

Kits

The kits on the next three pages have been designed for use in schools at KS3 and KS4. They can be used to cover many of the requirements of the GCSE Electronic Products syllabuses. Each project has been tried and tested and offers exceptional value for money.

To support the kits a workpack is available for each project that takes the student through the design process from the Design Brief to the Evaluation. These workpacks are available free either by downloading from our website at www.electronelec.co.uk and selecting the education section from the main menu, or when you place an order.

Teaching Electronics

Having being frustrated at the lack of resources available for teacher to teach electronics we have put together the following resources. They are all free!

A book called Understanding Electronics which has been written in simple terms to explain what is voltage, current and resistance, resistors, capacitors, transistors, sensors, timers, logic and operational amplifiers. The book is ideal for KS3 and KS4. It also has examples and questions for the student to complete.

A series of worksheets are also available to compliment the book. These include:

Basic Electrical principles, Resistor colour code, Resistors in series/parallel and potential divider, symbols. Each worksheet is designed for either classroom or homework use

Worksheets now available for teaching PICs.

Schemes of work are also being provided for the Monostable, Astable and Water Me projects. They show on a lesson by lesson basis what could be taught based around the project workpack and other facilities such as breadboard and computer simulation software.

All of this information can be downloaded for free from www.electronelec.co.uk and then select the Education page from the main menu.

It is planned to add more resources during the coming year.

Kitting service

Are you spending hours and hours putting components into bags ready to give to your students for practical lessons. If you are in that situation why not consider using a component supplier to do this work for you.

Electron Electronics is able to offer this facility to schools at very competitive prices. Each bag is supplied labelled with space for the student to enter their name and their DT class.

If you would like a quotation please supply details of the components required and the quantity of kits.

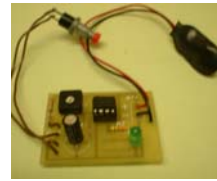
Teaching resources CD

The CD is packed with resources to enable teachers to deliver electronics both at KS3 and KS4. The CD contains all the project workpacks that are detailed on the next two pages, the pcb masks for making your own PCB's and example schemes of work. There are also a number of worksheets covering resistor colour code, PIC programming and circuit symbols. Also includes Understanding Electronics, a 7 chapter book explaining electronics for beginners. Covers basic electrical principles, resistors, capacitors, transistors, timers, logic gates, transistors and op amps. Finally a 50 plus revision questions book based on past examination questions. All of the resources has been written by Noel Humphrey, an experienced teacher of GCSE Electronic Products.

Type	Order code	Price each
Teaching resources disc	525-080	£10.00

Monostable timer project

Electron



Based around the NE555, this project introduces capacitor/resistor timing.

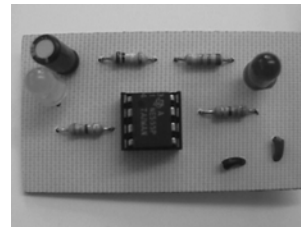
A series of worksheets take the student through the design process stage by stage, and clearly explain how the circuit works. The kit includes resistors, preset, capacitor, NE555, DIL socket, switch, battery snap and LED. A pre-drilled PCB is available either with the kit or separately.

Please note that the PP3 battery is not supplied. For those schools who wish to produce their own PCB's, a pack of masks is available.

Type	Order code	Price each
Monostable kit inc PCB	525-001	£1.14
Monostable kit exc PCB	525-002	£0.65
Monostable PCB	525-003	£0.49
PCB mask pack of 5	525-004	£1.00
Teaching notes	525-005	FOC (1 pack per school)

Astable timer project

Electron



Based around the NE555, this project has two LED's that alternate from on to off, and introduces the student to multistate timing. A series of worksheets take the student through the design process stage by stage. The circuit is explained in detail, and the student has the opportunity to amend the circuit to their own requirements. The kit includes resistors, capacitor, two LED's, NE555, DIL socket and battery snap. Please note that the PP3 battery is not supplied. A pre-drilled PCB is also available either with the kit or separately. For those schools who wish to produce their own PCB's, a pack of masks is available

Type	Order code	Price each
Astable kit inc PCB	525-006	£0.99
Astable kit exc PCB	525-007	£0.50
Astable PCB	525-008	£0.49
PCB mask pack of 5	525-009	£1.00
Teaching notes	525-010	FOC (1 pack per school)

Water level monitor project

Electron



Based around a transistor, this simple project introduces the student to the use of a transistor as a switch. A series of worksheets take the student through the design process stage by stage, and clearly explain how the circuit works. The kit includes transistor, resistors, battery snap and buzzer. Please note the PP3 battery is not supplied. A pre-drilled PCB is also available either with the kit or separately. For those schools who wish to produce their own PCB's, a pack of masks is available.

Type	Order code	Price each		
		1-24	25-99	100+
Water level kit inc PCB	525-016	£1.47	£1.31	£1.09
Water level kit exc PCB	525-017	£0.85	£0.75	£0.60
Water level PCB	525-018	£0.62	£0.56	£0.49
PCB mask pack of 5	525-019	£1.00		
Teaching notes	525-020	FOC (1 pack per school)		

Musical timer project

Electron

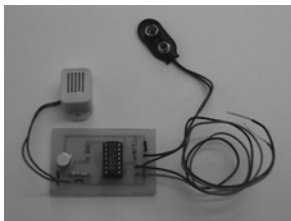


Using the principle of building blocks, this project is based around a monostable timer, melody generator and an audio amplifier. This projects could be used as a musical door bell alarm, egg timer etc. A series of worksheets take the student through the design process stage by stage, and clearly explain how the circuit works. The kit includes ICs, capacitors, melody generator (I'd like to teach the world to sing), resistors, battery snap and buzzer. Please note the PP3 battery is not supplied. A pre-drilled PCB is also available either with the kit or separately. For those schools who wish to produce their own PCB's, a pack of masks is available.

Type	Order code	Price each		
		1-24	25-99	100+
Musical timer kit inc PCB	525-026	£2.85	£2.60	£2.38
Musical timer kit exc PCB	525-027	£2.03	£1.88	£1.76
Musical timer PCB	525-028	£0.82	£0.72	£0.62
PCB mask pack of 5	525-029	£1.00		
Teaching notes	525-030	FOC (1 pack per school)		

Water me project

Electron



Based around a transistor, this simple project introduces the student to the use of a transistor as a switch. A series of worksheets take the student through the design process stage by stage, and clearly explain how the circuit works. The kit includes transistor, resistors, battery snap, DIL socket, 4011 IC and buzzer. Please note the PP3 battery is not supplied. A pre-drilled PCB is also available either with the kit or separately. For those schools who wish to produce their own PCB's, a pack of masks is available.

Type	Order code	Price each		
		1-24	25-99	100+
Water me kit inc PCB	525-021	£1.67	£1.51	£1.34
Water me kit exc PCB	525-022	£1.05	£0.95	£0.85
Water me PCB	525-023	£0.62	£0.56	£0.49
PCB mask pack of 5	525-024	£1.00		
Teaching notes	525-025	FOC (1 pack per school)		

Light operated switch project

Electron



Based around a light dependant resistor and a transistor, this project introduces the student to how an input device can be used to switch a transistor on or off. The project can be used to demonstrate how security/street lights work when the light level changes. A series of worksheets take the student through the design process stage by stage, and clearly explain how the circuit works. The kit includes variable resistor, LDR, transistor, LED, resistors and battery snap. Please note the PP3 battery is not supplied. A pre-drilled PCB is also available either with the kit or separately. For those schools who wish to produce their own PCB's, a pack of masks is available.

Type	Order code	Price each		
		1-24	25-99	100+
Light operated kit inc PCB	525-031	£1.91	£1.70	£1.49
Light operated kit exc PCB	525-032	£1.24	£1.09	£0.95
Light operated switch PCB	525-033	£0.67	£0.61	£0.54
PCB mask pack of 5	525-034	£1.00		
Teaching notes	525-035	FOC (1 pack per school)		

Hot or cold project

Electron

Air freshener kit

Electron

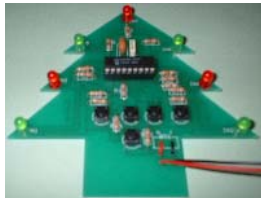
Based around a thermistor and a 741 operational amplifier as a comparator. The project can be used to demonstrate how temperature warning circuits work when the heat level changes. A series of worksheets take the student through the design process stage by stage, and clearly explain how the circuit works. The kit includes variable resistor, thermistor, operation amplifier, LED, resistors and battery snaps. Please note the PP3 batteries are not supplied. A pre-drilled PCB is also available either with the kit or separately. For those schools who wish to produce their own PCB's, a pack of masks is available.

Type	Order code	Price each
Hot or cold kit inc PCB	525-036	£1.09
Hot or cold kit exc PCB	525-037	£0.55
Hot or cold PCB	525-038	£0.54
PCB mask pack of 5	525-039	£1.00
Teaching notes	525-040	FOC (1 pack per school)

PIC Christmas light project

Electron

Based around a PIC16F84A this project provides an ideal entry into PIC microcontrollers. The objective of the project is for the student to write their own program to make the seven lights flash in any pattern. Four different sequences can be produced as there are four inputs to the PIC.



A set of worksheets are available describing the six commands required and how to write simple programs with exercises to complete. The second set of worksheets describe how the lights are connected to the PIC and examples of programming. All the worksheets are based around the Chip factory programmer but other systems could be used.

The worksheets can be downloaded from www.electronelec.co.uk and go to the education section. Since its launch at the 2003 DT show this project has proved to be popular with students. Ideal for KS3 and KS4

Type	Order code	Price each
PIC Xmas light kit	525-041	£4.25
Red LED pack	525-042	£0.27
Red/green LED	525-043	£0.29
White LED	525-044	£3.64
Preprogrammed PIC	525-045	£1.00

Based around a low power CMOS 555 this project uses a low current motor to spin a 4 blade fan thus circulating air. It can be used to circulate air through an air freshener. The kit contains all the components, battery holder and a pre-drilled PCB. Please note 2 x AA batteries are not supplied.

Type	Order code	Price each
Aroma kit inc PCB	525-0062	£3.25
		£2.95
		£2.65

Audio amplifier and tone control

Electron

A project for those who enjoy music but want more than a simple amplifier. This compact design based around the TDA7052 audio IC requires no output capacitor saving valuable space. The project has a bass control giving dB at and a treble control giving dB at . The kit of parts includes all the components required and a pre-drilled PCB. The project is powered by a PP£ battery which is not supplied. See our hardware section for suitable knobs for the potentiometers

Type	Order code	Price each
Amplifier and tone project	525-0064	£2.95

Electron Electronics is now stocking a range of kits that have been developed by the West Midlands Digital D&T Support Centre based at Finham Park School

Keyfob torch project

The torch utilises a high brightness red LED powered by two L736 button cells. The small size of the key-fob PCB makes the project ideal for designing and making economically priced enclosures using a laser cutter or 3-D printer

The PCB is printed on thin (1/16") laminate to minimise board height and is designed for surface mount assembly. The PCB can be constructed either by using a soldering iron or by using solder paste

Finham Park



Type	Order code	Price each
Keyfob torch kit inc PCB	525-152	£0.99

Push button badge project

Possibly the simplest possible project, the push button badge lights up one or more LEDs on the press of a push button. With two LEDs, the PCB could be used to provide the eyes in novelty projects and badges.

Finham Park



Type	Order code	Price each
Push button badge kit	525-154	£0.99

Greeting card project

The musical greeting card project is an excellent introduction to electronics and is suitable for pupils in year 7 upwards. It is based on the pre-programmed melody generator IC. The kit is supplied with the tune 'It's a small world' so that a greeting card can be made to suit any occasion.

The PCB is printed on thin (1/16") laminate to minimise board height and is designed for surface mount assembly of conventional components so that the back of the PCB can be readily glued into the card.

Finham Park



Type	Order code	Price each
Greeting card kit inc PCB	525-150	£1.69

Flashing badge project

The flashing badge can control up to 5 LEDs using a dedicated flasher IC at either 1Hz or 2Hz depending on the IC used. With two LEDs, the PCB could be used to provide the eyes in novelty projects and badges.

Finham Park



Type	Order code	Price each
Flashing badge kit inc PCB	525-158	£2.50

Nightlight project

Using conventional components and a small single sided PCB, the nightlight has proven to be very popular with pupils. It can inspire creative, individual work from students and enable them to design and make a quality product of which they are proud and want to keep.

Illumination by a high brightness LED is controlled by an LDR and timer circuit. When the light level on the LDR changes from light to dark, the LED is switched on for a time period set by the timing components. With suitable timing component values, the delay can be set to 15 minutes or more. At the end of the timing period, the LED switches off. The LED remains off until the timer is recharged by light falling on the LDR. The quiescent power drain of the circuit is so low that an on/off switch is not required.

Finham Park



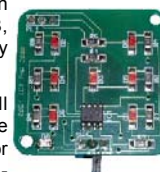
Type	Order code	Price each
Nightlight kit	525-156	£1.95

Digital dice project

Measuring only 36mm square, the digital dice makes an excellent project for exploring enclosure design and microcontroller programming. With this PCB, pupils can design and make very high quality outcomes.

The dice is powered by a single 3V CR2032 cell mounted on the reverse side of the PCB. A surface mount PICAXE08M monitors an onboard light sensor and controls the display. The PIC can be programmed to produce light displays and random numbers triggered by placing a hand over the light sensor.

Finham Park



Although the PCB can be assembled using a soldering iron, it is much easier to use solder paste and a toaster oven

Type	Order code	Price each
Digital dice kit inc PCB	525-162	£3.50

Ipod amplifier project

Based on the popular and low cost TBA820 amplifier IC, the iPod amplifier is a real hit with students. The project has been carefully designed to minimise difficulties with external wiring.

Although the amplifier can operate at 6V it works better from 9V (PP3) or higher. (With a suitable speaker and power supply, it can deliver 1.6W). The only permanent wiring to the PCB is the power supply (which is passed through two threading holes). Audio input is via a 3.5mm Jack socket which adds together the left and right channels of a stereo signal. Two PCBs can be used to reproduce stereo sound by amplifying each channel separately. The speaker is connected via a 2pin JYK connector.

Finham Park



Type	Order code	Price each
Ipod amplifier kit inc PCB	525-160	£2.50

DaisyPIC08

DaisyPIC08 is a carrier for an 8pin surface mount PIC with a 3 pin programming connector. Optional limiting resistors can be fitted to the PCB for connection to stand-alone LEDs sewn into the textiles.



Finham Park
new

Type	Order code	Price each
DaisyPIC08 kit	525-164	£2.95

DaisyPIC Tri LED

Carrier for surface mount Tri colour (red, green and blue) LEDs and their limiting resistors. Different colours can be produced by switching on different combinations of LED.



Finham Park
new

Type	Order code	Price each
DaisyPIC Tri LED kit	525-172	£1.15

DaisyPIC20

DaisyPIC20 is a carrier for a 20pin surface mount PIC with a 3 pin programming connector. 8 output pins are buffered with darlington transistors. There is provision for 4 inputs



Finham Park
new

Type	Order code	Price each
DaisyPIC20 kit	525-186	£3.89

Daisy Light sensor

Carrier for surface mount light sensor



Finham Park
new

Type	Order code	Price each
Daisy light sensor	525-184	£1.49

Daisy push button

Carrier for surface mount *new* tactile switch (push button).



Finham Park

Type	Order code	Price each
DaisyPIC push button kit	525-174	£0.95

DaisyPIC Programming connector

To save space on PIC based projects e.g. the Digital Dice and DaisyPIC, programming connections are made with a 3 way turned pin socket. The programming connector converts the 3.5mm jack plug on the PICAXE programming lead into a 3 pin header



Finham Park
new

Type	Order code	Price each
DaisyPIC programming conn	525-172	£1.05

DaisyPIC LED

Carrier for surface mount 1206 style LEDs. Depending on the required options, the LED can be fitted with or without a limiting resistor.



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new

Type	Order code	Price each
DaisyPIC LED kit	525-170	£0.49

Daisy 3V power supply

3V power supply with on/off switch. Uses a single CR2032 coin cell.



Finham Park
new

Type	Order code	Price each
Daisy 3V power supply	525-166	£1.15

Daisy 6V power supply

Finham Park
new

6V power supply with on/off switch.
Uses two CR2032 coin cells.



Type	Order code	Price each
Daisy 6V power supply kit	525-188	£1.59

PIC musical greeting card

Finham Park
new

Updated, programmable PIC based version of the above project. This is a great introduction to surface mount assembly using solder paste.

Students can programme the PIC with freely available rtttl ring tones of their choice. Two LEDs can be made to flash in time to the music.

A 3-pin SIL socket is used for connection to the download cable (to keep the height of the PCB to a minimum). A programming



Updated, programmable PIC based version

Type	Order code	Price each
PIC musical greeting	525-190	£3.99

PWM controller

Finham Park
new

Pulse width modulated (PWM) controller for efficient speed control of DC motors. When connected to a PP3 battery, this module provides very smooth control of the Scalextric car (or any other DC motor such as model electric train).



Type	Order code	Price each
PWM controller (t hole)	525-178	£3.50

PWM controller surface mount

Finham Park
new

Surface mount version version of PWM controller



Type	Order code	Price each
PWM controller (surface mnt)	525-180	£3.50