *	5.5 mm	$0.93 ($9.30)
SPU30	2.4mm	30mm	$1.14 ($11.40)
SPU50	2.4mm	50mm	$1.38 ($13.80)

Plastic pulley: - supplied in multiples of 10
* can be drilled to 2.4 mm dia to suit the 2.5 mm rod.

BELT O-RING

This O Ring can be used as a belt drive on the pulleys

Code	Inner dia.	Cross section	Price ea
SORING	45.5 mm	1.5mm	1–19 $0.35
SORG60	60 mm	1.0mm	20+ $0.32

PROPELLERS


SP-74
SP-128


SSPROP2
SSPROP3

Code	Usage	Type	Diameter	Hole size	Qty. Per pack	Price ea (pack price)
SP-74	Aero	2 blade	74mm	1.9mm	5	$0.77 ($3.85 pack)
SP-128	Aero	2 blade	128mm	1.9mm	10	$0.90 ($9.00 pack)
SSPROP2	Boat	2 blade	28 mm	2.4 mm	10	$0.105 ($10.55)
SSPROP3	Boat	3 blade	25 mm	2.4 mm	10	$0.105 ($10.55)

DRILL BITS

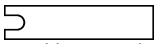
High Speed Steel drill bits

Code	Drill size	Qty. per pack	Price		Code	Drill size	Qty. per pack	Price
SDB1.9	1.9 mm	5	$5.41		***SDB2.9***	2.9 mm	5	$6.40
SDB2.3	2.3 mm	5	$5.41		***SDB3.5***	3.5 mm	5	$6.40
SDB2.6	2.6 mm	5	$5.41		***SDB3.9***	3.9 mm	5	$6.40

FASTENERS – Bolts, Nuts & washers

Item	Price	Item	Price	Item	Price	Item	Price
M3x 8mm Bolt	$4.10	M3x 12mm Bolt	$5.41	M3x 16mm Bolt	$5.71	M3x 20mm Bolt	$6.01
M3 Hex nut	$1.91	M3x Nyloc nut	$4.21	Washers	$1.21	Multi-use tool #1	$3.28

All of the above come in packs of **100** items, except for the Multi-use tool, which is sold in packs of **10**
#1 The Multi-use tool can be used as a Gear pusher or it can be used as a Spanner.
Note: M3 nut is 5.0mm across flats, the Nyloc nut is 5.5mm across flats, the Multi-use tool is 6.0mm across flats


Multi-use tool

ALLIGATOR CLIPS (for testing)

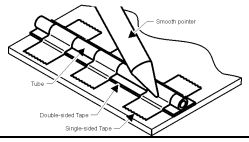
ALLIGATOR CLIP & WIRE Pack of 12 Alligator clips with 250mm wire – 6 colours. Price: 1-4: $8.53; 5-19: $8.20; 20+: $7.85

ALLIGATOR CLIP
Pack of 10 Alligator clips.
Price: 1-4: $3.94; 5-19: $3.61; 20+: $3.39

FOAM ADHESIVE TAPES

Suitable for use to retain motors and guide tubes

SINGLE SIDED	DOUBLE SIDED
SSTAPE	SSFOT
Width: 12 mm	Width: 12 mm
Roll of 66m	Roll of 25m
Price $5.05	Price $11.25

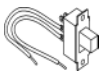


OUR WEBSITE

HAVE A LOOK AT OUR WEBSITE: you will find more information on how to use our components for both the RC Boat and the Solar model car Challenges. *We are adding more information to the website as needed. Is there anything that you would like to see, to help you? If so, let us know.*

COMPONENTS - ELECTRONICS

SSW - ***SLIDE SWITCH (SMALL)***
This switch is DPDT. Supplied with two M2 screws. Sold in multiples of 10.
Price ea: 10–20 $0.79, 25–50 $0.76; 55–100; $0.73; 100+ $0.70.



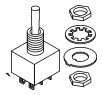
SSW-W - ***SLIDE SWITCH (SMALL)***
This is the same as SSW, with 2 100mm long wires. Supplied with two M2 screws. Sold in multiples of 10.
Price ea: 10–20 $0.83, 25–50 $0.80; 55–100; $0.77; 100+ $0.74.

SSSWL - ***SLIDE SWITCH (LARGE)***
This switch is DPDT with centre off position. M3 mounting holes. Sold in multiples of 10.
Price ea.: 10–20 $0.99; 25–50 $0.95; 55–100 $0.91; 100+ $0.87.

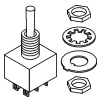
SPBUT SW - ***PUSH SLIDE SWITCH - NON LOCK***
DPDT push slide switch without locking position
Sold in multiples of 5.
Price ea.: 5–20 $0.79; 25–50 $0.76; 55–100 $0.73; 100+ $0.70.

PU-BUT MOM - ***PUSH BUTTON SWITCH***
Momentary "on" switch with washer and nut.
Sold in multiples of 5.
Price ea.: 5–20 $0.84; 25–50 $0.78; 55–100 $0.73; 100+ $0.68

PU-BUT WS - ***PUSH BUTTON SWITCH WITH WIRES***
Momentary "on" switch with washer and nut, and with 2 125mm long wires.. Sold in multiples of 5.
Price ea.: 5–20 $0.88; 25–50 $0.82; 55–100 $0.77; 100+ $0.72



SSW1W - ***ONE WAY SWITCH (TOGGLE)***
SPDT (Single Pole Double Throw). "ON-OFF" switch can also be used as "ON-OFF" switch. 4 terminals: 2 "in" and 2 "out". Sold in multiples of 5.
Price ea.: 5–20 $0.99; 25–50 $0.97 55–100 $ 0.95; 100+ $0.93.



SSW2W - ***TWO WAY SWITCH (TOGGLE)***
DPDT (Double Pole Double Throw). "ON-OFF-ON" switch. 6 terminals: 2 "in" and 4 "out". Can be used as a forward/reverse switch. Supplied in multiples of 5.
Price ea.: 5–20 $1.59; 25–50 $1.56; 55–100 $1.53; 100+ $1.50

SLIGBULB- ***LIGHT BULB 2.5 VOLT*** Torch bulb with a screw mounting

Quantity.	Price each	Total cost
Tray of 25	$0.441	$11.02
Box of 50	$0.385	$19.25

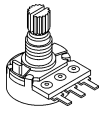
SBULB - ***BULB HOLDER*** Light bulb holder for screw mounting bulb

Qty. per bag	Price each	Total cost
Bag of 20	$0.39	$7.80
Bag of 100	$0.33	$33.00

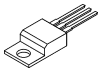
TRIMPOT

Code.	Value	Sold in multiples of
STRIMP1	1K	5
STRIMP50	50K	5
STRIMP100	100K	5

Variable resistor - Vertical adjustment. Lead spacing 2.5 mm (0.1").
Price ea. 5–20 $0.76; 25–50 $0.62; 55–100 $0.59; 100+ $0.56.

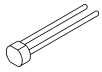


SPT25 - ***25K LINEAR POTENTIOMETER (16mm)***
Variable resistor can be mounted on a printed circuit board or connected to your circuit using flying leads. In the Forklift, this potentiometer is used to provide rotational position feedback.
Price ea.: 1 – 4 $1.48; 5 – 19 $1.36; 20+ $1.20



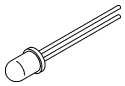
STIP122 ***NPN POWER TRANSISTOR***
STIP127 ***PNP POWER TRANSISTOR***
Darlington transistor. 65 Watt, Vce 100V, Ic 5A, TO-220 case.
Sold in multiples of 5.
Price ea. 5 – 20 $1.48; 25 – 50 $1.38; 55 – 100 $1.31; 100+ $1.26.

LDR **- LIGHT DEPENDANT RESISTOR (4mm diameter)**



Light Dependant Resistor with 10MΩ dark resistance, 400Ω light resistance.
Sold in multiples of 5.
Price ea. 5 – 20 $1.01; 25–50 $0.;96 55–100 $0.90; 100+ $0.86.

`LED 5.0mm DIAMETER High intensity light emitting diode.



Code	Colour	MCD	Qty.	Price ea.	Price per pack
SLEDW	White	14,000	10	$0.93	$9.30
SLEDG	Green	5,000	10	$0.83	$8.30

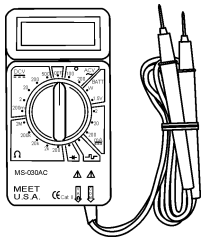
Code	Colour	MCD	Qty.	Price ea.	Price per pack
SLEDR	Red	3,000	10	$0.60	$5.80
SLEDY	Yellow	3,000	10	$0.60	$5.80

TECHNOLOGY CONSULTANT

Need some help or advice? We have a Technology consultant, ready to help! E-mail your questions to him at :
Scorpiotechnology@gmail.com

TEACHING AIDS & PUBLICATIONS

DIGITAL MULTIMETER

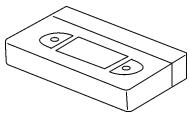


3.5 digits, 8 functions, 19 ranges.
Price ea. $28.29.

DRAGSTER RACING KIT

To evaluate the Dragsters':
- one reel of fishing line (200m)
- 2x Electronic sports timers
Price each kit: $14.75.

VID - *VIDEO: Technology in Schools*



Introduction to clock-making and technology kits. Useful ideas – see students constructing clocks & technology devices made from our kits. Price ea. $10.92 (incl. postage). Duration: 35 minutes.

TEACHER / STUDENT RESOURCES

LAPtek produces workbooks for students and teachers who want to learn more about electronics.

The problem-solving based learning workbooks provide the student with the opportunity to be independent learners and work self-paced. They assume no prior electronic knowledge and are an excellent intro to electronic fundamentals & microcontrollers.

ELECTRONIC PUBLICATIONS

- Electronic Fundamentals $20-
- Introduction to Microcontrollers (Picaxe - SES) – $24.05
- Make a Robot Using Picaxe. – $24.05
- Introduction to ezCircuit Designer and CoreChart. (PIC Microcontroller) – $24.05
- Make a Robot Using ezCircuit Designer and CoreChart–$24.05

PUBLICATION

"Picaxe: SES - Introduction to Microcontrollers"

This book is written by Steve Penna, to provide "the student with the opportunity to gain knowledge and competency to construct Picaxe microcontroller circuits and also obtain an understanding of basic electronic components and systems" (incl. Wombat). Cost $24.05

PUBLICATION

"VCE Systems Engineering – Units 1 & 2"

This book is written by Steve Penna, to allow the student to work through Unit 1 (Mechanical Engine-ering fundamentals) and Unit 2 (Electrotechnology Engineering fundamentals). Includes a section on the Electro-Mechanical Robot (similar to Robot Arm). Cost$36.04

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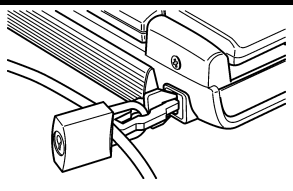

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