Electronic Kits & Components

Full range of Electronic Kits & Components available at:

www.rapidonline.com

Education

5

Electronic Kits & Components

Curriculum Based Projects
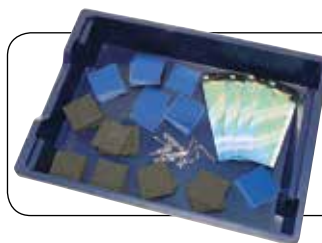
≡**Rapid**

Mini-light Project Kits

LED key ring light kits designed as an introduction for **Key Stage 2 & 3** students to design and make in electronics. Project notes are available as a free PDF download, at **www.rapidonline.com** and are designed to be photocopied for class and teacher use.

Notes include suggested lesson plans and mapping to the National Curriculum, an introduction to circuits and symbols, batteries, LEDs and pricing and costing exercises and a series of homework assignments to support work in class.

- Students start by investigating the need for security and the problems of using locks in the dark
- They can then complete the design process of a mini-light, which can be attached to a key ring
- With careful organisation it should be possible to manufacture the design without specialist workshop facilities
- The component kits include batteries and LEDs, plastazote foam core and high impact polystyrene outer layers
- Available in four styles:
- Standard Mini-light is a keyring torch kit using a red LED
- Super-bright Mini-light is an updated version using a modern white LED
- Rainbow Mini-light has a random colour-changing LED
- Ultraviolet Mini-light has a UV LED and can be used for revealing security coding on banknotes, etc.
- Suitable for **Key Stages 1, 2 & 3** (ages 5 to 14)
- Kits are supplied in **packs of 5**

Type	Order code	1+
Red	**70-0015**	2.73
White	**70-0012**	4.24
Rainbow	**70-0013**	4.65
Ultraviolet	**70-0014**	5.19

032668

▶ YouTube
Step by Step Guide!

≡**Rapid**

Mini-light Project Classpacks

This simple but interesting project has been designed by Rapid's technical team for **Key Stages 1, 2 & 3** students. It will help them to make a fully working mini-light from the parts supplied in this great kit. All the notes for making this kit are available as a free download from: **www.rapidonline.com** The classpack is supplied in a handy storage tray with lid, containing sufficient components for 20 mini-lights.

- Batteries and LEDs
- Plastazote foam core
- High impact polystyrene outer layers
- Available in four styles:
- Standard Mini-light is a keyring torch kit using a red LED
- Super-bright Mini-light is an updated version using a modern white LED
- Rainbow Mini-light has a random colour-changing LED
- Ultraviolet Mini-light has a UV LED and can be used for revealing security coding on banknotes, etc.
- Suitable for **Key Stages 1, 2 & 3** (ages 5 to 14)
- Supplied in **classpacks of 20**
- Also available in an assorted classpack of 20, containing 5 of each type

Type	Order code	1+
Standard classpack	**13-0138**	14.39
White classpack	**13-0155**	18.38
Rainbow classpack	**13-0156**	19.92
Assorted classpack	**13-0158**	17.36

070957

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Moisture Tester Project

▶ YouTube
Step by Step Guide!

Kits of components to build a functional **Moisture Tester** that can be used to tell if pot plants require water.

The kits contain all the electronic components required, except the PCBs, which are available separately. This provides the option to buy ready-made PCBs or for students to make their own.

The moisture tester project has been designed as an introduction for **Key Stage 2 & 3** students to the use of resistors and transistors in circuits.

Teachers notes are available to download from www.rapidonline.com/ pdf/70-0030e.pdf.

- Students start by investigating the care of house plants and the problems associated with incorrect moisture content of soil
- Downloadable information and activity sheets then guide the students through a series of exercises to build background knowledge in the use of resistors and transistors in circuits
- For manufacture, the project allows the teacher to select from two alternative methods of circuit construction, either self adhesive copper tape onto card or on a printed circuit board (available separately) see order code **34-0635**
- Upon completion of manufacture students are then guided through an evaluation of their work
- They also have the option of producing a 3D model using high density polystyrene foam illustrating how they might develop a final product if the design were manufactured commercially
- Project notes are available for free download and are designed to be photocopied for class use
- They include both detailed student and teacher notes, which contain suggested lesson plans, mapping to the National Curriculum and a series of structured homework assignments to support the work in class
- The component kits are supplied in multiples of 5 and include:
- All components including LEDs, battery clip, resistors and transistors
- The project can be produced using PCB available or self adhesive copper tape (see PCB products section)
- Suitable for **Key Stages 2 & 3** (ages 7 to 14)

Each kit requires 1x PP3 battery (not included).
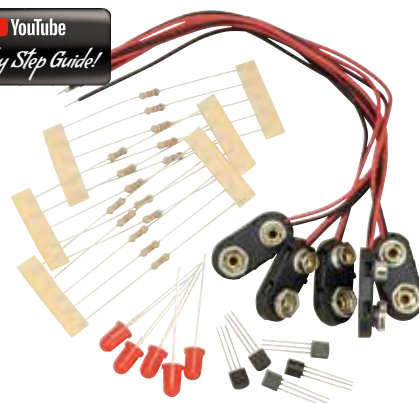
Type	Order code	1+
Class set of 5 kits	**70-0030**	1.47
PCB packs of 5	**70-0040**	4.99

032669

≡**Rapid**

Moisture Tester Project Classpack

A classpack of 20 kits of components to build a functional **Moisture Tester** that can tell if pot plants require water. The classpack contains all the electronic components required, including ready-made PCBs, in a Gratnell's Tray with lid. It offers a substantial saving compared to parts bought separately.

Students will love this Moisture Tester Project, which is linked to the National Curriculum, as it is simple to assemble and is ideal as an introduction to electronics.

- Dimensions of the box: 43cm x 31cm x 7cm
- Great school resource
- Suitable for **Key Stages 2 & 3** (ages 7 to 14)
- Supplied as **a pack**

Each kit requires 1x PP3 battery (not included).

Classpack contains:

4 x Moisture tester kit (pack 5)	**70-0030**
4 x Moisture tester kit PCBs (pack 5)	**70-0040**
1 x Shallow Tray	**14-0430**
1 x Tray lid	**14-0436**

Type	Order code	1+
Moisture tester classpack	**13-0102**	21.10

065931

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555 Timer Project Kits

The timer project has been designed as an introduction to the use of the NE555 monostable and resistor-capacitor timing circuits.

**YouTube** *Step by Step Guide!*

- Students start by investigating the need for an accurate timer and are then led through the complete design process
- Upon completion of manufacture, students evaluate their work and start to look into commercial product development
- The information and activity sheets guide the students through a series of exercises, including the use of Crocodile Clips software, to build up knowledge in the use of the NE555 monostable within circuits
- Project notes are available and are designed to be photocopied for class use
- They include both detailed student and teacher notes, which contain suggested lesson plans, mapping to the National Curriculum and a series of structured homework assignments to support the work in class
- The component kits are supplied in multiples of five and include: NE555 and IC holder, resistors and capacitors, buzzers and LEDs, switches and potentiometer and battery clips
- Pre-drilled PCBs are available separately in **packs of 5,** order code **70-0060**
- Suitable for **Key Stage 3** (ages 11 to 14)

Each kit requires 1x PP3 battery (not included).

Type	Order code	1+
Class set of 5 kits	**70-0050**	9.08
PCB pack of 5	**70-0060**	3.66

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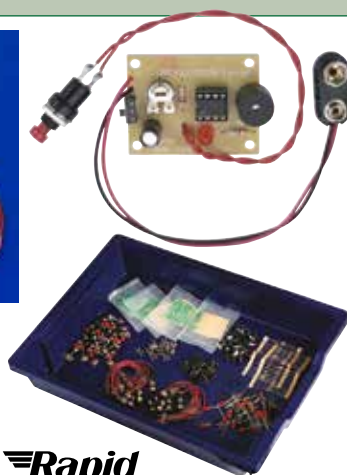
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555 Timer Project Classpack of 20

Your chance to buy a classpack of 20 Timer Project kits offering a substantial saving. Linked to the National Curriculum and supplied in a handy storage tray, complete with lid.

- Great school resource
- Suitable for **Key Stage 3** (ages 11 to 14)
- Supplied as **a pack of 20 kits**

*Each kit requires 1x PP3 battery (not included). Each student will also require: 4 x M3 6mm pan head slotted screws (available as order code **33-1500**), 4 x M3 12mm pan head slotted screws (**33-1510**), 4 x M3 spacer 4mm (**33-3632**) and 4 x 18mm threaded spacers (**33-3535**).*

Classpack contains	
4x Timer project kit (pack 5)	**70-0050**
4x Timer project kit PCBs (pack 5)	**70-0060**
1x Shallow tray	**14-0430**
1x Tray lid	**14-0436**

Type	Order code	1+
Timer Classpack	**13-0104**	37.14

065932

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Set of 5 Logic Alarm Project Kits

YouTube *Step by Step Guide!*

This project is designed to cover key topics in electronic based exam courses at GCSE level.

- Each unit of work will offer students an opportunity to build a fundamental circuit and incorporate this with their own design
- The student notes are also supported with a set of teaching notes outlining the areas of the syllabus covered, suggested lesson plans and mapping to the National Curriculum
- Care has been taken to ensure that this project provides schools with a cost-effective, flexible method of offering a practical class based assignment
- The Logic Alarm project is an ideal way to introduce students to logic circuit theory and design
- The notes guide students through the fundamentals of logic, the use of truth tables, common logic gates and the design of combination circuits
- The notes also look at the difference between TTL and CMOS based ICs and their use in project work
- Detailed worksheets can be used in conjunction with Crocodile Clips and PCB Wizard software with a range of homework based assignments
- All circuit design is developed from a systems approach

The component kits are supplied in **multiples of five** and include:
- ICs and switches
- Resistors and capacitors
- Piezo sounders and battery clips
- Pre-drilled PCBs are available separately in **packs of 5**, order code **70-0085**
- Suitable for **Key Stages 3 & 4** (ages 11 to 16)

Requires 1x PP3 battery per kit (not included).
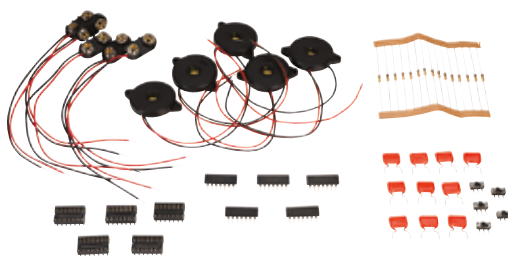
Project notes are designed to be photocopied for class and teacher use. The notes contain exercises that cover, in detail, core elements found in examination syllabuses

Possible design (case not included)

Type	Order code	1+
Class set of 5 kits	**70-0075**	6.53
PCB packs of 5	**70-0085**	3.82

034265

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Uncased 16GB USB Memory Stick Module

Fully-functional uncased memory sticks, ideal for allowing students to **design and make their own case.**

The finished product is a **practical item that students can keep** for transporting homework and other data.
The rear section of the PCB from the front of the rectangular hole does not have any components on it so can be used for fixing part of the case. Case designs should not protrude any further than the front of the circuit board so that the USB connector is not obscured. The maximum thickness of the PCB and components is 5mm.

The memory stick is an **ideal basis for a 3D Printing Project** to design and make a suitable case. The cases are relatively small, use only a small amount of filament and are reasonably quick to print. Some 3D printers allow several cases to be printed at once.

- 16GB memory capacity
- USB connection
- On-board LED indicator
- Overall dimensions 14 x 5 x 60mm
- Ideal 3D printer project

Type	Order code	1+
Uncased 16GB stick	**19-9996**	4.51

559407

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Flashing LED Christmas Tree Project Kit

A kit of parts for a simple to build festive project. Supplied with comprehensive instructions. Ideal as a one lesson end of term project.

- Size of finished tree: height 105mm, width (max.) 65mm
- Available **individually** and as a money-saving **classpack of 30** kits supplied in a Gratnells tray
- Suitable for **Key Stage 3** (ages 11 to 14)

Each kit requires 1x PP3 battery (not included).

Type	Order code	1+
Christmas tree kit	**70-1000**	3.81
Classpack of 30	**70-1005**	55.55

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Clap Switch Project

Build a switch circuit that responds to sharp sounds like clapping your hands, etc.

- Kit contains all components including circuit board
- 3A changeover relay output
- Circuit counts two claps before operating to avoid false triggers
- Operates from 6 to 20V
- Component count 36
- Circuit board dimensions: 55 x 50mm
- Also available as a money-saving **classpack of 20 kits** packed in a Gratnells tray
- Suitable for **Key Stages 2, 3 & 4** (ages 7 to 16)
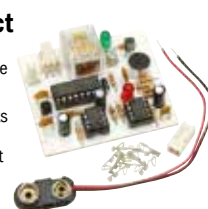
Type	Order code	1+
Clap switch project	**70-2570**	4.62
Classpack of 20	**70-2602**	74.44

		MOQ 2+
Type	Order code	2+
PCB for clap switch project kit	**70-2571**	0.62

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Audio Amplifier Project Kits

Aimed at **Key Stage 3**, the audio amplifier project provides teachers with a stimulating and inexpensive project through which to study the subject of amplification.

This schools projects package contains a comprehensive selection of components for schools working on audio related projects linked to the National Curriculum. The classpacks of 20 projects include PCBs and offers a worthwhile saving over parts bought separately which is ideal for schools working to tight budgets.

Teaching resources are available for free download at **www.rapidonline.com**

- Students have the opportunity to build a small amplifier, which can be incorporated into a variety of product designs, e.g., as an amplifier for a personal CD / MP3 player so that they can share their music with their friends
- The students have a number of design situations to select a starting point from, and they are provided with research topics and background material to help build understanding for their chosen design brief
- The student notes provide material for students to explore how a range of simple amplifier circuits work
- They also include guidance on the design and construction of speakers
- To support students during the construction of the circuit, detailed instructions have been included on how to assemble the amplifier, and how to integrate the circuit into student designs
- In addition, care has been taken, through extensive evaluation of the teaching material and PCB designs in schools, to ensure that the circuits are easy and robust enough for student manufacture
- A detailed set of teacher notes is available which includes suggested lesson plans and mapping to the National Curriculum
- The project notes have been designed for photocopying for class use

Each kit contains the following:
- TBA820M audio amplifier and IC socket
- Resistors, capacitors, and LED
- Switch and connecting jack socket
- Connecting cable
- Speaker and speaker cable
- Battery clip
- Available in **packs of 5** kits, **70-0180**, (no PCBs) or **classpacks of 20 packs** (including PCBs)
- Classpack of 20, **13-0106**, is supplied in a 43 x 31 x 7cm Gratnells tray
- Classpack of 20, **13-0105**, has an enclosed battery box and is supplied without the Gratnells tray

Each kit requires 1x PP3 battery (not included).

Pre-drilled PCBs are available separately in packs of 5, order code **70-0190** *(Included in Classpacks of 20,* **13-0105** *&* **13-0106***).*

Each kit contains:

Quantity	Description	Order code
1	7/0.2 Speaker Cable (150cm from 01-0162)	01-0162
1	150pF 2.5mm Ceramic Capacitor	08-0150
1	47nF 100V 5mm Polyester Box Capacitor	10-3258
1	100nF 63V 5mm Polyester Box Capacitor	10-3260
1	10uF 25V Radial Electrolytic Capacitor	11-0220
2	330uF 16V Radial Electrolytic Capacitor	11-1404
1	Battery Clip PP3 - end entry**	18-0588
1	3.5mm Stereo Plug to Plug lead	20-0040
1	3.5mm Stereo PCB socket	20-0137
1	8-pin DIL socket (1 from 22-0107)	22-0107
1	66mm Ferrite 8 Ohm speaker	35-0130
1	OSNR5164A 5mm 2.2V Red LED	55-1790
2	470R CR25 0.25W CF Resistor	62-0365
3	1K CR25 0.25W CF Resistor	62-0373
1	1R CR12 0.125W CF Resistor	64-1100
1	SPDT right angle PCD slide switch	76-0272
1	TBA820M Audio Amplifier IC	82-0485

13-0106 Classpack of 20 in Gratnells tray contains:

4	Audio amplifier project kits (pack of 5)	70-0180
4	Audio amplifier project kit PCBs (pack of 5)	70-0190
1	Shallow Gratnells tray	14-0430
1	Gratnells tray lid	14-0436

13-0105 Classpack of 20 contains:

20	18-0295 PP3 battery holders** (replacing 18-0588)	
4	Audio amplifier project kits (pack of 5)	70-0180
4	Audio amplifier project kit PCBs (pack of 5)	70-0190

Type	Order code	1+	5+
5 kits no PCBs	**70-0180**	9.77	
20 kits+PCBs in tray	**13-0106**	50.64	46.74
20 kits+PCBs no tray	**13-0105**	57.46	
Circuit boards (Pk 5)	**70-0190**	5.99	

501634

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AM Radio Project
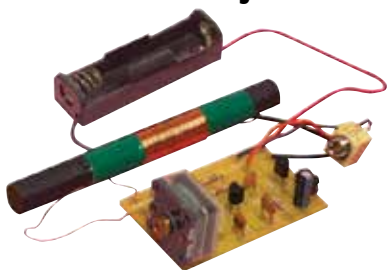
This project offers students a cost-effective way to build an AM tuner that is easy to incorporate into a variety of design situations. The Printed Circuit Board (PCB) can be either purchased ready made, or students can manufacture their own from the mask provided in the notes. Project notes are available for free download at **www.rapidonline.com** and can be photocopied for class use.

- Based on the TA-7642, an updated version of the popular MK484 IC
- Needs only a few external components to build a high quality AM radio
- They contain both detailed teacher and student sections, providing research information, and structured tasks
- The notes explain in detail how radio signals are transmitted and received
- They also look at how the design of radios has been influenced by style and technology of the day, from the first radios of the 1900's, through the introduction of the transistor, right up to todays digital radios
- Students are offered a variety of starting design briefs and guidance on how to develop their ideas
- Detailed diagrams and instructions support the radio circuit construction, and the notes provide suggestions for possible case designs and methods of manufacture
- The teacher section of the notes includes suggested lesson plans and mapping to the National Curriculum and a range of homework assignments

The component kits are supplied in multiples of five and include:
- TA-7642 and transistors
- Ferrite rods and wire
- Tuning capacitors and switches
- Battery holders and jack sockets
- Resistors and capacitors
- Screws, nuts and washers
- **Schools have the choice to either purchase a PCB or manufacture their own from the mask provided in the notes**
- Suitable for **Key Stages 3 & 4** (ages 11 to 16)
- Pre-drilled PCBs are **supplied separately in packs of 5**, order code **70-0120**.

Type	Order code	1+
AM radio project	**70-0110**	19.95
PCB packs of 5	**70-0120**	3.44

035911

≡Rapid

AM Radio Project Classpack

This excellent projects package contains a wide range of components for schools working on radio type projects. Linked to the National Curriculum, this classpack of 20 projects offers a substantial saving on parts bought separately which is ideal for schools working to tight budgets. The kit is supplied in a strong box with lid.

- Dimensions of the box: 43cm x 31cm x 7cm
- Great school resource
- Suitable for **Key Stages 3 & 4** (ages 11 to 16)
- Supplied as **a pack**

Each kit requires 1x AA battery (not included).

Classpack contains:

4 x Radio project kit (pack 5)		**70-0110**
4 x Radio project kit PCBs (pack 5)		**70-0120**
1 x Shallow tray		**14-0430**
1 x Tray lid		**14-0436**

Type	Order code	1+
Radio project pack	**13-0100**	81.95

065930

LOOK ONLINE FOR TEACHER GUIDES AND PROJECT EXAMPLES
Follow the links on the product pages at www.rapidonline.com

RK Education

Stereo Audio Amplifier Kit

This project kit is a stereo version of our popular Audio Amplifier Project, 70-0180. Once assembled, the amplifier can be connected to MP3 players, laptops or any other device with a 3.5mm headphone jack socket.
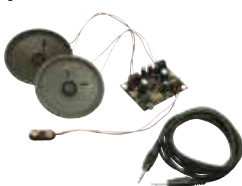
The kit contains all components, speakers, printed circuit board and connecting cable. It is available in packs of 5 kits or as a class pack of 20 kits.

- Stereo version of the popular Audio Amplifier Project, order code **70-0180**
- Can be connected to MP3 players, laptops or any other device with a 3.5mm headphone jack socket
- Kit contains all components, speakers, printed circuit board and connecting cable
- Available in **packs of 5** kits or as a class **pack of 20** kits

Each kit requires a 9V, PP3 battery (not included).

Type	Order code	1+
Pack of 5	70-0198	18.60
Class pack of 20	70-0199	69.21
Empty PCB only	70-0197	1.14

500601

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2.5W + 2.5W Stereo Audio Amplifier Kit

This stereo audio amplifier kit gives you more power and more volume than our standard kits. Each channel can deliver up to 2.5W per channel for a louder, crisper sound. The kit is available with speakers or without if you would prefer to add your own.
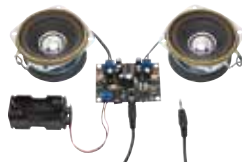
- Kit includes PCB and all components to make one stereo amplifier
- 2.5W power per channel
- Connecting cable supplied
- Available with or without speakers
- Requires 4x AA batteries (not included)
- Empty printed circuit board also available separately

Type	Order code	1+	20+
2.5W - No Speakers	70-0186	6.04	4.84
2.5W - With Speakers	70-0187	10.00	
PCB Only	70-0194	1.97	

519383

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10W + 10W Stereo Amplifier Kit

Our most powerful audio amplifier kit has 10W per channel, meaning it can drive much larger speakers to give a loud, clear sound. The kit is available with speakers or without if you would prefer to add your own.

- Kit includes PCB and all components to make one stereo amplifier
- 10W power per channel
- Connecting cable supplied
- Available with or without speakers
- Requires 4x AA batteries (not included)
- Empty printed circuit board also available separately

Type	Order code	1+
10W - No Speakers	70-0188	6.98
10W - With Speakers	70-0189	11.25
PCB Only	70-0195	1.97

519384

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POV Wand Project

Build this PIC based kit which uses the persistence of vision (POV) of the human eye to create the illusion of a message being written in mid-air. Instruction details are available for free download at www.rapidonline.com and are designed to be photocopied for class use.

- Programmable – create your own messages up to 6 characters long
- 57 pre-defined characters
- Complete set of components including printed circuit board
- Ideal demonstration of PIC controlled electronics and construction
- Component count 25
- Also available as a money-saving **classpack of 20 kits** packed in a Gratnells tray
- Empty PCBs are also available separately
- Suitable for **Key Stages 2, 3 & 4** (ages 7 to 16)

Requires 2x AAA batteries (not included).

Type	Order code	1+
POV wand project	70-2555	6.59
Classpack of 20	70-2557	101.39

		MOQ 2+
Type	Order code	2+
PCB for POV wand project kit	70-2556	0.604

073215

≡RVFM

Rechargeable Solar Buggy

Designed for the purpose of investigating solar cells, this buggy includes a solar panel, a 0.22F super capacitor and a small circuit board for switching between 'charge' or 'run' modes.

In 'charge' mode the capacitor is charged up by the solar panel. In 'run' mode the solar panel is disconnected and the charge stored in the capacitor powers a motor that propels the buggy forwards.

The buggy is supplied fully assembled and ready to use.

Experiments include:
- Charging the solar panel under different types of light source, e.g. tungsten, fluorescent, etc.
- Investigating distance travelled against charge time
- Exploring the effects of coloured filters with the solar panel
- Investigating the effect of charging at various distances from the light source

No batteries required.

Type	Order code	1+
Solar buggy	06-1580	14.94

553703

≡RVFM

Light Sensor Kit Pack of 10

A pack of components to build 10 light sensors, ideal for class projects with students working in small groups.

The general-purpose light-sensing circuit uses a miniature light dependent resistor (LDR) to detect changes in the level of light and switches the LED on or off accordingly. The sensitivity of the circuit can be set by adjusting a potentiometer.

Pack contains:
- 10x PCB
- 10x BC548 transistor
- 10x mini-LDR
- 10x 1kΩ resistor
- 10x 100Ω resistor
- 10x 470Ω resistor
- 10x standard LED
- 10x 47kΩ potentiometer
- 10x battery connector
- Designed for use with a 3 to 9V supply
- Supplied as a **pack of 10 kits**

Type	Order code	1+
Light sensor kit (10)	06-1581	9.94

553704

≡RVFM

Temperature Sensor Kit Pack of 10

A pack of components to build 10 temperature sensors, ideal for class projects with students working in small groups.
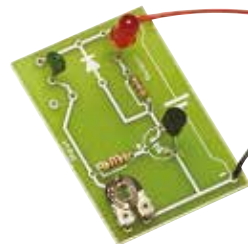
This general-purpose temperature-sensing circuit uses a thermistor to detect changes in temperature and switches the LED on or off accordingly. The sensitivity of the circuit can be set by adjusting a potentiometer.

Pack contains:
- 10x PCB
- 10x BC548 transistor
- 10x thermistor (1kΩ)
- 10x 1kΩ resistor
- 10x 3.3kΩ resistor
- 10x 470Ω resistor
- 10x standard LED
- 10x 10kΩ potentiometer
- 10x battery connector
- Designed for use with a 3 to 9V supply
- Supplied as a **pack of 10 kits**

Type	Order code	1+
Temp. sensor kit (10)	06-1582	12.21

553705

≡RVFM

Humidity Sensor Kit Pack of 10

A pack of components to build 10 humidity sensors, ideal for class projects with students working in small groups.

This general-purpose circuit detects changes in humidity and switches the LED on or off accordingly. The sensitivity of the circuit can be set by adjusting a potentiometer.

Pack contains:
- 10x PCB
- 10x BC548 transistor
- 10x humidity sensor
- 10x 1kΩ resistor
- 10x 100Ω resistor
- 10x 470Ω resistor
- 10x standard LED
- 10x 5kΩ potentiometer
- 10x battery connector
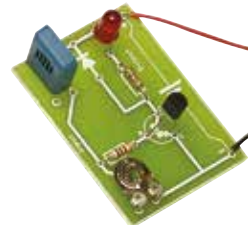- Designed for use with a 6 to 9V supply
- Supplied as a **pack of 10 kits**

Type	Order code	1+
Humidity kit (10)	06-1583	14.85

553706

Education

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Electronic Kits & Components

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Energy Transfer Demonstration Unit

This unit demonstrates a range of different energy transfers; for example, how energy is transferred electrically from a hand-turned dynamo to a motor. The unit is supplied complete with a booklet that discusses some of the key teaching and learning issues that surround the energy concept, and provides a series of activities that illustrate how the unit can be used to develop simple and coherent ways of talking about energy.

- Demonstrates a range of different energy transfers
- Unit houses a dynamo, electric fan, solar cell, capacitor and buzzer
- Supplied with booklet containing key teaching and learning topics
- Provides a series of activities

Type	Order code	1+
Energy transfer unit	**06-1584**	114.90

553707

≡Rapid

555 Astable/Monostable Project Kit

The 555 Astable/ Monostable PCB projecthas been designed specifically to support and integrate with teaching schemes for Key Stages 3 & 4. Instruction details are available for free download at **www.rapidonline.com** and are designed to be photocopied for class use.
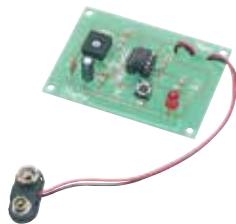
- The kit is a timing circuit, which can be used to switch devices or circuits on and off
- Knowledge, skills and understanding can be developed in: component recognition and purpose; PCB circuit assembly and soldering; system and circuit principles; signal tracing and fault finding; product design
- The kit can be used for both class teaching or for individual project work
- All components, including the PCBs, are provided
- The kit includes: resistors and capacitors, NE555 timer, switches and preset resistors, LEDs, wire PCB and PP3 battery clip
- Empty PCBs are also available in packs of 5
- **Kit contains components for 5 circuits**
- Suitable for **Key Stages 3 & 4** (ages 11 to 16)

Each kit requires 1x PP3 battery (not included).

Type	Order code	1+
555 project kit	**70-0225**	9.89
Empty PCBs (5)	**70-0230**	7.32

070866

≡Rapid

LDR PCB Project Kit

The LDR PCB project has been designed specifically to support and integrate with teaching schemes for Key Stages 3 & 4. Instruction details are available for free download from **www.rapidonline.com** and can be photocopied for class use.
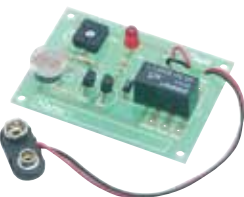
- The kit is a light sensing circuit, which can be used to switch output devices or circuits on and off
- Knowledge, skills and understanding can be developed in: component recognition and purpose, PCB circuit assembly and soldering, system and circuit principles, signal tracing, fault finding and product design

- The kit can be used for both class teaching or for individual project work
- All components, including the PCBs, are provided
- The kit includes: resistors and diodes, transistors and preset resistors, LEDs and relays, LDR PCB and PP3 battery clip
- Empty PCBs are also available in packs of 5
- **Kit contains components for 5 circuits**
- Suitable for **Key Stages 3 & 4** (ages 11 to 16)

Each kit requires 1x PP3 battery (not included).

Type	Order code	1+
LDR PCB project kit	**70-0245**	24.52
Empty PCBs (5)	**70-0250**	4.16

070867

≡Rapid

Thermistor Temperature Sensor Project Kit

The thermistor temperature sensorproject has been designed specifically to support and integrate with teaching schemes for **Key Stages 3 & 4**. Instruction details are available for free download at **www.rapidonline.com** and can be photocopied for class use.

- The kit is a heat sensing circuit, which can be set to recognise various temperatures through the use of a variable resistance
- Knowledge, skills and understanding can be developed in: component recognition and purpose; PCB circuit assembly and soldering; system and circuit principles; signal tracing and fault finding; product design
- The kit can be used for both class teaching or for individual project work
- All components, including the PCBs are provided
- The kit includes: resistors, amplifier IC sockets, diodes, thermistors, preset resistors, transistors, LEDs, thermistor PCB and PP3 battery clip
- Empty PCBs are available separately in packs of 5
- **Kit contains components for 5 circuits**
- Suitable for **Key Stages 3 & 4** (ages 11 to 16)

Each kit requires 1x PP3 battery (not included).

Type	Order code	1+
Temperature project kit	**70-0315**	14.15
Empty PCBs (5)	**70-0240**	9.71

070901

≡Rapid

Keyboard Encoder Project Kit

The keyboard encoder project has beendesigned specifically to support and integrate with teaching schemes for **Key Stages 3 & 4**. Instruction details are available for free download at www.rapidonline.com and can be photocopied for class use.

- The kit allows students to use a matrix keyboard and encode it to a binary coded decimal number.
- Knowledge, skills and understanding can be developed in: Component recognition and purpose, PCB circuit assembly and soldering, System and circuit principles, Signal tracing and fault finding, Product design
- The kit can be used for both class teaching or for individual project work and all components, including the PCBs are provided
- The kit includes: PIC, resistors, capacitors, voltage regulators, DIL sockets, pin headers, switches, crimp housing, matrix keyboard, thyristors, pan head screws, nuts, LEDs and keyboard PCB
- **Kit contains components for 5 circuits**
- Suitable for **Key Stages 3 & 4** (ages 11 to 16)

Each kit requires 1x PP3 battery (not included).

Type	Order code	1+
Keyboard project kit	**70-0325**	15.62
PCB only - pack of 5	**70-0270**	5.38

070902

RK Education

555 Monostable Projects

This project has been designed to introduce the important concept of timing circuits to students using the 555 monostable circuit. The circuit is very important as it features heavily in KS4 curriculums.
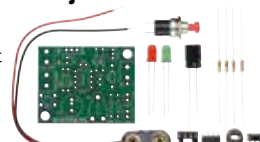
It has been designed to have more than one possible outcome and therefore more than one application. It allows for good differentiation and includes a transistor drive circuit.

- Time can be varied with the variable resistor
- Can be used with various trigger inputs
- Battery-powered
- PCB has space for a transistor drive circuit to allow higher powered outputs to be added
- Clear silkscreen text has been used to make construction simpler
- Professional double-sided PCB pre-drilled with silkscreen and solder-resist
- Empty PCBs are available separately, order code **70-9034**
- Suitable for **Key Stages 2, 3 & 4** (ages 7 to 16)

Type	Order code	1+
Economy	**70-6012**	2.30
Deluxe with buzzer	**70-6013**	2.46
PCB only	**70-9034**	1.04

082439

RK Education

555 Timer Astable Projects

This range of projects has been designed to introduce the important concept of astable timers and pulse-width modulation using a 555 timer astable circuit.
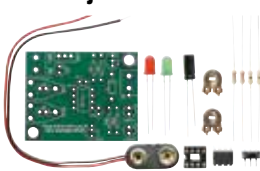
Three versions are available - Economy, **70-6017**; With drive circuit, **70-6018** and Deluxe, **70-6019**. The three kits all use the same PCB, but have a different set of components. Please see Technical Details for more information.

This circuit is very important as it features heavily in KS4 curriculums. The range of projects has been designed to have more than one possible outcome and therefore more than one application.

- Frequency can be varied by adjusting the two variable resistors
- Battery-powered
- Clear silkscreen text has been used to make construction simpler
- Professional double-sided PCB pre-drilled with silkscreen and solder-resist
- Empty PCBs are available separately, order code **70-9036**
- Suitable for **Key Stages 2, 3 & 4** (ages 11 to 16)

Lead-free Solder Wire

100g from
£5.51
Order code 85-1166

500g from
£26.61
Order code 85-1166
www.rapidonline.com

Parts & quantities per kits

Order code	Circuit designation	Description	Economy 70-6017	With drive circuit 70-6018	Deluxe 70-6019
08-0235	C1	100nF ceramic capacitor	1	1	1
11-0220	C2	10uF electrolytic capacitor	1	1	1
08-0232	C3	10nF capacitor	1	1	1
11-2922	C4	100uF capacitor	1	1	1
18-0585	–	Battery clip PP3	1	1	1
21-0461	J1, J2	2-way 16A 5mm terminal block	–	–	2
22-0107	SK1	8-pin DIL socket	1	1	1
47-3142	D1	1N4007 1A diode	–	1	1
55-1790	LED1	5mm red LED	1	1	1
55-1792	LED2	5mm green LED	1	1	1
62-0650	R4	0R (zero Ohm) resistor	–	–	1
62-0359	R2, R3	270R resistor	2	2	2
62-0373	R1	1K resistor	–	1	1
67-0408	RV1, RV2	2K preset	2	2	2
70-9036	–	PCB	1	1	1
76-0306	SW1	SPDT slide switch	1	1	1
81-0143	T1	MPSA13 Darlington NPN transistor	–	1	1
82-0336	IC1	NE555 timer	1	1	1

Type	Order code	1+
Economy	**70-6017**	2.44
With drive circuit	**70-6018**	2.86
Deluxe	**70-6019**	3.39
PCB only	**70-9036**	1.39

082444

RK Education

Transistor Switch Projects

This project introduces the transistor switch and is an excellent first electronics/ systems and control project for students.

The project is also excellent for GCSE students as it has been designed with KS4 curriculums in mind. It is a very versatile project and can be used as a moisture sensor, temperature sensor and light sensor. The project has been designed to allow differentiation and has space for up to 5 outputs and a range of inputs including variable resistors.

- A number of different solutions are possible
- Can be used with an LDR, thermistor or moisture sensor
- Battery-powered
- PCB has space for up to five outputs
- Clear silkscreen text has been used to make construction simpler
- Professional double-sided PCB pre-drilled with silkscreen and solder-resist
- A training system, **70-6046**, is available to help aid teaching and learning with this project and to help students to arrive at their final solution
- 2 versions available for maximum flexibility
- Available with or without temperature sensor
- Empty PCBs are available separately, order code **70-9040**
- Suitable for **Key Stages 2, 3 & 4** (ages 7 to 16)

Kit contains:

Quantity	Description	Order code
1	Transistor switch projects (70-6024/5) PCB	**70-9040**
1	1K 0.25W carbon film resistor	**62-0373**
1	270R 0.25W carbon film resistor	**62-0359**
1	TMPSA13 Darlington NPN 30V 0.5A TO-92	**81-0143**
1	SPDT ultraminiature slide switch	**76-0306**
1	Battery clip PP3 - end entry	**18-0585**
1	5mm red LED	**55-1790**
70-6024 only:		
1	Miniature photoresistor	**58-0134**
1	47K 0.25W carbon film resistor	**62-0410**
70-6025 only:		
1	NTC thermistor - 100K 10% 3.5mm pitch	**61-0420**
1	100K miniature carbon resistor	**67-0418**

Price each

Type	Order code	1+
Economy	**70-6024**	1.86
With temperature sensor	**70-6025**	1.84

MOQ 2

Type	Order code	2+
PCB only	**70-9040**	0.747

082451

RK Education

Transistor Astable Project

This project introduces astable circuits and also other important concepts including how resistance and capacitance affect timing circuits and the use of a transistor as a switch.

There are a number of possible outcomes for the circuit including electronic decorations, a police car/fire engine or advertising.

- Frequency of the astable circuit can be varied
- Different outputs can be used
- Battery-powered
- The PCB has space for up to five outputs on either side
- Professional double-sided PCB with silkscreen and solder-resist
- Empty PCBs are available separately, order code **70-9042**
- Suitable for **Key Stages 2, 3 & 4** (ages 7 to 16)
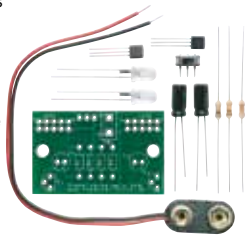
Kit contains:

| Qty	Description	Order code
1	Transistor astable project PCB	**70-9042**
2	270R 0.25W carbon film resistor	**62-0359**
2	BC182L TO92 60V NPN GP transistor	**81-0034**
1	SPDT ultraminiature slide switch	**76-0303**
1	Battery clip PP3 - end entry	**18-0092**
2	10k 0.25W carbon film resistor	**62-0397**
2	10µ 25V radial electrolytic capacitor	**11-0220**

Price each

Type	Order code	1+
Economy	**70-6028**	1.80

MOQ 2

Type	Order code	2+
PCB only	**70-9042**	0.75

082453

RK Education

SCR/Thyristor Projects

This project introduces latching circuits and also other important concepts including different ways of triggering and resetting circuits. There are a number of possible outcomes for the circuit including electronic alarms, an electronic money box, a target game and a steady-hand game.

- Different trigger inputs can be used
- Different resets can be used
- Space for up to 3 outputs
- Battery-powered
- Clear silkscreen text has been used to make construction simpler
- Professional double-sided PCB pre-drilled with silkscreen and solder-resist
- Available in 2 versions: economy and complete
- Both versions are supplied with empty PCB, 1x PP3 battery clip, 1x 2N5060G SCR or equivalent, 1x 5mm red LED, 1x 270 ohm resistor, 1x 1k resistor, 1x 10k resistor (all 0.25W), 1x SPDT slide switch
- Complete version has additional push-to-make switch and 6V PCB mounting buzzer
- Empty PCBs are available separately, order code **70-9048**
- Suitable for **Key Stages 2, 3 & 4** (ages 7 to 16)
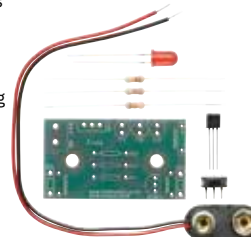
Price each

Type	Order code	1+
Economy	**70-6031**	1.84
Complete	**70-6032**	2.30

MOQ 2

Type	Order code	2+
PCB only	**70-9048**	0.747

082458

RK Education

Assembled Transistor Switch Training Kit

This system has been specifically designed to be used alongside the Transistor Switch Project, **70-6024**. Using this system students can gain an understanding of the operation and application of the transistor switch circuit and this system also helps students make important decisions that will affect the final outcome of their project.
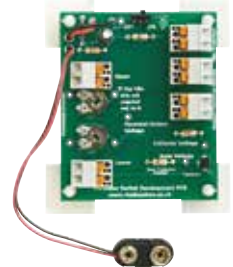
- Curriculum-based
- Allows students to model a light, temperature and moisture sensing circuit
- Allows students to test their designs prior to final construction
- Battery powered to remove the need for power cables and access to power sockets
- Screwless terminal blocks are used to allow students to easily insert different values for the potential divider section
- Clear silkscreen text has been used to aid learning
- Large pads have been included to allow the potential divider, base and collector voltages to be measured using a multimeter
- Professional double-sided PCB with clear white silkscreen and solder-resist
- Suitable for **Key Stages 2, 3 & 4** (ages 7 to 16)

Type	Order code	1+
Trans. switch training kit	**70-6046**	11.82

082469

RK Education

RK Education RKL298 H-Bridge Motor Drive IC Project PCB Kit

A kit of parts to build this versatile PCB that has been designed specifically for the L298 H-Bridge motor drive chip. The kit is ideal for DC motor control and robotic projects.

Further details, schematics and constructional notes can be downloaded from www.rapidonline.com.

- Uses an L298 stepper motor control/driver
- L298 has output current of 2A continuous per channel in DC operation
- Ideal for DC motor control and robotic projects
- Great for use with PIC, PICAXE, Genie, ATMEL and Arduino
- Designed for use in DC motor control and robotic projects
- Maximum output current 2A per channel
- Terminal blocks used for easy interfacing
- Mounting holes for PCB mounts
- Includes smoothing capacitors
- High quality, black, double-sided PCB
- Empty PCB is also available separately
- Suitable for Key Stages 4 & A Level (ages 14 to 18)

Kit contents

Quantity	Description
1x	RKL298 PCB
1x	L298N dual full bridge driver
1x	7805 regulator TO-220
1x	85°C 100µF 25V radial lead aluminium electrolytic capacitor
2x	0.1µF +/-20% 50V Y5V 2.54mm pitch radial ceramic capacitor
2x	3-way single row PCB socket 2.54mm pitch
2x	10kΩ CR25 0.25W CF resistors
4x	CTB5201/2BK 2-way 16A low profile terminal block 5mm pitch
8x	UF4007 1A 1000V ultrafast diode

Type	Order code	1+
L298 H-bridge kit	**70-9111**	5.96
Empty PCB only	**70-9069**	0.935

551957

RK Education

Servo Controller Project PCB Kit

A kit of parts to make a servo controller PCB that has been specially designed to be fully compatible with Atmel®, Arduino®, Genie®, PIC® and PICAXE®.

- PCB controls upto 8 servos
- Each servo has an LED indicator
- Servos are controlled via headers
- Designed for use with Atmel, Arduino, PIC, Genie and PICAXE
- High quality, double-sided PCB
- Empty PCB is also available separately

Technical specification

Quantity	Description
1x	Servo control PCB
1x	0.1uF +/-20% 50V Y5V P:2.54mm radial ceramic capacitor
1x	CTB5201/2BK 2-way 16A low profile terminal block 5mm pitch
2x	4-way single row PCB socket 2.54mm pitch
8x	3W single row PCB header plug
8x	CR25 0.25W CF resistor
8x	330R CR25 0.25W CF resistor
8x	3mm green LED miniature

Type	Order code	1+
Servo controller kit	**70-9112**	2.50
Empty PCB only	**70-9070**	1.80

551958

RK Education

4 Siren Sound and Flashing Lights Generator Kit Based on UM3561 IC

A kit of parts to build a 4 siren sound and flashing lights generator ideal for building into models.

- Uses a UM3561 Sound IC
- High quality speaker
- 4 different emergency siren sounds, selected using a jumper
- Perfect for emergency vehicles
- Sound can be adjusted with a potentiometer
- PCB has space for up to 8 LEDs (available separately)
- LEDs flash
- LEDs can be turned off
- Frequency of flashing can be varied
- Ideal for using RC vehicles, cars, trucks, lorries etc
- Available as a kit or as a blank PCB
- Professional double sided PCB

Technical specification

Quantity	Description
1x	Siren generator PCB based on UM3561 IC with flashing lights
1x	Battery clip PP3-end entry 200mm
1x	2-way single row PCB header plug
1x	3W single row PCB header plug
1x	Miniature closed jumper link
1x	85°C 100U 25V radial lead aluminium electrolytic capacitor
1x	0.1uF +/-20% 50V Y5V P:2.54mm radial ceramic capacitor
1x	1N4007 1A 1000V silicon rectifier diode
1x	BZX55C3V3 500MW Zener diode
1x	W/proof 66mm mylar speaker 8 Ohm
1x	100K CR25 0.25W CF resistor
1x	47R CR25 0.25W CF resistor
1x	8-pin DIL socket, narrow 7.62mm without central support
1x	UM3561 three siren generator
2x	1K CR25 0.25W CF resistor
2x	470R CR25 0.25W CF resistor box
2x	10K CR25 0.25W Cf resistor box
2x	200K WR3296W 10% 3/8 cermet trimmer pot
2x	SPDT ultra miniature slide switch
2x	85°C 10U 25V radial lead aluminium electrolytic capacitor
3x	MPSA13 DAR NPN 30V 0.5A TO-92B

Type	Order code	1+
4 siren & lights kit	**70-9116**	7.80
Empty PCB only	**70-9076**	2.85

551962

≣Rapid e d u c a t i o n

We bring STEM to life

Order online
Save time, and place your order at:
www.rapidonline.com

≣Rapid

Nightlight Kit Project

The nightlight project is a safe, battery powered, bedside light that automatically switches on when the room lights are switched off. After a time delay of about 5 minutes the light automatically switches off to conserve battery power.

- Light source is a high efficiency, high brightness white LED
- Suitable for illuminating different coloured translucent acrylic, coloured inkjet film or 'fun and fancy' acrylic paints
- An excellent platform for creative product design
- Featured in Electronics Education published by the **IEE**
- Can be used to explore timing circuits using different component values
- Very popular and engaging project
- The key aim of the hubs is to identify the needs of local teachers, and provide ongoing support to encourage teachers and schools offering electronics in the design and technology curriculum. The work undertaken by the hubs includes twilight workshops and half-day training sessions. A variety of material is covered in these sessions, ranging from reviewing developments in software and hardware to allowing teachers the opportunities to discuss Year 10 activities and Year 11 project work. In addition, the hub centres are involved in organising single, two and four-day teacher training programmes in conjunction with an ECT accredited trainer, through funding from both the Department for Skills and Education, and the IEE.
- Suitable for **Key Stages 2, 3 & 4** (ages 7 to 16)
- Component kits are **supplied in packs of 5 kits** including printed circuit boards

Each kit requires 4x AAA alkaline batteries (not included).

Type	Order code	1+
Nightlight project	**70-2600**	15.52

073656

≣RVFM

Badge Module with Flashing LEDs
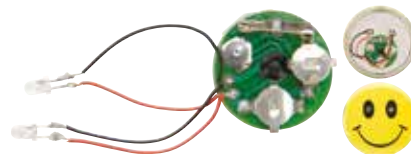
Add eye-catching flashing LEDs to your badge designs with this ready-built, battery-powered electronic module.

- Two 3mm red LEDs flash alternately
- On/Off button on circuit board
- Size only 7mm thick x 25mm diameter
- Takes 2x L736 alkaline button cell (supplied)
- Holes can be easily made in most badges for the LEDs
- Complete with badge pin, double-sided adhesive foam pad for fixing to badge and plastic back cover
- Supplied in **packs of 30**

For neat LED holders please see order code **55-0160**.

Type	Order code	1+
Badge flash modules (30)	**70-0721**	25.57

077733

AREXX Engineering

CP-01K Classical Piano Kit

This kit enables you to build a miniature classical piano to create your own melodies. The piano is able to play a chromatic scale. Alternatively it is pre-programmed with 15 registered melodies for your enjoyment.

- Suitable for **Key Stage 4** (ages 14 to 16)

Requires 3x AAA batteries (not included).

Type	Order code	1+
Piano kit	**13-1440**	23.90

079552

Sound, Music & Light Modules

≣RVFM

Coin Operated Sound and Music Modules

These modules enable students to enhance a simple container based assignment with a music or sound element.

- The modules are easy to incorporate into a container and can be triggered by a wide variety of coins
- Modules employ a 27mm diameter piezo speaker and 2 replaceable L736 button cells (supplied). For replacement cells, see **www.rapidonline.com**
- Module dimensions: behind flange 39 x 15 x 31mm, flange dimensions 45 x 21 x 2.2mm, coin slot 30 x 3mm

Type	Order code	1+
Bird call sound	**13-0626**	1.89
It's a small world	**13-0627**	1.45

034061

≣RVFM

20 Second Sound Recorder Module
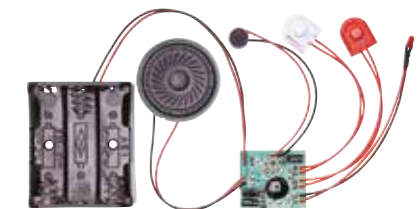
A sound recording module providing up to 20 seconds of playback time for speech, music or sound effects.

- Allows students to include a record and playback element into projects
- 40mm mylar speaker
- Separate microphone, record and play buttons
- A single press of the play button starts playback
- The record push-button is held down during recording
- Separate battery holder
- Non-volatile memory allows the batteries to be changed without losing the recorded message
- PCB dimensions: 31 x 27mm

Requires 3x AA batteries (not included).

Type	Order code	1+	5+	10+	25+
20s Sound recorder	**13-0665**	10.79	10.47	10.00	9.23

080582

≢RVFM

Sound Module for Recording/Playback

A compact sound recording module allowing you to make a 10-second recording of your own sounds or personalised messages for use in soft toys and textile projects.

- 40mm diameter mylar speaker for sound quality
- 10 seconds worth of recording time
- Recording is made by setting the slide switch to the recording position, depressing the top of the module and speaking into the microphone at the back of the unit
- An LED lights during the recording period
- With the slide switch set to play, depressing the top of the module plays your message back
- New recording can be made by sliding the switch back to record
- Battery compartment cover for easy battery changing
- Dimensions: 26 x 45mm diameter

Powered by three L1154 button cells (supplied).

Type	Order code	1+	10+
10s Record/play	**13-0678**	9.10	7.70

060530

≢RVFM

10 Flashing LED Module

A flashing LED module, with built-in timer, producing a multi-coloured running light effect similar to that seen in disco light shows. By arranging the LEDs around the PCB, a large display can be created with minimal effort. The module is activated by a push button switch mounted on the PCB, and runs for approximately 10 to 15 seconds before automatically switching off.
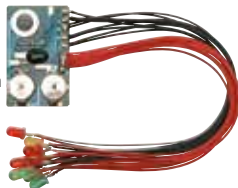
- Ideal for eye-catching displays, notices, etc.
- Each module consists of an assortment of ten red, green and yellow 5mm LEDs which flash in pairs in sequence
- The module is powered by two, replaceable L1131 button cells. For replacement cells, see **www.rapidonline.com**
- PCB dimensions: 47 x 29mm
- LED lead length: approx. 280mm

Type	Order code	1+	5+	10+	25+
10 LED Flash module	**13-0652**	4.46	4.27	4.08	3.92

034071

Zinc Chloride AA & AAA Batteries

MOQ 4+ AAA from
£0.271
Order code 18-1440
www.rapidonline.com

MOQ 4+ AA from
£0.142
Order code 18-1442
www.rapidonline.com

Conductive Paint

Bare Conductive®

Electric Paint

Bare Conductive Electric Paint is conductive which means that electricity from the battery can pass through it just like a wire. When you draw a circuit with a Bare Electric Paint Pen, the components and battery are joined together by the paint and make a complete loop, or circuit.

Bare Electric Paint is non-toxic, solvent-free and dries at room temperature.

- Draw a circuit on almost any surface: Paper, plastic, cardboard, fabric, wood, and more!
- Connect batteries, LEDs and other components
- Try it with microcontrollers like Arduino
- Can be used with conductive thread and e-textiles
- Great for attaching components and for PCB repair
- Can be used as a Cold Solder and Wire Paint
- Non-toxic and solvent free
- Dries at room temperature
- Available in **10ml pens, 50ml jars** and **1l tins**
- **www.rapidonline.com/Bare-Conductive/paint** for further information, image gallery, data sheets and downloads.

Type	Order code	1+
10ml Pen	**70-0873**	8.57
50ml Jar	**70-0874**	18.22
1l Tin	**70-0885**	230.80

524978

Bare Conductive®

Touch Board

The Bare Conductive Touch Board is a printed circuit board module that can make your projects interactive, responsive, smart or just fun. Change the world around you by using the Touch Board to turn almost anything into a sensor.

Connect anything conductive to one of the 12 electrodes and trigger a sound via the onboard MP3 player, play a MIDI note or do anything else you might do with an Arduino or Arduino-compatible device.

The Touch Board has been designed to be an easy-to-use platform for a huge range of projects, whether it is painting a lightswitch on your wall, making a paper piano or creating a customised interactive surface.

- Touch sensing
- Distance sensing
- No programming required for basic operation

- Arduino compatible and works with popular shields
- Ideal for use with Bare Conductive paint or any other conductive material
- MP3 Player / MIDI device
- MicroSD card socket
- Standard 3.5mm audio jack for headphones and speakers
- Lithium Polymer (LiPo) battery recharges via USB
- HID capable - turn the Touch Board into a keyboard or mouse
- Board size: 84 x 62 x 10mm

See **www.rapidonline.com/Bare-Conductive/TouchBoard** for further information, image gallery, data sheets and downloads.

See **www.rapidonline.com/Bare-Conductive/projects** to see our **Bare Conductive Ideas Page**.

Technical specification

Arduino compatible (recognised as an Arduino Leonardo in IDE)
Atmel ATMega32U4 Microprocessor
Freescale MPR121 dedicated touch interface
VLSI VS1053B audio processor
Arduino Shield Compatible (check pins available)
32KB of Flash Memory of which 4KB is used for bootloader
5V operating voltage (automatic voltage selector for USB or battery operation)
Built in LiPo battery charging with onboard boost circuit for 5V operation
16MHz clock speed
Can be powered and programmed via USB
20 digital I/O pins (3 used for Touch IC and 5 for MP3 IC – can be disabled)
7 PWM channels
12 analogue input channels
12 Touch electrodes of which 8 can be configured as extra digital inputs or outputs with PWM capability
84mm x 62mm foot print with maximum height of 10mm (audio connector)
On/Off switch when powered from battery

Type	Order code	1+
Touch board	**70-0105**	49.68

548747

Piggyaxe

6-LED Random Flasher Kit

A kit of parts to make a circuit that flashes 6 LEDs at random. The circuit is really 6 separate circuits combined into a single chip: a CMOS 40106 Hex (6) Schmitt trigger.

The overall circuit is made up of 6 relaxation oscillators directly driving 6 LEDs. The free-running oscillator frequencies soon drift apart and become out of sync, thus producing an eye-catching 'random' display. By angling the LEDs and adding ping-pong balls as light diffusers, striking effects can be achieved with relative simplicity. The circuit is compact and economical enough to be used to enhance anything that would benefit from some flashing LEDs.

- Kit contains printed circuit board and standard components
- See Technical Specification table for list of kit contents
- Construction notes are available for download at **www.rapidonline.com**

Kit contains:

Order code	Description	Quantity
83-0482	40106B hex Schmitt trigger	1
62-0466	10MΩ CR25 0.25W carbon film resistor	6
62-0370	1kΩ CR25 0.25W carbon film resistor	6
08-0235	100nF 5mm ceramic disc capacitor	6
18-0092	TruPower PP3 battery clip (heavy duty) end entry	1
70-1052	6 LED flasher PCB	1
55-0125	Kingbright L-7113YD 5mm 2.1V yellow LED 20mcd	2
55-0155	Kingbright L-7113ID 5mm 2V red diffused LED 45mcd	2
55-0122	Kingbright L-7113PGD 5mm 2.25V green LED 5mcd	2
18-2909	Battery box 4x AA with switch	1

Type	Order code	1+
6 LED flasher kit	**70-1053**	1.98

544634

No minimum order value
UK mainland only

Multi-Timer Kit
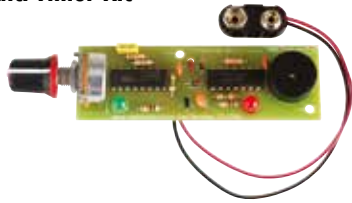
A set of parts to build a multi-purpose pocket timer. The timer is fun to build and useful, with great repeatability and long time delays possible. The circuit provides an activity LED, a strident 'beep-beep-beep' warning when the time is up and a visual warning too.

The circuit uses a self-clocking binary counter that controls a number of relaxation oscillators that control each other.

- Kit contains printed circuit board and standard components
- See Technical Specification table for list of kit contents
- Visit **www.rapidonline.com** to download constructional notes for this kit

Kit contains:

Order code	Description	Quantity
83-0390	4060B 14-stage ripple carry binary counter (DIL)	1
83-0482	40106B hex Schmitt trigger	1
18-0092	TruPower PP3 battery clip (heavy duty) end entry	1
47-3416	1N4148 signal diode 75V 150mA	2
55-0155	Kingbright L-7113ID 5mm 2V red diffused LED 45mcd	1
35-0044	Miniature PCB piezo transducer	1
65-0740	470k 16mm linear potentiometer	1
55-0122	Kingbright L-7113PGD 5mm 2.25V green LED 5mcd	1
10-5828	220nF 5% 63V 5mm polyester box capacitor	1
62-0398	15kΩ CR25 0.25W carbon film resistor	1
62-0458	4.7MΩ CR25 0.25W carbon film resistor	1
62-0442	1MΩ CR25 0.25W carbon film resistor	1
62-0370	1kΩ CR25 0.25W carbon film resistor	2
08-0235	100nF 5mm ceramic disc capacitor	3
70-1056	Multi-timer PCB	1
62-0402	22kΩ CR25 0.25W carbon film resistor	1
62-0450	2.2MΩ CR25 0.25W carbon film resistor	1
65-0745	1MΩ 16mm linear potentiometer	1
32-1200	Tricolour knob with red insert	1

Type	Order code	1+
Multi-timer kit	**70-1057**	3.42

544636

14M2 Motherboard Kit

If you run out of I/O with the 08M2 then the **14M2 motherboard kit** provides a logical step up. Based on the 14M2 and offering 11 pins that offer a huge variety of options, the chances are it will do what you want.

With 4 hardware PWM channels, total dimming control of 4 channels of LEDs becomes a possibility, with of course analogue and digital inputs and Infra-red capability too. It's an ideal starting point if you need to switch on more or simply want more ways of sensing and controlling your project.

- Kit contains printed circuit board and standard components
- See Technical Specification table for list of kit contents
- Visit **www.rapidonline.com** to download constructional notes for this kit

Kit contains:

Order code	Description	Quantity
20-0137	TruConnect PCB Jack socket (stereo) 3.5mm	1
62-0394	10kΩ CR25 0.25W carbon film resistor	1
62-0402	22kΩ CR25 0.25W carbon film resistor	1
50-0381	1N4001 Diotec rectifier diode 1A 50V	1
11-0820	Forever 85°C 100µF 10V radial micro miniature electrolytic capacitor	1
19-0086	15-way single row PCB socket 2.54mm pitch	1
18-0092	TruPower PP3 battery clip (heavy duty) end entry	1
13-5024	PICAXE-14M2 chip	1
70-1062	14M2 motherboard PCB	1
22-1721	14-pin 0.3in. turned pin socket	1

Type	Order code	1+
14M2 motherboard kit	**70-1063**	2.23

544639

Velleman Kits

Flashing LED Module Kit

A simple multivibrator circuit driving two LEDs.

- Suitable for many applications including model construction and education
- Adjustable flashing speed with two potentiometers
- Power consumption approx. 8mA
- Dimensions: 30 x 35 x 15mm
- Kit contains all components required including printed circuit board and construction instructions
- **Velleman MK102**

Requires 1x PP3 battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Flashing LED kit	**70-4138**	3.65

074555

Dual Super Bright Flashing LED Lights Kit

A module with two superbright red LEDs giving a powerful warning indication.

- Ideal for emergency and warning signs, eye-catchers, etc.
- High visibility 'alarm-active' - simulation, etc.
- 'Auto turn-on at dark' - mode with adjustable sensitivity
- On/Off switch
- Can be operated from 12V supply
- Dimensions: 55 x 32 x 40mm
- Kit contains all components required including printed circuit board and construction instructions
- **Velleman MK148**

Requires 1x PP3 battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Dual LED flasher	**70-4164**	4.33

074568

MK107 Running LED Light Kit

This kit will produce a running light effect.

- 8 LEDs
- Different running light effects are selectable (Prog push button)
- Adjustable effect speed with potentiometer
- Includes stand-by push button power switch (Off push button)
- Suitable for beginners
- Dimensions 95(L) x 40(W)mm
- **Velleman MK107**

Requires a 9V battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Running LED light kit	**70-4010**	5.13

073834

LED Sets

Packs of 5mm light emitting diodes, ideal for use with Velleman's Advertisement LED Display Kit (available as Rapid part **70-4264**), and many other electronics projects.

- Available in **packs of 50** (red or green)

Set size	Colour	Order code	1+
50	Green	**70-4222**	4.99
50	Red	**70-4224**	5.12

518057

Mini-6-LED Chaser Kit

If you've ever wanted to recreate the light sequences from the Star Trek Enterprise or from the 1980s TV show Knight Rider, the Velleman Mini-6-LED Chaser Kit is just what you need. The kit provides LED sequences which scan from side to side or go in one direction and is a great attention-grabber.Suitable for use on cars or in shop windows, at exhibitions.. or anywhere where you want to get the point across.

- 6 high-intensity 3mm red LEDs
- Fixed scan speed 0.5 sec
- Dimensions 55 x 25 x 10mm
- Power supply 4-15Vdc (20mA at 12Vdc)
- Manufacturer's part **MK173**

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Chaser Kit	**70-4416**	6.28

518134

Infrared Light Beam Kit

This kit will produce an IR light beam that can be used to monitor a doorway, a pathway, an area etc. for the arrival or presence of a person or object.

- When the light beam is interrupted the kit makes an audible noise (85dB)
- Uses an IR transmitter emitter to project a beam of infrared light to an IR receiver detector
- Ideal for home security
- On/Off switch provided
- Basic soldering techniques required for circuit board assembly
- Suitable for beginners with little or no previous knowledge of electronics
- Not recommended for outdoor use
- **Velleman MK120**

Transmitter and receiver both require a 9V PP3 battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Technical specification

Audible signal	85db
Visible signal	LED alert
Range	1 to 4m (3.3ft to 13ft)
IR transmitter	5.5 x 4cm
IR receiver	10 x 5 cm
Transmitter emitter	9V DC, 50mA max.
Receiver detector	9V DC, 20mA max.
9V battery holder and power adaptor jack included.	

Type	Order code	1+
IR Light barrier	**70-4028**	7.13

073843

Minikits Starter Sets

These starter sets from Velleman give you everything you need to start enjoying electronic projects. Each set contains a number of kits for you to enjoy making. Choose from the Minikits Starter Set, with 6 different projects, or the Seasonal Minikit Pack which gives you 5 different kits, each with a festive theme.

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Starter set	**70-4464**	29.05
Seasonal pack	**70-4466**	20.50

518153

Traffic Light Kit

A miniature four way traffic light as seen at many junctions.

- Realistic operation with adjustable delay
- 12 LEDs
- Great for model railroads, exhibitions or as a toy
- Low power consumption 15mA
- Suitable for beginners
- Dimensions: 115(H) x 50(W) x 35(D)mm
- **Velleman MK131**

Requires a 9V PP3 battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Traffic light	**70-4040**	6.98

073849

MK191 Classic TV Game with Analog Bats

A modern adaptation of the classic 'tele tennis' TV game: - build the kit then play the game. Each player has his own bat with rotary potentiometer for ultra-fast bat movement. The game has 5 single-player levels, 5 two-player levels, 3 ball angles, smash function and game play sound.

- 5 single-player levels
- 5 two-player levels
- 3 ball angles
- Smash function (press the button the moment the ball hits the bat)
- Only the server can score points
- Audio output
- Composite video out
- PAL or NTSC selection
- Brightness control
- Consumption only 7mA

- Auto power-down
- **Velleman type MK191**

Takes 2x AA batteries, not included.

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
TV Tennis Game	**70-4147**	13.75

526298

MK112 and MK159 Memory Brain Game Electronics Kits

The Velleman Brain Game Kit will provide hours of fun with just 4 LEDs and 4 push buttons.

It is available **either with or without a case**.

- Aim of the game is to repeat a pattern, which is generated at random
- Pattern is played both visually and audible or visually only (selectable)
- Features 4 difficulty levels, which can be selected at start-up
- Replay speed gradually increases during the game, to make it even more challenging
- Low power consumption
- Microprocessor controlled
- Auto power off
- Basic soldering techniques required for circuit board assembly
- Suitable for beginners with little or no previous knowledge of electronics
- Dimensions 65(L) x 50(W)
- **Available with or without case**

Requires 3x AAA batteries (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Without enclosure	**70-4018**	8.72
With enclosure	**70-4402**	13.88

073838

Expandable Quiz Kit

This quiz table will allow up to four players to compete against one another.

- LED indicates first button pushed
- Quizmaster reset button
- Two units can be daisy chained for eight player fun
- Add your own remote pushbutton and indication
- Suitable for beginners
- On/Off switch
- Dimensions 110(L) x 78(W) x 28(D)mm
- **Velleman MK133**

Requires a 9V PP3 battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Quiz table	**70-4042**	6.10

073850

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on all orders over £30 (excl. VAT)
(UK mainland only)
* See Terms & Conditions for full details - **www.rapidonline.com/terms**

Wheel of Fortune Kit

This wheel of fortune acts just like the game, just push the button and the 10 LEDs start showing a spinning action. They gradually slow down until the winning one remains lit.

- Push the button to start spinning action
- 10 LEDs red, yellow and green
- Spinning action gradually decreases
- Auto power-off
- Low power consumption
- Suitable for the intermediate, some previous knowledge of electronics required
- Good soldering techniques for medium dense boards recommended
- Dimensions 33(L) x 0.64(D)mm
- **Velleman MK152**

Requires 9V PP3 battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Wheel of fortune kit	**70-4058**	6.02

073858

Roulette Kit

This roulette kit is just like the real thing, and will be a sure winner with you, your friends and relatives.

- With a push of a button, the LEDs lights flash in a spinning sequence and stop randomly
- Enjoy hours of fun with this game of chance
- 37 LEDs are arranged in a circle
- Winner tune played for each colour
- Pushbutton operation
- Microprocessor technology
- Auto power off
- Low power consumption
- Some previous knowledge of electronics required
- Good soldering techniques for medium dense boards
- Suitable for intermediates
- Diameter 90mm
- **Velleman MK119**

Requires 3x AA batteries (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Roulette kit	**70-4026**	13.13

073842

MK109 Electronic Dice Kit

Board games provide an excellent source of pleasant and healthy entertainment, and this dice kit will provide the players with even more fun.

- Fully independent electronic dice
- Result displayed on this electronic dice module
- Cheating is out of the question
- Displays are switched off automatically saving battery power
- Some soldering experience recommended
- Suitable for beginners
- Dimensions 60(L) x 45(W)mm
- **Velleman MK109**

Requires a 9V PP3 battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Electronic dice	**70-4014**	4.31

073836

MK150 Electronic Dice Kit

Novel dice that you don't have to throw or press any buttons. Just shake.

- Acts just like regular dice
- Lights roll out slowly and flash the last combination or winning number
- Buy two and simulate a pair of real dice
- Auto power-off
- Suitable for beginners
- Dimensions 36(L) x 36(W) x 32(D)mm
- **Velleman MK150**

Requires 1x 3V Lithium button cell type CR2025 or CR2032 (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Shaking dice kit	**70-4056**	9.07

073857

Animated LED Smiley

You can make light of every occasion with the Animated LED Smiley Kit from Velleman. The smiley face goes through a sequence of eight different faces, from sad to happy and a few in between. You can use this kit as a novelty gift or just build it for the fun of it.

- Great attention grabber
- Choose between static or animated expressions
- On/off expression selection button
- Auto power off
- Power consumption 15mA
- Dimensions 75 x 75 x 32mm
- Power supply 3 x AAA batteries
- Manufacturer's part MK175

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
LED Smiley	**70-4420**	7.13

518136

Running Microbug Kit

This attractive bright coloured bug-shaped miniature robot is always hungry for light, and will constantly run towards it in a bug-like behaviour.

- A really great gift for the budding robotics enthusiast
- Features two open chassis sub-miniature motors
- Adjustable light sensitivity to work in almost any light condition
- LED eyes to indicate driving direction
- Bug stops in total darkness
- Suitable for beginners
- Dimensions 100(L) x 60(W)mm
- **Velleman MK127**

Requires 2x 1.5V AAA batteries (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Running microbug kit	**70-4034**	7.31

073846

Electronic Christmas Tree

Have yourself a cosy little Christmas with this Electronic Christmas Tree from Velleman.

- 16 blinking LEDs
- Very low power consumption: max. 4mA
- Dimensions 60 x 100 x 25mm
- Power supply 9V battery PP3 (not supplied)
- Manufacturer's part **MK100**

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Electronic Xmas Tree	**70-4382**	5.21

518121

3D Christmas Tree Electronics Kit

Make sure everyone knows that you're in the Christmas spirit with the Velleman 3D Christmas Tree Kit. Customise your tree with a choice of red, green and yellow LEDs.

- 16 flashing red LEDs
- Extra green and yellow LEDs provided
- Can be hung on and fed through wires
- Low power consumption
- Dimensions 80 x 88 x 102mm
- Power supply 9-12Vdc or 9V battery/8mA (not supplied)
- Manufacturer's part **MK130**

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
3D Christmas Tree	**70-4386**	8.19

519180

LED Animated Bell Kit

An animated illuminated bell display with 83 LEDs.

- Power supply 9 to 12VDC adaptor or 9V PP3 battery
- No need to remove battery when using external supply
- 12V operation possible for use in cars, lorries, trucks, etc.
- On/Off switch included
- Kit contains all components required including printed circuit board and construction instructions
- **Velleman MK122**

Requires 1x PP3 battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Animated bell kit	**70-4148**	7.68

074560

Riding Santa Kit

This animated Riding Santa will make a delightful addition to any seasonal decoration or Christmas display.

- 126 multi-coloured LED lights
- Suitable for use in cars, lorries etc.
- No need to remove battery when using external supply
- On/Off switch included
- Some soldering experience recommended
- Suitable for beginners
- Dimensions: 145(L) x 80(W)mm
- **Velleman MK116**

Powered by either a 9 to 12V DC supply or 9V alkaline battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Riding Santa	**70-4000**	14.98

073829

Flashing LED Stars

You can be the star of the local Christmas scene with these Flashing LED Star kits from Velleman. Ideal for lighting up the festive season, these stars are available in 2 colours - red and yellow.

- 35 LEDs included
- Safe battery operation
- Flashing or static operation
- Can be used on desktop or hanging from the ceiling
- Multiple kits enhance the effect
- In-car (12V) operation possible
- Current consumption 40mA (static mode)
- Flash duty cycle 1:2
- Dimensions 90 x 90mm
- Power supply 9Vdc battery

Please note: *This is a self-assembly kit and requires soldering.*

Colour	Order code	1+
Red	**70-4410**	6.80
Yellow	**70-4412**	7.18

518132

Free Delivery*

on all orders over £30 (excl. VAT) – (UK mainland only)

* See Terms & Conditions for full details

Education

5

Electronic Kits & Components

Velleman

LED Halloween Pumpkin Kit

A brightly coloured halloween pumpkin kit with 25 LEDs.

- Random flash effect simulates flickering candle
- One extra high intensity yellow LED illuminates the pumpkin On/Off switch
- Dimensions: 100 x 80 x 33mm
- Kit contains all components required including printed circuit board and construction instructions
- Suitable for **Key Stages 2 & 3** (ages 7 to 14)

Requires 1x PP3 battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
LED pumpkin kit	**70-4162**	6.10

074567

Velleman

Sound to Light Unit Kit

This kit has four high-intensity LEDs that light up and react simultaneously on every sound.

- For different funny and practical applications
- Sound indicator
- Simple sound-to-light unit for music
- Can be used to indicate the telephone, door bell for the hearing impaired
- Adjustable sensitivity with potentiometer
- Built-in microphone
- Some soldering experience recommended
- Suitable for beginners
- Dimensions 55(L) x 55(W) x 35(D)mm
- **Velleman MK103**

Requires 1x 9V battery (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Technical specification
Adjustable sensitivity	RV1
LEDs	4 high bright
Operating voltage	9V DC
Power consumption	0.5mA min./12mA max.
Built-in microphone	

Type	Order code	1+
Sound-to-light unit	**70-4004**	4.78

073831

Velleman

Electronic Clock Kit

Digital clock with red seven-segment displays in an attractive case.

- Automatic time base selection (internal or net-frequency controlled 50/60Hz)
- Internal time base with fine-tuning adjustment
- Selectable 12 or 24 hour display
- Equipped with optional backup battery facility in case of power failure
- Dimensions: 92 x 45 x 101mm
- Kit contains all components required including printed circuit board and construction instructions
- **Velleman MK151**

Requires a 9V, 500mA AC/DC mains adaptor or 3x AA batteries (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
LED clock kit	**70-4166**	13.18

074569

Velleman

Countdown Timer Kit

A very useful kitchen timer that will alert you with timings from 1 minute to 1 hour.

- Single button and straight forward operation
- Clear 16 LED readout
- Audible and visible alarm
- Discrete pre-alarm
- Auto power-off
- Attractive designer enclosure
- Suitable for beginners
- Dimensions 76.5(L) x 75(W) x 32(D)mm
- **Velleman MK128**

Requires 3x AAA 1.5V DC batteries (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Technical specification
Timer settings	1-10 minutes in one minute steps
	10-30 minutes in five minute steps
	30-60 minutes in 15 minute steps
Basic accuracy	Better than 5%
Power supply	3x AAA 1.5V batteries (not incuded)
Power consumption	10mA typical

Type	Order code	1+
Kitchen timer kit	**70-4036**	8.72

073847

Velleman

Rolling Message Kit

Create your own moving message with up to 16 self definable characters, the options are many and varied.

- Adjustable scrolling speed
- Press 'SET' to change a particular character
- Press the up or down-key to select a character and end with the '>' sign
- Display standby function press 'Stby' (press RUN to restart)
- 35 LED graphic display
- Requires an 9-12V DC power supply or car battery
- 20mA maximum
- Suitable for beginners
- Dimensions 46/89(L) x 67(W)mm
- **Velleman MK124**

Back-up battery 9V PP3 (not included).

Please note: *This is a self-assembly kit and requires soldering.*

Type	Order code	1+
Rolling message	**70-4032**	10.96

073845

Velleman

USB PC Scope and 2-channel Generator

The feature-packed Velleman USB PC Scope and 2-Channel Generator is a complete USB-powered lab in a box. The software offers a 2-channel oscilloscope, spectrum analyser, transient recorder, function generator and bode plotter. With the generator, you can create your own waveforms using the integrated signal wave editor. For automated measurements, it is possible to generate wave sequences, using file or computer input.

- Manufacturer's part **PCSGU250**

Type	Order code	1+
USB PC Scope	**70-4468**	134.99

518154

Velleman

USB PC Scope and Signal Generator

The pocket-sized Velleman USB PC Oscilloscope and Signal Generator contains a whole world of measuring tools in one small box. It includes apowerful 2-channel oscilloscope and a handy bode plot function. There is no need for a power supply as the unit is powered over USB.

- Includes function generator, oscilloscope, transient recorder, bode plotter, spectrum analyser, manual, USB PC scope+generator unit and USB cable
- Dimensions: 100 x 100 x 35mm
- Minimum system requirements - IBM compatible PC, Windows™ XP, Vista, 7 *, SVGA display card (min.1024 x 768), mouse, USB port 1.1 or 2.0
- Manufacturer's part **PCSU 200**

Type	Order code	1+
PC Scope + Generator	**70-4470**	124.59

518155

Velleman

EDU09 Educational PC Oscilloscope Kit

Oscilloscopes needn't be expensive and complicated!

Build your own oscilloscope and use your PC to display your measurements. This small and easy to build kit has all the features of a full blown oscilloscope and comes complete with detailed instructions and test leads.

- Self-assembly kit
- Dimensions 94 x 94mm
- **Velleman type EDU09**

Technical specification
Oscilloscope:
Bandwidth: DC to 200kHz ± 3dB
Input impedance: 100kΩ / 20pF
Maximum input voltage: 30V (AC + DC)
Time base: 10μs to 500ms per division
Input range: 100mV to 5V/division
Input sensitivity: 3mV display resolution
Readouts: True RMS, dBV, dBm, p to p, Duty cycle, Frequency ...
Record length: 1k samples
Sampling frequency: 62.5Hz to 1.5MHz
Sample history function
Auto set-up function
Pre-trigger function : on 0.1ms/div. to 500ms/div ranges
Persistence options: Colour graded, Variable and Infinite
Spectrum analyser:
Frequency range: 0 to 150Hz to 75kHz
Operating principle: FFT (Fast Fourier Transform)
FFT resolution: 512 lines
Transient recorder:
Timescale: 20ms/div to 2000s/div
Max. recording time: 9.4h/screen
Automatic storage of data
Record and display of screens
Automatic recording for more than 1 year
Max. number of samples: 100/s
Min. number of samples: 1 sample/20s
General information:
Markers for: amplitude/voltage and frequency/time
Expert or basic mode selection in software
Input coupling: DC and AC
8 Bit resolution
Storage of display and data
Power supply through USB: +/- 200mA
Uses Microsoft® human interface device (HID) driver, no external driver required
Dimensions: 94 x 94mm
Minimum system requirements:
IBM compatible PC
Windows® XP, Vista, 7, 8
SVGA display card (min. 1024 x 768)
Mouse
Free USB port 1.1 or 2.0
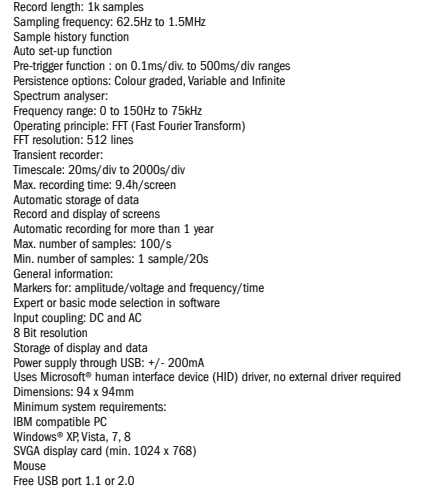
Type	Order code	1+
PC based scope	**57-4590**	30.45

545233

5

Education

Electronic Kits & Components

≡velleman

USB Controlled DMX Interface Kit

The Velleman USB-Controlled DMX Interface Kit enables you to control DMX lighting fixtures using a PC and USB interface. Test software and DMX Light Player software is included, and a Dynamic Link Library (DLL) is provided to write your own software. The device includes a stand-alone test function that outputs all 512 channels at a time, with adjustable levels.

- Kit includes enclosure and USB cable
- Connected and powered through USB
- 512 DMX channels with 256 levels each
- 3 pin XLR-DMX output connector
- Windows 98SE or higher compatible
- 9V battery (not supplied) needed for stand alone test mode
- Solid state - fuse protection on DMX output
- Dimensions 106 x 101 x 45mm
- Power supply 5V DC via USB
- Manufacturer's part **K8062**

Please note: This is a self-assembly kit and requires soldering.

Type	Order code	1+
USB DMX Interface	**70-4318**	43.95

518103

≡velleman

Multifunction Relay Switch

This kit has a total of 14 different functions including timers, switching, flashing, interval and random switching.

- Two pre-programmed delays
- Learning mode for delays of 2 seconds up to 12 days
- Pushbutton control
- EEPROM for delay time storage in case of power failure
- On-board transient filter for the relay contacts
- Suitable for control of incandescent lighting, halogen lighting, fluorescent lighting, fans, valves, buzzers
- Maximum load 2.5A (550W/220V; 275W/110V)
- Suitable for intermediate with knowledge with previous electronics knowledge and good soldering techniques
- Dimensions 87(L) x 39(W) x 26(D)mm
- **Velleman K8015**

Requires a 12V DC battery or 9 to 12V AC power supply (not included).

Please note: This is a self-assembly kit and requires soldering.

Type	Order code	1+
Multi-function relay	**70-4066**	12.13

073865

≡velleman

USB Experiment Interface Board

The Velleman USB Experiment Interface board has 5 digital input channels and 8 digital output channels, plus two analogue inputs and two analogue outputs with 8 bit resolution.

The number of inputs/outputs can be further expanded by connecting up to 4 more cards to the PC's USB connectors. All communication routines are contained in a Dynamic Link Library (DLL). You may write custom Windows (XP, Vista, Windows7) applications in Delphi, Visual Basic, C++ Builder or any other 32-bit Windows application development tool that supports calls to a DLL. Available either as a kit for you to make yourself or as a pre-assembled module.

- Source code examples for Visual Basic, Visual C++, Visual C#, Excel, Delphi and Borland C++ builder available
- 5 digital inputs (on board test buttons provided)
- 2 analogue inputs with attenuation and amplification option
- 8 digital open collector output switches
- 2 analogue outputs
- Up to 4 cards can be connected to PC
- General conversion time: 2ms per command
- Uses Microsoft human interface device (HID) driver, no external driver required.
- Power supply through USB: approx. 70mA
- Dimensions 145 x 89 x 20mm
- Manufacturer's part **K8055N**

Type	Order code	1+
Kit	**70-4314**	21.51
Pre-assembled module	**70-4476**	37.23

518101

≡velleman

Solderless Experimental Electronics Starter Kit

Take your first steps into the world of electronics with the Velleman EDU01 Solderless Experimental Starter Kit. If you ever needed proof that electronics can be fun, this is it, as the EDU01 allows you to build your own circuits in a fun, safe and educational way.

The kit contains a breadboard and all the components needed to get started, so you can finish assembling your first circuit in just a few minutes.

- Projects include: LED with push button
- Transistor as current amplifier
- Astable multivibrator
- Simple burglar alarm with LED indication and sound
- Light detector
- Polarity tester
- Start-Stop circuit
- Timer circuit
- Light switch
- Water alarm
- No soldering required
- High-quality breadboard with 456 contact terminals
- Extended manual
- Dimensions: 80mm x 60mm

Requires 9V battery (not included)

Type	Order code	1+
Solderless Experiment	**70-4204**	9.63

518049

≡velleman

Oscilloscope Tutor Board

The Velleman EDU06 Oscilloscope Tutor Board will show you how to get the most out of your digital oscilloscope. The board generates a number of signals, which you can use to become familiar with AC, DC and frequency measurements, sine and square waves, power supply ripple, full and half wave rectifiers and oscillators. The kit will also help you learn the meaning of terms such as V/div, Time/div, trigger level and auto-setup. Most of the experiments involved can be done using any digital storage scope. Some experiments can be performed with an analogue scope.

- Assembled and tested
- No soldering required
- Dimensions: 116 x 74 x 24mm
- Power supply 9-12V AC/100mA min

Type	Order code	1+
Tutor board	**70-4210**	16.88

518052

≡velleman

USB Interface Card

The Velleman USB Experiment Interface Board has 5 digital input channels and 8 digital output channels, plus two analogue inputs and two analogue outputs with 8 bit resolution.

The number of inputs/outputs can be further expanded by connecting up to 4 more cards to the PC's USB connectors. All communication routines are contained in a Dynamic Link Library (DLL). You may write custom Windows (XP, Vista, Windows7) applications in Delphi, Visual Basic, C++ Builder or any other 32-bit Windows application development tool that supports calls to a DLL. Also available as a kit for you to make yourself.

- Source code examples for Visual Basic, Visual C++, Visual C#, Excel, Delphi and Borland C++ builder available
- 5 digital inputs (on board test buttons provided)
- 2 analogue inputs with attenuation and amplification option
- 8 digital open collector output switches
- 2 analogue outputs
- Up to 4 cards can be connected to PC
- General conversion time: 2ms per command
- Uses Microsoft human interface device (HID) driver, no external driver required.
- Power supply through USB: approx. 70mA
- Dimensions 145 x 89 x 20mm
- Manufacturer's part **VM110N**

Type	Order code	1+
Interface card	**70-4476**	37.23

518158

MitchElectronics®
Electronics for Hobbyists and Education

NEW

555 Astable Kit

A kit of parts to make an astable circuit using a 555 timer IC.

The circuit is known as an 'astable' circuit because it is not stable in any state (either on or off). This makes it ideal for applications like flashing a warning light by continually switching it on and off.

The 555 timer is arguably the most famous integrated circuit ever invented. Created by Hans Camenzind in 1971 for Signetics (now NXP), the 555 timer is still widely used and in production. These devices are so common that over 1 billion are made each year.

- Frequency range: approx. 0.5Hz to 100Hz
- Component count: 10
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
555 astable kit	**70-0051**	1.95

568027

≡Rapid
…where price meets quality

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NEW

555 Monostable Kit

A kit of parts to make a monostable circuit using a 555 timer IC.

The circuit is known as a 'monostable' circuit because it is only stable in one state, the Off state. While the 555 is in the On state it will only be a matter of time (depending on the resistance of the potentiometer and the size of C1), before the system is reset back into the off state. This makes it ideal for controlling applications like security lights that switch off after a certain length of time.

The 555 timer is arguably the most famous integrated circuit ever invented. Created by Hans Camenzind in 1971 for Signetics (now NXP), the 555 timer is still widely used and in production. These devices are so common that over 1 billion are made each year.

- Component count: 12
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
555 monostable kit	**70-0052**	1.95

568028

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NEW

AC-DC 5V Regulator Kit

Many circuits require a voltage supply that is constant and unchanging, e.g. radios, calculators, computers, monitors, phones and even cars.

Batteries are a good source of constant voltage but since they are usually limited by size, weight and power capacity, the mains electricity supply is often used. But the mains electricity supply is constantly changing as it is AC (alternating current), which is not suitable for DC (direct current) circuits.

Therefore, an AC-DC converter is required to convert the alternating current into direct current! This kit will not only do this, but will also regulate the DC output so that it is a smooth, constant 5V which can be used to power many projects and circuits.

- Component count: 15
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires an AC input from a suitable mains transformer with a maximum output voltage of 16V AC, not included
- **Do not connect directly to the mains supply**

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
5V regulator kit	**70-0053**	1.95

568029

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NEW

Transistor Flasher Kit

A kit of parts to make a circuit that continuously flashes 2 LEDs alternately.

In electronics it is often required to have a circuit that creates a continuous series of pulses (like the second hand on a clock which ticks every second). Examples of where this is useful include: digital clocks (to track time) and computers - the CPU needs to be triggered by pulses. Most digital systems usually require a central 'clock' that synchronises all the various parts.

A circuit which produces a pulse every so often is called an oscillator. Once powered, an oscillator's output will turn on and then turn off. Once this cycle has been completed it repeats itself indefinitely as long as there is power.

But how is an oscillator made? How do you get some components to keep on pulsing? With this kit you will be creating an circuit that uses two transistors and a few other components to create an oscillator that generates a few pulses every second so that it flashes LEDs (that is why it is called a flasher).

- Component count: 12
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Flasher kit	**70-0054**	1.45

568030

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NEW

Simple Function Generator Kit

A kit of parts for you to build into a simple function generator.

In just about every electronic circuit there will be a signal that changes with time, and in many circuits this signal may be continuous. For example, the electricity from the mains supply has a sinusoidal shape (like an ocean wave). Another example would be the clock for a computer which has a square shape.

Imagine a scenario where a digital circuit has been created and requires a clock from an external source. One could be built especially for the task, however the clock source would most likely have a fixed frequency. Even if one was designed to have a variable frequency (which takes time), the device would only output a square wave.

This is where the humble function generator steps in! Not only does the SFG (Simple Function Generator), have both a square and triangle output but the frequency is also adjustable. The square and triangle wave are generated by the same source and thus are always in the same phase which means that the two waveforms follow each other constantly (useful if both waves are being used).

But how does this circuit work? What active devices are used to create the oscillations and how is the frequency adjusted? Let's find out .....

- Component count: 18
- Includes high quality printed circuit board (PCB)

- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires a 5V power supply, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Simple generator kit	**70-0056**	2.45

568031

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NEW

PWM Generator Kit

A kit of parts to build a Pulse Width Modulation (PWM) generator.

PWM signals are those that have variable duty-cycles and are found in many thousands of circuits. Just a few examples of how PWM signals can be used include Digital-To-Analogue conversion, high efficiency power controllers, servo control, timing and much more.

This kit will allow you to build a simple PWM generator that runs on voltages between 3 and 28V and has two potentiometers for adjusting both the frequency of the PWM wave and the duty-cycle between 0% and 100%.

- Component count: 18
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires a 3 to 28V power supply, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
PWM generator kit	**70-0058**	2.45

568032

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NEW

Continuity Probe Kit

A kit of parts to build yourself a continuity probe.

If you need to check for continuity but want to use a tool that won't damage sensitive devices, then this continuity probe is just for you!

A simpler continuity probe could be built with a buzzer, a battery and two probes, which combine to make a simple buzzer circuit. While this is fine for checking the continuity of wires, it is not recommended for circuits containing potentially sensitive components as they could be damaged.

- Component count: 25
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Continuity probe kit	**70-0121**	2.95

568045

Education

5

Electronic Kits & Components

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NEW
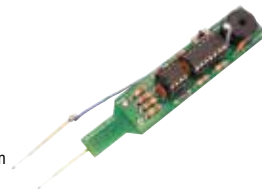
Logic Probe Kit

A kit of parts to build a test probe that will indicate the logic levels in your circuits.

Circuits are often tested with multi-meters and oscilloscopes, but this is not always the best method. For example, not everyone has access to an oscilloscope and multi-meters are no good for fast-changing signals. Another reason is ease of use: testing a circuit with an oscilloscope can be tricky as you need to probe the contact and then turn away to look at the display. All it takes is for the probe to slip slightly and then the oscilloscope will be showing the signal trace for a completely different connection.

This is where the logic probe saves the day! Instead of having numbers to show voltages, or a display to show signals over time, the logic probe has just three LEDs for outputs. These outputs can show On, Off, Floating, and Oscillating! So long as the probe has a common ground to the circuit under test (which can be done easily by either using the same power supply or connecting the probe's GND-REF to the circuit's ground), the probe will display one of the four listed conditions above when connected to a point in the circuit. But how does this probe work? Get this kit and find out!

- Component count: 17
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- No battery required - uses the same power supply as the circuit being tested

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Logic probe kit	**70-0059**	2.45

568033

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NEW

Discrete Op-Amp Kit

A kit of parts to make an Operational Amplifier (op-amp) using individual (discrete) components.

Operational Amplifiers are key components used in electronics and are found in many (if not most) circuits today! Op-amps can be used for amplifying voltages, comparing voltages, producing waveforms and even for converting analogue signals into digital numbers.

But how does an op-amp work? What components make up an op-amp? With this kit you will build your own simple op-amp and learn about its inner workings, as well as its many possible basic configurations including unity buffer, amplifier and comparator!

- Component count: 23
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Discrete op-amp kit	**70-0103**	1.95

568034

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NEW

Simple Power Supply Kit

A kit of parts for you to build a simple multi-output power supply.

While PP3 and AA batteries can be used to power some kits directly, not every kit can handle these unregulated voltages. For example, any kit with an active buzzer requires a 5V source and some other kits (such as the M602 Door Bell) can only handle up to 4V! Providing these voltages can be cumbersome and any project that requires more than a single 5V source may prove challenging.

This is where the Simple Power Supply comes in! This kit is directly powered from a 9V battery and provides many different outputs including: 9V Out, -9V (approx), 5V Out, and 3.3V Out . The kit generates the 3.3V output with the use of the AMS1117 which is a Surface Mount Device (SMD). However, this is arguably one of the easiest SMD parts to solder and can provide great soldering practice for surface mount devices!

- Component count: 42
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Simple PSU kit	**70-0104**	3.95

568035

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NEW

M602 Door Bell Kit

A kit of parts for you to build a 'ding-dong' door bell.

While creating circuits from discrete parts and carefully planning out glue logic can be fun for some makers, it can be a pain for others. This kit allows you to create a fully working door bell based around the M602 which perfectly demonstrates how some scenarios can justify a specialised IC.

- Component count: 18
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- This circuit requires a power supply between 3 and 4V to operate correctly, so 2x AA batteries, not included, could be used. Alternatively, the Simple Power Supply kit, not included, could be used as it has a 3.3V output

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Door bell kit	**70-0106**	2.95

568036

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NEW

4017 Audible Beacon Kit

A kit of parts for you to build an audible locator beacon.

The 4017 is a 5-stage Johnson counter that has 10 outputs which turn on one after another. The IC is a commonly used 4000 series part and can be used in many scenarios including finite state machines, simple counters, and even time division.

With this kit you can build a 4017-based beacon that can be used for locating fallen radio-controlled drones or planes, or just for soldering practice!

- Component count: 25
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires a 5V power supply, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Audible beacon kit	**70-0107**	2.95

568037

MitchElectronics®
Electronics for Hobbyists and Education

NEW

RTL Logic Gate Kits (Packs of 5)

Kits of parts to build Resistor-Transistor Logic (RTL) gates.

Logic gates can be constructed using many different technologies, with one of the most famous ones being called CMOS, which stands for Complementary Metal Oxide Semiconductor. However, while this technology is employed in almost all electronic circuits, it was not always the popular choice.

Back in the 80s, TTL (Transistor-Transistor logic) was the popular choice for logic components, but again, this too was not the only option available for logic gates. During the days of the Apollo moon missions there existed a logic family called RTL, which stands for Resistor-Transistor Logic and, as the name suggests, logic gates built using this method relied on resistors and transistors to enable their logic functions.

- Low component count
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Require a 1V to 12V power supply, not included

Supplied as a kit of parts for assembly. Soldering is required.

Truth tables

AND			**NAND**		
Input A	Input B	Output	Input A	Input B	Output
0	0	1	0	0	1
0	1	0	0	1	1
1	0	0	1	0	1
1	1	0	1	1	0
OR			**NOR**		
Input A	Input B	Output	Input A	Input B	Output
0	0	0	0	0	1
0	1	1	0	1	0
1	0	1	1	0	0
1	1	1	1	1	0
NOT					
Input A	Output				
1	0				
0	1				

Gate type	Order code	1+
AND	**70-0126**	1.95
NAND	**70-0122**	1.95
OR	**70-0127**	1.95
NOR	**70-0123**	1.95
NOT	**70-0124**	1.95

568046

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NEW

4017 Light Chaser Kit

A kit of parts for you to build into a 10-LED light-chaser.

The 4017 is a 5-stage Johnson counter that has 10 outputs which turn on one after another. This IC is a commonly used 4000 series part and can be used in many scenarios including finite state machines, simple counters and even time division.

With this kit you will build a 4017 based variable light chaser that is great for creating futuristic sci-fi looking displays and lighting effects.

- Component count: 24
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
4017 light chaser kit	**70-0108**	2.95

568038

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NEW

Negative Voltage Generator Kit

A kit of parts for you to build a negative voltage generator. Many projects require a negative voltage source such as those heavily based around op-amps and generating a negative voltage can be difficult.

With this kit you will learn how to build a simple negative voltage generator that can be useful in scenarios where a negative voltage is needed from a single rail supply such as a battery or solar panel! This kit is also great for solder practice and teaches how capacitive coupling can be exploited in electronic circuits.

- Component count: 21
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
-ve generator kit	**70-0109**	1.95

568039

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NEW
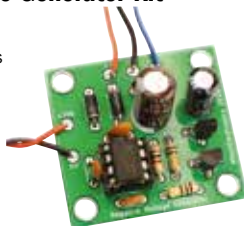
5V Source Kit

A kit of parts for you to make a regulated 5V power source.

Many circuits require a 5V supply that is smoothed and reliable. The reason for this is that some components are not able to handle other voltages, for example, the buzzer found in many MitchElectronics kits.

The buzzers are rated for 5V operation only. If a different voltage is used, the buzzer may either fail to work properly, or be permanently damaged! Creating a 5V source can be done with the use of a 7805 regulator, but bread-boarding a 5V source can be cumbersome, as breadboards are often large in size and inconvenient.

The 5V source kit, however, is compact and convenient, and produces a stable and regulated 5V source from a standard 9V, PP3 battery.

- Component count: 11
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
5V source kit	**70-0114**	1.95

568040

MitchElectronics®
Electronics for Hobbyists and Education

NEW

Sound Activated Alarm Kit

A kit of parts for you to make a sound-activated intruder alarm.

When it comes to valuables we all know that security is critical. Whether it be a pesky co-worker pinching your cookies, or a more devious pet finding their way into the pantry, this sound-activated alarm kit can inform you when someone or something is trying to rob you if they make any noise.

The sound-activated alarm is made up of four different stages; input stage from the microphone, a comparator stage, a latch stage and an oscillator stage that produces an audible warning.

- Component count: 29
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires a 5V power source, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Sound alarm kit	**70-0116**	2.95

568041

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NEW

Datacorder Kit

A kit of parts for you to build a datacorder.

Modern storage for computers include USB drives, hard disks, and even cloud storage. Computers of the past, however, did not have such technological capabilities, with hard disks having megabytes instead of terabytes of storage and portable storage being in the form of large floppy disks. Even then, only the most expensive computers had access to such storage methods and home users would be lucky to have a floppy drive.

One storage method that was popular with home computers from the 70s to 90s was cassette tapes which could be used to store large amounts of data very cheaply. But how can computer data be stored on a cassette tape that is designed to play music? With sound of course!

With this kit you can build a Serial to Audio converter that lets you store UART data as sound onto a tape cassette, a Dictaphone, or even a computer.
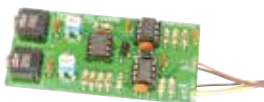
- Component count: 33
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires a 5V power supply, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Data recorder kit	**70-0117**	2.95

568042

MitchElectronics®
Electronics for Hobbyists and Education

NEW

Electronic Dice Kit

A kit of parts for you to make an electronic dice.

If you find yourself inside on a rainy day without dice to play your favourite board games, then look no further because the MitchElectronics Electronic Dice kit is just for you!

The circuit consists of 3 main sub-circuits: a 555 monostable circuit, a 555 astable circuit and a 4017 counter circuit. The finished kit simulates an electronic dice with a simple cool-down system so you can watch the numbers roll.

Press and hold the switch to start the dice rolling, then let go when you're feeling lucky for that number which gets you past those expensive hotels or past that snake!

- Component count: 40
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Electronic dice kit	**70-0118**	2.95

568043

MitchElectronics®
Electronics for Hobbyists and Education

NEW

MitchElectronics Reaction Game Kit

Want to test your reaction speed? Build this reaction tester kit that uses glue logic to display the result on a dual 7 segment display!

While it would be very easy to design a single-chip solution with the use of a microcontroller, this kit demonstrates how glue logic can be used to create complex systems with discrete parts - and no processors!

- Component count: 61
- Includes high quality printed circuit board (PCB)
- Downloadable Electronics Construction Manual includes sections on how to solder and how to identify and mount all types of components on to the printed circuit board
- Downloadable instructions include information specific to this kit including circuit diagrams, schematic diagrams and explanations, 'how it works' circuit descriptions as well as component identification and constructional notes
- Requires 1x PP3, 9V battery, not included

Supplied as a kit of parts for assembly. Soldering is required.

Type	Order code	1+
Reaction tester	**70-0119**	6.95

568044

Education

5

Electronic Kits & Components

BUILD YOUR OWN ARDUINO!

Orangepip®
Segments328

Orangepip Segments328

- An Arduino compatible board you can use in your own projects.
- Test your soldering skills!
- Understand the components needed to support a microcontroller.
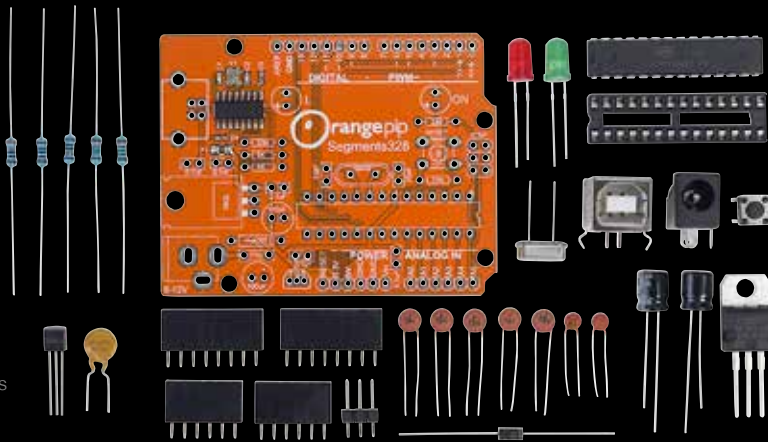
Contents includes:

1 Orangepip Segments PCB
1 x 16MHz crystal
1 ATmega328 microcontroller
1 Dual in line socket
1 Tactile switch
1 Red LED
1 Green LED
1 x 6-pin dual row header
2 x 8-pin single row sockets
2 x 6-pin single row sockets
1 ISB socket
1 Power supply jack socket
1 x 10K resistor
2 x 330R resistors

2 x 1K resistors
2 x 47µF electronic capacitors
1 x 1N4007 diode
1 x 7805 voltage regulator
1 x 7133 voltage regulator
1 PTC resettable fuse
5 x 0.1µF ceramic capacitors
2 x 22pF ceramic capacitors

SINGLE
£11.95
Order code 75-1200

CLASSPACK OF 15
£90.00
Order code 75-1201

Pixy 2 Vision Sensor Camera CMUcam5 Arduino/Pi Compatible

CHARMED LABS

The Charmed Labs Pixy 2 vision sensor camera is smaller, faster and more capable than the original Pixy.

Like its predecessor, Pixy2 can learn to detect objects that you teach it, just by pressing a button. Additionally, Pixy2 has new algorithms that detect and track lines for use with line-following robots. The new algorithms can detect intersections and 'road signs' as well. The road signs can tell your robot what to do, such as turn left, turn right, slow down, etc. Pixy2 does all of this at 60 frames-per-second, so your robot can be fast, too.

No need to mess around with tiny wires - Pixy2 comes with a special cable that plugs directly into an Arduino and a USB cable that plugs into a Raspberry Pi, so you can get started quickly.

No Arduino or Raspberry Pi? No problem! Pixy2 has several interfaces (SPI, I2C, UART, and USB) and simple communications, so you can quickly get your chosen controller talking to Pixy2.

- Small, fast, easy-to-use, low-cost, readily-available vision system
- Learns to detect objects that you teach it
- Connects to Arduino with included cable. Also works with Raspberry Pi, BeagleBone and similar controllers
- All libraries for Arduino, Raspberry Pi, etc. are provided
- C/C++ and Python are supported
- Communicates via one of several interfaces: SPI, I2C, UART, USB or analog / digital output
- Configuration utility runs on Windows, MacOS and Linux
- All software/firmware is open-source GNU-licensed
- All hardware documentation including schematics, bill of materials, PCB layout, etc. are provided
- Kit contains: Pixy2 CMUcam5, Pixy IO to Arduino ISP cable, microUSB cable, mounting hardware

£48.20
Order code 75-1010

Clock Movements

TruMotion

Quartz Clock Movement and Numerals

These quartz crystal controlled clock movements and numerals are ideal for replacing defective units or for creating your own personalised clock projects.

They allow you to make any number of different clocks from CDs, papier mache, even paper plates, the only limits are your imagination. Use paper crafting techniques to design and build clocks that will suit any room and express your creativity.

- Quartz crystal controlled clock movements ideal for replacing defective units or for creative clock projects
- Black self-adhesive Arabic Numerals, 20mm high

Type	Order code	1+	5+	25+	100+
Clock movement	85-1430	1.68	1.42	1.30	1.19
Numeral set - black	85-1421	1.07	0.989	0.905	0.834

074959

≡Rapid

Wooden Clock Face Blanks

Have fun with these handy wooden clock face blanks.

- Great for painting and decorating with your own design
- Suitable for use with TruMotion clock movement **85-1430** and numerals **85-1421** & **85-1422**
- Choose from square or round shape
- Size: 170 x 170mm (square), 170mm diameter (round)
- Made from 6mm thick MDF
- 8mm central hole
- Supplied in **packs of 10**

Type	Order code	1+
Square clock blanks	06-0782	7.14
Round clock blanks	06-0783	5.30

010568

≡Rapid

Clock Group Kit

This kit enables pupils to create and design their own working clocks.

Kit contains
- 10x wooden clock blanks, 10x clock mechanisms, 10x numeral sets and 100 sheets of A4 white card
- Clock blanks 170 x 170mm
- Suitable for all ages
- **Supplied as a pack**

Type	Order code	1+
Clock group kit	13-0152	26.20

070756

Component Kits

≡Rapid

Education Components Spares Kit

A comprehensive range of essential electronic consumables offering a huge saving over individually purchased items.

- The kit is ideal for the classroom and contains LEDs, resistors, capacitors, etc.
- All the pieces are neatly packed into a well laid out stackable storage box with lid
- Dimensions of the box: 43cm x 31cm x 7cm
- Great school resource
- Total number of components = 1945
- Supplied as **a pack**

Technical specification

Order code	Description
55-1796	1x 5mm red LED (pack 100)
55-1792	1x 5mm green LED (pack 100)
55-1794	1x 5mm yellow LED (pack 100)
13-0260	1x Carbon film resistor kit (pack 1000)
13-0220	1x Electrolytic capacitor kit (pack 93)
13-0215	1x Polyester capacitor kit (pack 100)
34-0500	30x Stripboard 25 x 64mm
34-0610	2x Single sided pins (pack 100)
01-0108	2x Equipment wire (pack 11)
81-0466	100x BC548B Transistor
82-0458	50x LM741 Op-amp
82-0336	50x NE555 Timer
14-0430	1x Shallow Tray
14-0436	1x Tray lid
14-0438	1x Insert (3 long compartments)

Total number of components = 1945

Type	Order code	1+
Education spares kit	13-0108	66.61

065934

≡Rapid

Education Wire Starter Pack

A substantial kit containing a wide array of wire related consumables.

- Ideal for the classroom
- Contains wire cutters and strippers, wire, batteries and battery clips
- Offers a massive saving over separately purchased items
- Moulded box included
- Dimensions of the box: 43cm x 31cm x 7cm
- Great resource for all ages
- Supplied as **a pack**

Technical specification

Order code	Description
86-0350	5x Wire stripper
85-0205	5x Economy side cutter
01-0108	10x Equipment wire (pack)
18-1448	15x PP3 zinc chloride battery
18-0105	50x PP3 battery clip
14-0430	1x Shallow tray
14-0436	1x Tray lid

Type	Order code	1+
Wire starter pack	13-0112	40.87

065939

≡Rapid

Electricity Class Pack

A cost-saving classpack containing a selection of commonly used electrical accessories.

- Cost saving over buying parts separately
- Popular parts can be topped up
- Packed in a Gratnells storage tray with lid
- Please see individual product descriptions for full details
- Supplied as **a pack**

Technical specification

Order code	Quantity	Description
41-0125	10	3.5V bulbs
18-0125	5	2x AA battery holders
41-0070	5	Bulb holders
37-0140	5	Motors
18-0105	5	Battery snaps
17-0350	1	Crocodile leads (Pack of 10)
01-0102	5	Wire
75-0180	5	Toggle switch
76-0100	5	Slide switch
78-0115	5	Push on/off switch
78-0112	5	Push to make switch
35-3610	5	Buzzer
14-0430	1	Gratnells tray
14-0436	1	Lid for tray

Type	Order code	1+
Electricity classpack	70-1012	41.41

078013

≡Rapid

Education LED Pack

A considerable range of LEDs and LED related products are neatly packaged in this classroom kit.

- All the pieces come in re-sealable polythene bags
- Offers a significant saving over separately bought items
- Storage box with compartment tray and lid
- Dimensions of the box: 43cm x 31cm x 7cm
- Suitable for all ages
- Total number of components = 680
- Supplied as **a pack**

Technical specification

Order code	Description
55-1790	1x 5mm red LED (pack 100)
55-1792	1x 5mm green LED (pack 100)
55-1794	1x 5mm yellow LED (pack 100)
55-0140	25x Flashing 5mm red LED
55-0142	25x Flashing 5mm green LED
55-0144	25x Flashing 5mm yellow LED
55-1770	1x 3mm red LED (pack 100)
55-1772	1x 3mm green LED (pack 100)
55-1774	1x 3mm yellow LED (pack 100)
55-0000	1x LED tester
58-0134	1x Miniature LDR
14-0430	1x Shallow tray
14-0436	1x Tray lid
14-0443	1x Insert 8 compartment

Total no. of components = 680

Type	Order code	1+
Education LED pack	13-0122	47.58

065946

Education

5

Electronic Kits & Components

Free Delivery*

on all orders over £30 (excl. VAT)
(UK mainland only)

* See Terms & Conditions for full details

Forever

Electrolytic Capacitor Kit 93-Piece

This 93-piece capacitor kit contains a range of micro-miniature radial leaded electrolytic capacitors. The capacitors have a high capacitance per unit volume and are ideal for applications where high density packaging and low profile capacitors are required.

- Each value individually packed
- A total of 12 different values
- 7mm height
- Tolerance ±20%
- Temperature Range -40°C to +85°C

Technical specification

Number	Value	Voltage
15x	100µF	16V
5x	220µF	16V
5x	470µF	16V
3x	1000µF	16V
2x	2220µF	16V
15x	10µF	25V
5x	22µF	25V
10x	47µF	25V
3x	1000µF	25V
10x	1µF	63V
10x	2.2µF	63V
10x	4.7µF	63V

Type	Order code	1+	5+
Electrolytic capacitor kit	**13-0220**	7.96	6.90

062537

Wire & Cable

≡**Rapid**

Equipment Wire 7/0.2mm

A high quality wire produced to the **DEF61-12 (Part 6)** standards, making it ideal for general interconnection within apparatus.

- 7/0.2mm tinned copper conductor
- Overall diameter 1.2mm
- Rating 1kV rms 1.4A at 70°C
- Supplied on **reels of 100m** and **500m**

	Price per 100m reel	
Type	Order code	1+	10+
Black	**01-0400**	6.90	5.92
Blue	**01-0405**	6.90	5.92
Brown	**01-0410**	6.90	5.92
Green	**01-0415**	6.90	5.92
Grey	**01-0420**	6.90	5.92
Orange	**01-0425**	6.90	5.92
Pink	**01-0430**	6.90	5.92
Red	**01-0435**	6.90	5.92
Violet	**01-0440**	6.90	5.92
White	**01-0445**	6.90	5.92
Yellow	**01-0450**	6.90	5.92
Kit of 11 reels	**01-0480**	70.56	59.25

	Price per 500m reel	
Type	Order code	1+
Black	**01-2200**	29.79
Blue	**01-2202**	29.79
Brown	**01-2204**	29.79
Green	**01-2206**	29.79
Grey	**01-2208**	29.79
Orange	**01-2210**	29.79
Pink	**01-2212**	29.79
Red	**01-2214**	29.79
Violet	**01-2216**	29.79
White	**01-2218**	29.79
Yellow	**01-2220**	29.79

062320

≡**Rapid**

1/0.6mm Single Core Equipment Wire

This wire has a solid core and is ideal for plate wiring (running wires across a chassis with all wires straight or at right angles to one another). This wire remains in formed shape without cable ties.

- 1/0.6mm copper conductor
- Overall diameter 1.2mm
- Rating 1kV rms 1.8A at 70°C
- weight of reel approx 400g
- Supplied on **reels of 100m**

Type	Order code	1+	10+
Black	**01-0300**	7.25	6.61
Blue	**01-0305**	7.25	6.61
Brown	**01-0310**	7.25	6.61
Green	**01-0315**	7.25	6.61
Grey	**01-0320**	7.25	6.61
Orange	**01-0325**	7.25	6.61
Pink	**01-0330**	7.25	6.61
Red	**01-0335**	7.25	6.61
Violet	**01-0340**	7.25	6.61
White	**01-0345**	7.25	6.61
Yellow	**01-0350**	7.25	6.61
1 Each of above (11 reels)	**01-0380**	71.33	66.34

062317

≡**Rapid**

Equipment Wire 16/0.2mm

A high quality wire produced to **DEF61-12 (Part 6)** standards for general use and interconnection within apparatus.

- 16/0.2mm (0.5mm²) tinned copper conductor
- Overall diameter 1.6mm
- Rating 1kV 3A at 70°C
- Supplied on **reels of 100m** and **500m**

	Price per 100m reel		
Type	Order code	1+	10+	25+
Black	**01-0900**	13.50	12.86	12.68
Blue	**01-0905**	13.80	12.97	12.74
Brown	**01-0910**	13.80	12.97	12.74
Green	**01-0915**	13.80	12.97	12.74
Grey	**01-0920**	14.20	13.44	13.24
Orange	**01-0925**	13.80	12.97	12.74
Pink	**01-0930**	13.80	13.23	13.08
Red	**01-0935**	13.50	12.86	12.68
Violet	**01-0940**	13.80	12.97	12.74
White	**01-0945**	13.80	12.97	12.74
Yellow	**01-0950**	13.80	12.97	12.74
100m reels (total 11)	**01-0970**	115.08		

	Price per 500m reel	
Type	Order code	1+	5+
Black	**01-2280**	57.93	53.44
Blue	**01-2282**	57.48	54.32
Brown	**01-2284**	58.54	54.57
Green	**01-2286**	58.54	55.32
Grey	**01-2288**	58.54	53.99
Orange	**01-2290**	58.54	54.69
Red	**01-2294**	55.35	52.30
Violet	**01-2296**	58.19	54.24
White	**01-2298**	58.54	55.32
Yellow	**01-2300**	53.11	50.20

062322

≡**Rapid**

10/0.1mm Equipment Wire 100m

A high quality flexible equipment wire, available in a range of colours in 100m lengths.

Buy 10/0.1mm wire from Rapid Online today!

- 10/0.1mm tinned copper conductor
- Perfect for general interconnections within instruments
- Overall diameter 1.05mm
- 1kV at 0.5A @ 70°C
- Supplied on **reels of 100m**

Type	Order code	1+	10+	25+
Black	**01-1500**	4.48	4.08	3.66
Blue	**01-1505**	4.48	4.08	
Brown	**01-1510**	4.48	4.08	
Green	**01-1515**	4.48	4.08	
Grey	**01-1520**	4.48	4.08	
Orange	**01-1525**	4.48	4.08	
Pink	**01-1530**	4.48	4.08	
Red	**01-1535**	4.48	4.08	3.66
Violet	**01-1540**	4.48	4.08	
White	**01-1545**	4.48	4.08	3.66
Yellow	**01-1550**	4.48	4.08	

062319

Rapid

32/0.2mm Equipment Wire 1500V 6A

A high quality manufactured wire.

- Overall diameter 2.6mm
- 32/0.2mm (1.0mm²) tinned copper conductor
- Rating 1500V 6A at 70°C
- Approved **DEF61-12** (**Part 6**) for general use and connection within apparatus
- Supplied on **reels of 100m**

Type	Order code	1+	10+
100m reels			
Black	**01-1200**	22.68	21.97
Brown	**01-1210**	22.68	21.97
Red	**01-1235**	22.68	21.97
Orange	**01-1225**	22.68	21.97
Yellow	**01-1250**	22.68	21.97
Green	**01-1215**	22.68	21.97
Blue	**01-1205**	22.68	21.97
Violet	**01-1240**	22.68	21.97
Grey	**01-1220**	22.68	21.97
White	**01-1245**	22.68	21.97
Pink	**01-1230**	22.68	21.97

062325

Rapid

Extra Flexible Wire 25m

A very flexible wire suitable for test leads, interconnection and frequently being moved wires.

- 55/0.1mm copper conductor
- Overall diameter 2.8mm
- Maximum current rating 6A
- Temperature: minimum -10°C
- Temperature: maximum: 60°C /Aging temperature
- Supplied on **reels of 25m**

Type	Order code	1+	10+
Red extra-flex	**01-0600**	4.76	4.07
Black extra-flex	**01-0605**	4.76	4.07
Blue extra-flex	**01-0610**	4.76	4.07
Green extra-flex	**01-0615**	4.76	4.07
White extra-flex	**01-0625**	4.76	4.07
Yellow extra-flex	**01-0630**	4.76	4.07

062327

Rapid

Economy Mini Side Cutters

From only

£2.40

Order code 85-0205

www.rapidonline.com

UNISTRAND cable

Tinned Copper Wire

A reel of tinned copper wire.

- Supplied on **reels of 500g**

Technical specification
Please Note: These figures are the carrying currents.
The fusing currents will be higher.

Size	SWG	Carrying current	Order code
2.0mm	14	100A	**05-0295**
1.6mm	16	65A	**05-0300**
1.25mm	18	45A	**05-0305**
0.90mm	20	32A	**05-0310**
0.71mm	22	24A	**05-0315**
0.56mm	24	18A	**05-0320**
0.45mm	26	13A	**05-0325**
0.375mm	28	10A	**05-0330**
0.315mm	30	9A	**05-0335**
0.28mm	32	7.5A	**05-0340**
0.25mm	34	6.6A	**05-0350**
0.15mm	38	3A	**05-0360**

SWG	Length (m)	Order code	1+	10+
14	17	**05-0295**	15.05	
16	27	**05-0300**	16.02	13.21
18	48	**05-0305**	16.02	13.21
20	66	**05-0310**	16.02	13.21
22	140	**05-0315**	16.02	13.21
24	230	**05-0320**	16.02	
26	340	**05-0325**	16.02	
28	490	**05-0330**	16.02	
30	780	**05-0335**	16.02	
32	914	**05-0340**	16.30	

		MOQ 10		
SWG	Length (m)	Order code	10+	
34	1285	**05-0350**	17.30	

		Price each		
SWG	Length (m)	Order code	1+	
38	3182	**05-0360**	17.96	

062485

UNISTRAND cable

Copper/nickel Alloy Wire

A range of copper/nickel alloy wire (also known as Constantan)

- Suitable for winding resistance coils
- Wire not insulated
- Supplied in **lengths of 228m approx.**
- **Supplied on reels of 125g**

Type	Order code	1+	10+
16SWG	**05-0400**	17.39	14.32
20SWG	**05-0405**	17.39	
28SWG	**05-0407**	17.39	
30SWG	**05-0410**	17.39	
32SWG	**05-0415**	17.39	
34SWG	**05-0420**	17.39	
36SWG	**05-0425**	17.39	

062486

UNISTRAND cable

Enamelled Copper Wire

A wide range of enamelled copper wire for winding transformers and coils, etc.

- Supplied on **reels of 500g**

Warning: This product contains modified polyurethane.

Type	Approx. length (m)	Order code	1+	10+
35/36	1850	**05-0200**	15.14	12.50
34/35	1450	**05-0205**	15.14	
34	1250	**05-0207**	15.14	
33	1120	**05-0210**	15.14	
30	720	**05-0215**	15.14	12.50
27	450	**05-0220**	15.14	12.50
25	290	**05-0225**	15.14	
24	230	**05-0230**	15.14	12.50
22	140	**05-0235**	15.14	
20	100	**05-0240**	15.14	
18	45	**05-0245**	14.51	
16	28	**05-0250**	14.51	

062484

UNISTRAND cable

Nichrome Wire

This **nichrome wire** is ideal for use in applications requiring a **heating element** and can be used for ignition in applications such as fireworks and pyrotechnics.

- Suitable for producing heating elements
- Weight of reels 125g
- Please see technical specification for reel lengths

Technical specification

Type	Reel length	Order code
125g Reel 14SWG Nichrome Wire	4.5m	**05-0490**
125g Reel 16SWG Nichrome Wire	7.0m	**05-0495**
125g Reel 18SWG Nichrome Wire	11.5m	**05-0500**
125g Reel 20SWG Nichrome Wire	22.0m	**05-0505**
125g Reel 22SWG Nichrome Wire	35.0m	**05-0510**
125g Reel 24SWG Nichrome Wire	57.0m	**05-0515**
125g Reel 26SWG Nichrome Wire	88.0m	**05-0520**
125g Reel 28SWG Nichrome Wire	127.0m	**05-0525**
125g Reel 30SWG Nichrome Wire	180.0m	**05-0530**
125g Reel 32SWG Nichrome Wire	228.0m	**05-0535**

SWG	dia. (mm)	Order code	1+
14	2.01	**05-0490**	19.57
16	1.62	**05-0495**	19.57
18	1.22	**05-0500**	18.89
20	0.91	**05-0505**	18.89
22	0.71	**05-0510**	18.89
24	0.56	**05-0515**	18.89
26	0.46	**05-0520**	18.89
28	0.38	**05-0525**	18.89
30	0.32	**05-0530**	18.89
32	0.27	**05-0535**	18.89

062487

UNISTRAND cable

UL2651 Ribbon Cable 30m Reels

A range of unscreened flat ribbon cable to UL2651.
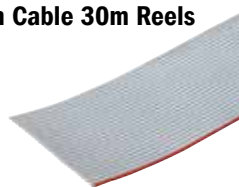
Consists of parallel stranded tinned copper wire conductors laminated between layers of PVC film. The laminate ensures precise alignment and spacing between conductors during assembly.

The cables are suitable for use on computers, peripherals and interface units, audio and digital equipment and are used in internal connection for computer, duplicator, facsimile, game, interface and other electronic equipment.

- Colour: grey
- Available as a 10-way with rainbow colours
- Suitable for Speedbloc insulation displacement connectors
- Cable one edge has a red marker to indicate the first conductor
- Supplied on 30m reels

Technical specification

Order code	Part number	Colour	Cores	AWG	Composition	Thickness	Width
01-0361	UNIRIB9WG	Grey	9	28	7/0.127	0.9	11.43
01-0362	UNIRIB10WG	Grey	10	28	7/0.127	0.9	12.7
01-0363	UNIRIB14WG	Grey	14	28	7/0.127	0.9	17.78
01-0364	UNIRIB16WG	Grey	16	28	7/0.127	0.9	20.32
01-0365	UNIRIB20WG	Grey	20	28	7/0.127	0.9	25.4
01-0366	UNIRIB26WG	Grey	26	28	7/0.127	0.9	33.02
01-0367	UNIRIB34WG	Grey	34	28	7/0.127	0.9	43.18
01-0368	UNIRIB40WG	Grey	40	28	7/0.127	0.9	50.8
01-0369	UNIRIB10WR	Rainbow	10	28	7/0.127	0.9	12.7

Characteristic Impedance	105Ω
Operating Temperature Range	-20°C to +105°C
Voltage Rating	300V DC

Type	Order code	1+	5+
9-Way	**01-0361**	18.34	16.74
10-Way	**01-0362**	18.34	16.74
14-Way	**01-0363**	24.29	21.04
16-Way	**01-0364**	27.52	22.67
20-Way	**01-0365**	31.30	26.45
26-Way	**01-0366**	38.32	31.84
34-Way	**01-0367**	41.00	38.32
40-Way	**01-0368**	51.27	43.16
10-Way rainbow	**01-0369**	19.42	17.81

567530

AlphaWire
Cables you trust. Service you deserve.

3583 Coloured Ribbon Cable

This range of top quality multi-coloured **ribbon cable** from **Alpha Wire** is available with a variety of ways.

Rapid can offer access to the complete Alpha Wire catalogue - so even if we do not stock the product or line you need, we can order and despatch it for you. All lines are available on short lead times.

Find out more by visiting www.rapidonline.com/alphawire

- Ideal for conserving space.
- Suitable for computer chassis to connect a PC board to CD-ROMs and hard drives etc.
- Supplied on **reels of 30.5m**

Technical specification	
Operating Temperature	–20°C to 105°C
Voltage Rating	300V
Color	Brown, red, orange, yellow, green, blue, violet, grey, white, black, repeats beyond 10 conductors
Description	
Conductor	Stranded tinned copper on 1.27mm centres
Insulation	Thermally bonded PVC with clear PVC covering
Capacitance	45.9pF/m at 1MHz
Propagation Delay	4.6 ns/m–0.18 ns) rise time pulse at 1MHz
Impedance	$10^5\Omega$, Nom
Crosstalk	Near end 3.2%
(3.05m @ 1ns)	Far end 11.5%
Applications	PC board to PC board interconnects where space is a premium, where a high degree of flexibility is required.
Transmission Characteristics	Ground-signal
Approvals	UL AWM Style 2651

Alpha part No	No. of conductors	Nominal Width (mm)	Nominal span (mm)
3583/9	9	11.43	10.16
3583/10	10	12.7	11.43
3583/14	14	17.78	16.51
3583/15	15	19.05	17.78
3583/16	16	20.32	19.05
3583/20	20	25.4	24.13
3583/24	24	30.48	29.21
3583/34	34	43.18	41.91
3583/37	37	46.99	45.72
3583/40	40	50.8	49.53
3583/50	50	63.5	62.23
3583/60	60	76.2	74.93

Type	Order code	1+	5+	10+
9-way	**01-1460**	66.93	62.74	
10-way	**01-1461**	70.73	65.49	
14-way	**01-5455**	38.48		
15-way	**01-1463**	98.17	94.50	89.06
16-way	**01-1464**	107.10	100.80	95.40
20-way	**01-1465**	132.63	124.92	
40-way	**01-1471**	110.99		
50-way	**01-1472**	137.37		

071075

UNI**STRAND** cable

3-Core Silicone Cable – Reels of 50m

3-core Mains cable with a silicone rubber insulation.

- Silicone rubber sheathed to compound E12
- Intended for applications where the cable can be in contact with high temperatures such as soldering irons etc.
- Available in 0.5mm² and 1.0mm² sizes
- Conforms to **BS6141 and BS6500**
- Supplied in white
- Supplied on **reels of 50m**

Type	Order code	1+
0.5mm≤ Silicone	**01-3005**	65.84
1.0mm≤ Silicone	**01-3007**	76.10

062337

≡**Rapid**
…where price meets quality

UNI**STRAND** cable

3-core Mains Equipment Cable

Mains electric cable with round profile.

- Flexible PVC sheath
- Suitable for connection of electrical equipment and most light electrical applications
- **BS6500, VDE BSI** approved
- Supplied on **reels of 100m**

Technical specification						
300V/500V H05VV-F3 13A						
CSA	Strands	Current	Overall Dia	Colour	Reel size	Order code
1.25mm²	3x 40/0.2mm	13.0A max	7.8mm	black	100m	**01-0282**
1.25mm²	3x 40/0.2mm	13.0A max	7.8mm	white	100m	**01-0284**

Type	Colour	Order code	1+	5+
100m 13A	Black	**01-0282**	110.33	106.77
100m 13A	White	**01-0284**	88.49	85.47

066590

UNI**STRAND** cable

Speaker Wire on 100m Reels

A flexible twin cable having a 'figure 8' shape.

- Ideal for speaker connection
- 7/0.2mm copper conductor
- Rating 60V rms 1A
- Overall size 4x 1.6mm
- Grey colour with polarity marking
- Supplied on **reels of 100m**

Type	Order code	1+	10+
100m Reel speaker cable	**01-0162**	14.20	11.34

062345

Cable Management

UNI**STRAND** cable

Canister Packed Cable Ties

Assorted cable ties in a variety of colours and sizes conveniently packed in a plastic canister.

- Manufactured from Nylon 6.6
- Flame retardant to **UL94V2**
- Four different packs available

Technical specification				
Order Code	Type	Length	Qty	Colour
04-0430	Canister 1	100mm	1000	1000x various mixed colours
04-0432	Canister 2	100mm	200	100x natural, 25x red, 25x yellow, 25x blue, 25x black
		140mm	200	100x natural, 100x black
		180mm	100	50x natural, 50x black
04-0434	Canister 3	100mm	200	100x natural, 25x red, 25x blue, 25x yellow, 25x green
		200mm	100	50x natural, 25x red, 25x blue
04-0436	Canister 4	100mm	300	100x red 100x blue, 100x green
		200mm	100	100x natural

Type	Order code	1+
Canister 1 1000	**04-0430**	8.68
Canister 2 500	**04-0432**	8.45
Canister 3 300	**04-0434**	4.26
Canister 4 300	**04-0436**	5.08

067744

UNI**STRAND** cable

Black Weather Resistant Cable Ties

These black cable ties are ideally suited for any outdoor application.

- Weather-resistant ties have Carbonate A
- Offers UV resistance
- Fastens wires, cables and hose
- One-piece construction for consistent performance and reliability
- High strength and low thread force
- For outdoor use
- Supplied in **packs of 100**
- 100mm cable ties also available in **packs of 1000**, order code **04-0725**

Technical specification	
Normal service temperature range:	-40°C to +85°C
Flammability rating	UL 94V-2
Heat stabilized nylon	Service temperature 135°C
Specification	Made to comply with mil-spec drawing no. MS-3367 Tensile strength meets or exceeds the MIL-S-23190E standard

Order code	Dimensions (L x W)
04-0636	100 x 2.5mm
04-0637	150 x 3.6mm
04-0638	200 x 4.6mm
04-0639	292 x 3.6mm
04-0640	368 x 4.8mm
04-0725	100 x 2.5mm

Length	Pack size	Order code	1+	10+	50+
100mm	100	**04-0636**	0.669	0.577	0.502
150mm	100	**04-0637**	1.77	1.56	1.41
200mm	100	**04-0638**	2.75	2.19	1.90
292mm	100	**04-0639**	4.17	3.77	3.66
368mm	100	**04-0640**	5.51	5.09	4.56
100mm	1000	**04-0725**	5.29	4.75	4.31

071168

VULCASCOT

High Visibility Cable Protectors

A range of high visibility cable protectors manufactured from a special compound.

- Elastomer rubber is flexible, rugged and hard wearing
- Eye catching warning stripe along each side of the profile
- Enhances safety at work by preventing accidents caused by loose cables
- Ideal solution for trailing cables
- Low lying profile geometry with a unique 'snap open' feature for fast and simple installation
- Housing suitable for one or more cables
- Easily re-laid as required
- Produced from a flame retardant compound to **BS476 Part 7 Class 3** and European equivalent **DIN 4102 Part 1 and Class B1**
- Tested for non-conductivity to **BS903-C5 500V,** and UV stabilised for extended life
- Available in **68** and **83mm** widths
- Supplied in **lengths of 3m**
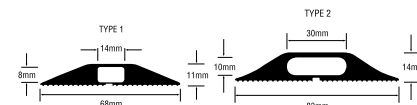
TYPE 1 14mm 8mm 68mm 11mm

TYPE 2 30mm 10mm 14mm 83mm 16mm

Technical specification		
Order code	**04-0800**	**04-0802**
Type	**HAZ/1**	**HAZ/2**
Colour	Black	Black
Stripe colour	Yellow	Yellow
Width	68mm	83mm
Height	15mm	16mm
Cable channel width	14mm	30mm
Cable channel height	8mm	8mm

Type	Order code	1+	3+
HAZ/1 Black/yellow 3m	**04-0800**	14.91	
HAZ/2 Black/yellow 3m	**04-0802**	39.45	36.49

062483

UNISTRAND cable

2:1 Heat Shrinkable Sleeving – 25m Reels

Available in a wide range of sizes.

- Excellent flame retardant properties
- Excellent flexibility and insulation
- Thermally stabilised flame retardant polyolefin
- 2:1 shrink ratio
- Temperature range –55°C to +125°C
- Shrinking temperature starts at +70°C and totally shrunk at 115°C
- Available in black (for other colours see order code **03-0351**)
- Sizes quoted before shrinking
- Supplied on **reels of 25m**
- UL224 **approved**

Nominal pre-shrunk diameter	Order code	1+	5+	10+
1.6mm Black	03-0340	6.18	5.56	4.95
2.4mm Black	03-0341	7.88	7.09	6.29
3.2mm Black	03-0342	8.50	7.67	6.81
4.8mm Black	03-0343	9.05	8.14	7.22
6.3mm Black	03-0344	10.56	9.52	8.44
9.5mm Black	03-0345	13.13	11.81	10.41
12.7mm Black	03-0346	14.82	13.30	11.81
19.1mm Black	03-0347	21.75	19.59	17.40
25.4mm Black	03-0348	26.27	23.66	21.03
40mm Black	03-0349	50.09	47.27	45.55
50.8mm Black	03-0350	58.84	55.52	53.45

080616

Shrinktek

Heat Shrink Sleeving

A highly flexible, polyolefin tubing supplied on small boxed reels for convenient storage and ease of use.

- Shrink ratio 2:1
- Operating temperature +105°C
- Shrink temperature +100°C
- Resistant to fuel and oils
- Suitable for a wide range of uses including military and professional electronics, and industrial electronics manufacturing
- Applications include insulation, marking, strain relieving, building of wire bundles, colour coding and identification and mechanical protection
- Dielectric strength 20kV/mm
- Flame retardant to **UL224**
- Sizes quoted before shrinking
- Available in black, clear, red, yellow, blue, white, green and brown

Please note: The un-shrunk size may vary, but it does not affect the shrink size.

Technical specification

Bore size (mm)	Shrunk (mm)	Bore size (mm)	Shrunk (mm)
1.2	0.6	6.4	3.2
1.6	0.8	9.5	4.75
2.4	1.2	12.7	6.35
3.2	1.6	19	9.5
4.8	2.4	25.4	12.7

Type	Size	Order code	1+	5+
1.2mm Black	12m reel	03-0240	6.91	6.10
1.6mm Black	12m reel	03-0250	6.91	6.10
2.4mm Black	11m reel	03-0260	6.91	6.10
3.2mm Black	11m reel	03-0270	6.91	6.10
4.8mm Black	10m reel	03-0280	6.58	5.81
6.4mm Black	9m reel	03-0290	6.91	6.10
9.5mm Black	8m reel	03-0301	6.58	5.81
12.7mm Black	7m reel	03-0241	6.91	
19.0mm Black	5m reel	03-0251	6.91	6.10
25.4mm Black	3.5m reel	03-0261	6.58	5.81

Type	Size	Order code	1+	5+
1.2mm Clear	12m reel	03-0271	6.91	
1.6mm Clear	12m reel	03-0281	3.41	
2.4mm Clear	11m reel	03-0291	6.91	
3.2mm Clear	11m reel	03-0302	6.91	
6.4mm Clear	9m reel	03-0252	6.91	6.10
9.5mm Clear	8m reel	03-0262	5.60	
12.7mm Clear	7m reel	03-0272	5.60	
19.0mm Clear	5m reel	03-0282	6.91	
25.4mm Clear	3.5m reel	03-0292	6.91	
1.2mm Red	12m reel	03-0303	6.91	
1.6mm Red	12m reel	03-0243	6.91	
2.4mm Red	11m reel	03-0253	6.58	5.81
3.2mm Red	11m reel	03-0263	6.91	
4.8mm Red	10m reel	03-0273	6.58	
6.4mm Red	9m reel	03-0283	6.58	5.81
12.7mm Red	7m reel	03-0304	6.58	
19.0mm Red	5m reel	03-0244	6.58	
2.4mm Yellow	11m reel	03-0284	6.91	
3.2mm Yellow	11m reel	03-0294	6.58	
4.8mm Yellow	10m reel	03-0306	6.58	5.81
6.4mm Yellow	9m reel	03-0245	6.58	5.81
9.5mm Yellow	8m reel	03-0255	5.22	4.83
12.7mm Yellow	7m reel	03-0265	6.02	5.31
1.2mm Blue	12m reel	03-0295	5.84	5.16
2.4mm Blue	11m reel	03-0246	4.83	4.47
3.2mm Blue	11m reel	03-0256	6.58	
4.8mm Blue	10m reel	03-0266	6.58	5.81
9.5mm Blue	8m reel	03-0286	6.58	5.81
12.7mm Blue	7m reel	03-0296	6.58	
25.5mm Blue	3.5m reel	03-0247	6.38	5.64
1.2mm White	12m reel	03-0257	6.32	5.58
1.6mm White	12m reel	03-0267	6.91	
4.8mm White	10m reel	03-0297	6.02	
12.7mm White	7m reel	03-0258	6.58	5.81
19.0mm White	5m reel	03-0268	6.58	
1.2mm Green	12m reel	03-0288	5.03	4.66
1.6mm Green	12m reel	03-0298	6.58	
2.4mm Green	11m reel	03-0311	6.13	5.42
3.2mm Green	11m reel	03-0249	6.32	5.58
9.5mm Green	8m reel	03-0279	5.43	5.03
12.7mm Green	7m reel	03-0289	6.58	5.81
25.4mm Green	3.5m reel	03-0312	6.58	
3.2mm Brown	11m reel	03-0317	6.91	
6.4mm Brown	9m reel	03-0319	6.91	6.10
9.5mm Brown	7m reel	03-0321	6.58	5.81
12.7mm Brown	6m reel	03-0322	5.82	5.45
19.0mm Brown	5m reel	03-0323	6.32	5.58

071629

UNISTRAND cable

2:1 Heat Shrinkable Sleeving

Flame retardant heat shrinkable sleeving with 2:1 shrink ratio. Available in a wide range of colours and sizes.

- Excellent flame retardant properties
- Excellent flexibility and insulation
- Thermally stabilised flame retardant polyolefin
- 2:1 shrink ratio
- Temperature range –55°C to +125°C
- Shrinking temperature starts at +70°C and totally shrunk at 115°C
- Available in red, yellow, green, clear, blue, grey, purple and white
- Supplied on **reels of 25m**

Type	Order code	1+	5+	10+
Red				
1.6mm Red	03-0351	7.56	6.81	
2.4mm Red	03-0352	7.73	6.96	6.19
3.2mm Red	03-0353	8.36	7.52	
6.3mm Red	03-0355	10.37	9.34	
9.5mm Red	03-0356	11.94	10.75	
12.7mm Red	03-0357	14.57	13.06	
19.1mm Red	03-0358	21.35	19.24	
38.1mm Red	03-0360	22.63		

Type	Order code	1+	5+	10+
Yellow				
2.4mm Yellow	03-0363	7.73	6.96	
3.2mm Yellow	03-0364	8.36	7.52	
4.8mm Yellow	03-0365	8.87	8.00	
6.3mm Yellow	03-0366	10.37	9.34	
9.5mm Yellow	03-0367	12.89	11.60	
12.7mm Yellow	03-0368	14.57	13.06	
Green				
4.8mm Green	03-0376	8.87	8.00	
Clear				
1.6mm Clear	03-0384	6.06	5.45	
3.2mm Clear	03-0386	8.36	7.52	
4.8mm Clear	03-0387	8.87	8.00	
6.3mm Clear	03-0388	10.37	9.34	
9.5mm Clear	03-0389	12.89	11.60	10.33
12.7mm Clear	03-0390	14.57	13.06	
19.1mm Clear	03-0391	21.35	19.24	
25.4mm Clear	03-0392	25.78	23.24	
38.1mm Clear	03-0393	69.36	61.67	
50.8mm Clear	03-0394	81.32	72.34	
Blue				
3.2mm Blue	03-0397	8.36	7.52	
4.8mm Blue	03-0398	8.87	8.00	
6.3mm Blue	03-0399	10.37	9.34	
19.1mm Blue	03-0452	21.35	19.24	
25.4mm Blue	03-0453	25.78	23.24	
Grey				
2.4mm Grey	03-0457	4.25		
3.2mm Grey	03-0458	0.968		
12.7mm Grey	03-0462	14.57	13.06	
Purple				
4.8mm Purple	03-0470	3.56		
White				
2.4mm White	03-0479	7.73	6.96	
3.2mm White	03-0480	8.36	7.52	
4.8mm White	03-0481	8.87	8.00	
6.3mm White	03-0482	10.37	9.34	
9.5mm White	03-0483	12.89	11.60	
25.4mm White	03-0486	10.19		

080624

UNISTRAND cable

3:1 Heat Shrink Sleeving, 25m Reels

This heat shrink sleeving has excellent flame retardant properties, flexibility and insulation.

- Thermally stabilised flame retardant polyolefin material
- 3:1 shrink ratio
- Temperature range –55°C to +125°C
- Shrinking temperature starts at +70°C and totally shrunk at +115°C
- Sizes quoted before shrinking
- Supplied on **reels of 25m**
- UL224 approved

Type	Order code	1+	5+
1.5mm Black	03-0489	8.05	7.70
3mm Black	03-0490	12.07	11.52
6mm Black	03-0491	20.08	18.95
9mm Black	03-0492	38.23	36.07
12mm Black	03-0493	43.80	41.23
18mm Black	03-0494	53.28	50.26
24mm Black	03-0495	73.74	69.58
6mm Red	03-0702	20.54	19.39

068952

Need a product urgently?
We can offer a next day, before noon, delivery service
01206 751166

Shrinktek

3:1 Heat Shrinkable Sleeving

A range of general purpose, black, flexible polyolefin heat shrink tubing.

- Shrink ratio of 3:1 when heated above +125°C
- Operating temperature −75°C to +135°C
- Suitable for a wide range of uses including military and professional electronics, and industrial electronics manufacturing
- Applications include insulation, marking, strain relieving, building of wire bundles, colour coding, identification and mechanical protection
- Dielectric strength 25kV/mm
- All sizes quoted before shrinking
- Supplied in **lengths of 1.2m**

Technical specification

Order code	Mftrs Part No.	Bore size	Shrunk dia.
03-1100	SP3X 1.5 BLK	1.5mm	0.5mm
03-1105	SP3X 3 BLK	3.0mm	1.0mm
03-1110	SP3X 6 BLK	6.0mm	2.0mm
03-1115	SP3X 9 BLK	9.0mm	3.0mm
03-1120	SP3X 12 BLK	12.0mm	4.0mm
03-1125	SP3X 18 BLK	18.0mm	6.0mm
03-1130	SP3X 24 BLK	24.0mm	8.0mm

Bore size	Shrunk dia.	Order code	1+	25+	100+
1.5mm	0.5mm	**03-1100**	0.897	0.733	
3.0mm	1.0mm	**03-1105**	0.877	0.752	0.626
6.0mm	2.0mm	**03-1110**	1.52	1.24	1.06
9.0mm	3.0mm	**03-1115**	1.71	1.46	
12.0mm	4.0mm	**03-1120**	2.01	1.63	1.37
18.0mm	6.0mm	**03-1125**	3.06	2.37	
24.0mm	8.0mm	**03-1130**	4.01	3.06	

062470

Extension Cables

brennenstuhl®

Energy Cube

A double sided, height adjustable, hanging extension reel.

- 6x 240V socket outlets (3 each side)
- Galvanised steel hanging chain (3m)
- Housing made from break resistant plastic
- Rated 13A
- Supplied with **cable length of 5m**

Type	Order code	1+
Energy cube	**23-0220**	30.00

067934

Low Temperature 10m Extension Reel

A 10m mains cassette cable reel fitted with four UK mains sockets and a UK plug fused at 13A.

- Super flexible cable
- Thermal cut out and reset button
- Tough fused 13A plug to **BS1363/A**
- 10A maximum load
- 240V AC
- Four outlet sockets
- Suitable for use down to -20°C
- Smooth winding action
- Easy grip recess and handle for effortless winding
- Complies to all relevant British Standards

- Guaranteed for 25 years against materials and workmanship
- Manufactured to **BSEN61242**
- **CE** approved

Technical specification

Fully wound	720W
Fully un-wound	2400W

Type	Order code	1+
Extension reel	**23-0233**	17.31

074760

brennenstuhl®

Automatic Cable Reel, 9+2m/ 16+2m

This range of **Brennenstuhl Wall and Ceiling Mountable Cable Reels**, are ideal for **Garage and Workshop use**. They feature an easy to use automatic cable rewind function. This makes sure that the durable rubber-neoprene cable is safely stored inside the plastic outer casing, reducing the risk of damage to the cable and preventing the cable becoming a potential trip hazard.

The automatic cable reel is suitable for use in dry interior rooms.

- Automatic cable reel
- Convenient automatic rewind
- Ideal for fitting on walls and ceilings
- Slewable up to 180°
- Robust plastic housing
- Safety cut-out
- Childproof socket
- Cable quality: Rubber-Neoprene
- Body colour: **Yellow**
- Cable colour: **Black**
- Available in **240** and **110V power options**
- Available with cable **length of 16+2m** and **9+2m**

Type	Order code	1+
Cable reel 16+2m 110V	**23-1343**	76.93
Cable reel 16+2m 240V	**23-1344**	77.70
Cable reel 9+2m 240V	**23-1345**	43.85

539862

brennenstuhl®

13A Mains Extension Reels

A range of compact, handy extension cable reels ideal for home, office and DIY.

- 5 or 15m cable lengths
- Three 13A, 240V sockets with self-closing covers
- Maximum overall current rating 13A
- Safety cut-out
- Colour: blue
- Housing made of break-resistant plastic
- Practical carrying handle
- Twin feet for excellent stability
- Easy to unwind and rewind
- Compact, handy cable reel for home, office and DIY
- **Brennenstuhl Vario Line series**

Cable length	Order code	1+
5m	**23-0215**	12.92
15m	**23-0217**	21.05

067933

≡Rapid
…where price meets quality

SEALEY POWER PRODUCTS

CRM10 Retractable Cable Reel System 10m, 2x 230V Sockets

Hard wearing, composite cased, retracting electric cable reel operated by simple pull and release action. Features integral manual thermal trip switch to prevent overload. Double socket outlet with individual LED power indicators and rocker on/off switches.

This socket is wall-mountable.

- Hard wearing, composite cased, retracting electric cable reel operated by simple pull and release action.
- Features integral manual thermal trip switch to prevent overload.
- Double socket outlet with individual LED power indicators and rocker on/off switches.
- Model No. CRM10

Technical specification

Model No:	**CRM10**
Voltage:	230V
Cable Length:	10mtr
Cable Section:	3 x 1.5mm≤
Thermal Trip:	Yes
Capacity Wound:	1000W
Capacity Unwound:	2750W

Type	Order code	1+
Cable reel system	**89-1635**	61.15

302047

brennenstuhl®

4-Way Extension Sockets with Neon Indicator, White 2m/5m

These **White 4-Way Extension Sockets with Neon Indicator 2m/5m 05VV-F3G1.25 GB** from **Brennenstuhl** feature a neon indicator and have been manufactured with highly impact-resistant special plastic in an attractive design, making it ideal for the home, DIY and office. Equipped with an extra long 5m cable and mounting facilities for wall installation.

- Stylish white design
- Neon indicator
- 27cm housing length
- 2m or 5m cable lengths

Cable length	Order code	1+
2m	**23-0644**	4.85
5m	**23-0645**	5.98

533039

brennenstuhl®

Premium Line Technics Extension Sockets

These black/grey extension sockets from Brennenstuhl are manufactured from break-resistant plastic, making them ideal for the home, office and school.

Equipped with an illuminated 2-pole switch with protection cover, widely spaced sockets and mounting facilities for wall installation.

- Stylish black/grey design
- Child-proof sockets
- Excess cable can also be wound around housing
- 3m cable length
- 13A nominal current

Sockets	Cable length	Order code	1+
12	3m	**23-0661**	21.82

533047

mercury®

2-Way Trailing Extension Lead

A high quality extension lead.

- 240V AC 13A
- Fitted with 3m of cable
- All sockets are shuttered with the main body of the socket sealed for extra safety
- **BS1363/A** and **CE** approved

Type	Order code	1+	5+
3m Extension lead	**23-0509**	6.87	6.29

072001

USB Connectors

CABLE POWER

Micro USB to USB Cables

These USB 2.0 cables from Cable Power are ideal for connecting a range of devices which have a Micro USB connection. They are available in a choice of black or beige colour in 1.8m lengths and in black in 3m lengths.

- Ideal as a charger for a mobile phone with Micro USB charging dock
- USB A to Micros USB cable
- USB 2.0 specification

Technical specification

Order code	Mftrs Part No.	Cable length	Colour
19-9314	CPUSB001-1.8m	1.8m	Black
19-9316	CPUSB002-1.8m	1.8m	Beige
19-9315	CPUSB001-3m	3m	Black

Cable length	Colour	Order code	1+
1.8m	Black	**19-9314**	2.16
1.8m	Beige	**19-9316**	3.30
3m	Black	**19-9315**	4.40

530506

TruConnect®

USB2 Cables

A range of USB 2.0 leads and cables for connecting peripheral devices such as printers to PCs.

- Data transfer rate of 480Mb/s
- Backwards compatible with USB 1.1 devices
- Cables with LEDs can be used to check connections
- On-the-go (OTG) cables can connect two devices without needing to go via a PC
- Available in different lengths and with male or female connectors

Technical specification

Order code	Mftrs Part No.	Connectors	Length	Colour
19-8660	USB2-102	A male to B male	2m	Beige
19-8662	USB2-103	A male to B male	3m	Beige
19-8663	CDL-103	A male to B male	3m	Black
19-8664	USB2-105	A male to B male	5m	Grey
19-8665	USB2-105K	A male to B male	5m	Black
45-4006	USB2-022	A male to A female	2m	Beige
45-4008	USB2-023	A male to A female	3m	Beige
45-4010	USB2-025	A male to A female	5m	Beige
45-4021	USB2-062K	A male to mini B male	2m	Black
45-4012	USB2-062	A male to mini B male	2m	Beige
45-4016	USB2-012	A male to A male	2m	Beige
45-4017	USB2-012	A male to A male	2m	Black
45-4018	USB2-013	A male to A male	3m	Beige
45-4020	USB2-015	A male to A male	5m	Beige

Type		Order code	1+	10+	50+
AM to BM 2m	Beige	**19-8660**	3.37	3.12	2.29
AM to BM 3m	Beige	**19-8662**	3.57	3.17	1.54
AM to BM 3m	Black	**19-8663**	1.48	1.30	1.19
AM to BM 5m	Grey	**19-8664**	5.00	4.45	2.90
AM to BM 5m	Black	**19-8665**			
AM to AF 2m	Beige	**45-4006**	2.64	2.43	1.44
AM to AF 3m	Beige	**45-4008**	3.35	3.09	
AM to AF 5m	Beige	**45-4010**	4.15	3.70	2.43
AM to Mini BM 2m	Black	**45-4021**	3.43	3.36	2.02
AM to Mini BM 2m	Beige	**45-4012**	3.15	2.92	1.79
AM to AM 2m	Beige	**45-4016**	3.06	2.80	1.69
AM to AM 2m	Black	**45-4017**	1.87	1.72	1.03
AM to AM 3m	Beige	**45-4018**	4.96	4.59	
AM to AM 5m	Beige	**45-4020**	5.68	5.10	

072434

TruConnect®

USB 2.0 Type A to Micro B Cable - 1m

A USB 2.0 type A to micro B data cable for connecting devices such as mobile phones and digital cameras equipped with a micro USB port. Suitable for use with BBC Micro:bit

- Length 1m
- Colour: black

Type	Order code	1+
USB A to micro B, 1m	**45-4009**	0.987

563834

TruConnect®

USB A Type Male Solder Kit

This self assemble USB kit will enable you to customise and construct your own USB leads to the length required.

- Housing materials: PBT+30% G.F(UL 94 V-0)
- Contact materials: copper alloy
- Shell materials: steel

Technical specification

Contact current rating:	1.5A max. per pin
Voltage rating:	30V (DC)
Contact resistance:	30mΩ max.
Dielectric withstanding voltage:	500V AC(rms) for 1 minute
Insulation resistance:	100MΩ min.
Operating temperature:	0°C to +50°C

MOQ 5 - In Multiples of 5

Type	Order code	5+	10+	100+
USB A-Type solder kit	**24-0351**	0.264	0.185	0.121

123511

▶❚❚ av:link®

USB 2.0 Cables

Standard USB 2.0 plug to plug leads, suitable for connection of printers, hubs, audio devices, etc., to A PC.

- Black coloured cable
- Cable diameter 4.3mm
- Cable type 4x0.15mm CCA + 32x0.10 CCA Braid, Cotton Reinforced
- Available in A to A and A to B options
- Length 1.5m

Type	Order code	1+
USB cable A-A 1.5m	**35-4758**	1.22
USB cable A-B 1.5m	**35-4757**	1.31

400281

Audio Connectors

TruConnect®

Miniature 3.5mm Jack Plugs

Miniature 3.5mm insulated mono or stereo jack plugs with strong plastic barrel and integral cable protector.

- Strong plastic barrels
- Integral cable protector sleeve
- Solder termination

MOQ 5 - In Multiples of 5

Type	Order code	5+	100+	500+
3.5mm mono plug	**20-0105**	0.378	0.313	0.287
3.5mm stereo plug	**20-0125**	0.378	0.313	0.287

518892

TruConnect®

PCB Jack Sockets (Stereo & Mono)

Switched PCB mounting 3.5mm jack sockets in either stereo or mono.

- Stereo and mono versions available
- Chrome plated trim
- Both circuits switched
- Also suitable for GENIE and PICAXE download circuits

MOQ 10 - In Multiples of 10

Type	Order code	10+	100+	500+
3.5mm Stereo PCB socket	**20-0137**	0.178	0.119	0.112
3.5mm Mono PCB socket	**20-0138**	0.164	0.115	0.099

063492

▬ Selected brands

3.5mm Stereo Jack Plug to 3.5mm Stereo Jack Plug Leads

3.5mm stereo plug to plug leads with screened audio cable.

Ideal for connecting MP3, laptop or personal CD players to speakers or Hi-Fi.

- Nickel plated connectors
- Quality materials
- Moulded strain relief
- Available in **lengths of 1.2, 3** and **6m**

Technical specification

Order code	Mftrs Part No.	Type
35-4475	112.038UK	3.5mm stereo to 3.5mm stereo 3m
35-4476	112.040UK	3.5mm stereo to 3.5mm stereo 6m

Length	Order code	1+
3m	**35-4475**	1.71
6m	**35-4476**	1.23

400271

TruConnect®

Jack and Audio Leads

Common jack leads.

- Employing moulded construction

Technical specification

3.5mm stereo plug to 3.35mm stereo socket	3m	**20-0030**
3.5mm stereo plug to 3.5mm stereo plug	1.2m	**20-0040**
3.5mm Stereo plug to bare wires	1.5m	**20-0041**

Type	Order code	1+	10+	50+	100+
3.5 Stereo plug/skt	**20-0030**	1.66	1.37	0.979	0.883
3.5 Stereo plug/plug	**20-0040**	1.32	1.13	0.926	0.769
3.5 Stereo/bare wire	**20-0041**	1.10	0.961	0.765	0.627

067173

Education

5

Electronic Kits & Components

Power Connectors

TruConnect®

DC Power Sockets

These DC power sockets are supplied with 2.1 or 2.5mm central pins.

- Panel mounting
- Supplied with washer and hexagonal fixing nut
- Contact rating 1A 16V DC
- Switched

Type	Order code	1+	100+	500+
2.1mm Panel power socket	20-1094	0.924	0.753	0.667
2.5mm Panel power socket	20-1096	0.924	0.753	

034015

TruConnect®

DC Power Socket for Panel Cut-out 12.6mm

High quality chassis mounting DC socket.

- Flush mounting with single hole fixing
- Supplied with hexagonal fixing nut
- Integral break switch on outer contact
- Suitable for panel thickness up to 4.5mm
- Panel cut-out 12.6mm
- Overall dimensions: bezel diameter 14mm, length 15.7mm

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	500+
2.1mm Power socket	20-0980	0.784	0.63	0.586
2.5mm Power socket	20-0985	0.842	0.671	

063543

TruConnect®

Moulded DC Power Extension Leads

Extension leads for use with DC power applications.

- DC plug to DC socket
- Polarity marked figure-of-8 cable
- Pin length 10mm
- Max. current 3A
- 140Ω per Km
- 14/0.12 bare copper
- Supplied in **lengths of 5m**

Type	Order code	1+	10+	50+
2.1mm DC Extension	20-1080	2.73	1.92	1.70
2.5mm DC Extension	20-1082	2.73	1.92	1.70

063536

≡RVFM

Chassis Mounting Single Hole Fixing DC Power Socket

High quality chassis mounting DC sockets for 2.1 and 2.5mm power plugs.

- Flush mounting with single hole fixing
- Supplied with hexagonal fixing nut
- Integral break switch on outer contact
- Suitable for panel thickness up to 8mm
- Panel cut–out 12.6mm
- Rating: 1A 12V
- Overall dimensions: bezel diameter 14.8mm, length 18mm

Technical specification

Contact:	Tin plated brass
Rating:	1A 12V
Nut:	Nickel plated brass
Cover:	PCB
Pin:	Nickel plated brass
Spring:	Tin plated phosphor bronze
Housing:	PBT

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	500+
2.1mm Chassis Single hole	20-0988	0.48	0.322	0.279
2.5mm Chassis Single Hole	20-0989	0.48	0.322	0.279

400550

CLiCK•

13A Mains Plugs

Tough 13A white or black mains plugs.

- Fitted with 3A or 13A fuse
- Manufactured to **BS1363/A**
- Suitable for industrial, commercial or educational environments

Type	Order code	1+	20+	100+
3A White	23-0305	2.42	2.06	1.93
3A Black	23-0310	1.81	1.53	1.44
13A White	23-0315	1.81	1.53	
13A Black	23-0325	2.67	2.26	2.12

063619

CLiCK•

13A Transparent Clear Fast Fit Plug

Transparent 250V 13A mains plugs.

- Fitted with 13A fuse
- Plugs can be readily safety checked without dismantling
- Suitable for industrial, commercial or education environments
- **BS1363/A** approved

Type	Order code	1+	20+	100+
Clear	23-0342	1.80	1.75	1.69

071521

TruConnect®

13A Plug to Dual IEC Cordsets

A mains power cord comprising of a moulded 13A plug, fused at 13A, terminating in two moulded IEC straight sockets.

- Ideal for PCs and monitors
- **BS1363/A, VDE** and **KEMA** approved
- Supplied in **lengths of 2m**

Type	Order code	1+	25+	100+
Dual IEC lead	23-6455	3.32	3.05	2.88

072089

IC Sockets

TruConnect®

DIL IC Sockets

A range of high quality, dual-in-line narrow sockets with black thermoplastic bodies and tin-plated copper alloy contacts. The sockets may be mounted end to end to achieve longer continuous runs. Sockets have chamfered side walls to assist insertion. One end is indented for easy identification of the polarisation.

Please note: All these products are supplied in tubes. For the actual number in a tube see the technical specification and price panel.

- Ideal for production and replacement use
- PCB hole required: 0.6mm
- Overall height above PCB: 4.8mm
- **UL94V-0** approved
- Available in 7.62mm (0.3in) pitch with **6, 8, 14, 16, 20, 24** and **28-pin** options
- Available in 15.24mm (0.6in) pitch **28, 32** and **40-pin** options

Technical specification

Material Thermoplastic	UL 94V-0	
Contacts Copper	alloy	
Storage temperature	–20°C to +70°C	
Operating temperature	0°C to +85°C	
Contact resistance	20mΩ	
Insulation resistance	1000MΩ	
Dielectric withstanding	500V AC one minute	
Description	Dimensions	Order code
Without central support	7362(L) x 5.08(W) x 10.16(H)	22-0106
Without central support	10.16(L) x 7.62(W) x 10.16(H)	22-0107
Without central support	17.78(L) x 15.24(W) x 10.16(H)	22-0108
Without central support	20.32(L) x 17.78(W) x 10.16(H)	22-0109
Without central support	22.86(L) x 20.32(W) x 10.16(H)	22-0110
Without central support	25.40(L) x 22.86(W) x 10.16(H)	22-0111
With central support	25.40(L) x 22.86(W) x 10.16(H)	22-0112
Without central support	30.48(L) x 27.94(W) x 17.78(H)	22-0113
With central support	35.56(L) x 33.02(W) x 10.16(H)	22-0114
Without central support	35.56(L) x 32.02(W) x 17.78(H)	22-0115
Without central support	40.64(L) x 38.10(W) x 17.78(H)	22-0116
Without central support	50.80(L) x 48.26(W) x 17.78(H)	22-0117

Tube qty	Pins		Pitch	Order code	1+	10+	25+	100+
80	6	narrow	7.62mm	22-0106	2.28	1.29	1.19	
60	8	narrow	7.62mm	22-0107	1.88	1.16	1.02	0.928
34	14	narrow	7.62mm	22-0108	1.62	0.97	0.847	0.774
30	16	narrow	7.62mm	22-0109	1.78	1.09	0.97	0.847
26	18	narrow	7.62mm	22-0110	1.68	1.03	0.91	0.805
24	20	narrow	7.62mm	22-0111	1.80	1.12	0.979	0.909
20	24	narrow	7.62mm	22-0112	1.78	1.05	0.935	
20	24		15.24mm	22-0113	1.76	1.09	0.964	0.857
17	28	narrow	7.62mm	22-0114	1.79	1.11	0.979	0.877
17	28		15.24mm	22-0115	1.79	1.11	0.979	0.877
15	32		15.24mm	22-0116	1.73	1.02	0.907	
12	40		15.24mm	22-0117	1.76	1.05	0.897	0.836

400861

TruConnect®

DIL (Dual In Line) Turned Pin Sockets

A range of good quality DIL sockets with closed pins that accept round pin headers. The range includes both 7.62mm (0.3in) and 15.24mm (0.6in) pitch options. The pins been machine turned and the main body has been manufactured from Polybutylene terephthalate (PBT) with glass fibre.

- Closed pin design
- Contacts: Copper alloy
- Moulded in PBT with glass-filled flame retardant polyester
- Please see technical specification for more details
- Approved to **UL 94 V-0**

Technical specification

Electrical characteristics

Contact resistance:	20 milliohms max.
Dielectric withstanding voltage:	500v AC(rms) for 1 minute.
Insulation resistance:	1000 megaohms min.

Environment characteristics

Operating temperature:	0°C to +85°C
Storage temperature:	–20°C to +70°C

8-pin 0.3in turned pin socket (tube 60)	Order code **22-1757**
14-pin 0.3in turned pin socket (tube 34)	Order code **22-1758**
16-pin 0.3in turned pin socket (tube 30)	Order code **22-1759**
18-pin 0.3in turned pin socket (tube 26)	Order code **22-1760**
20-pin 0.3in turned pin socket (tube 24)	Order code **22-1761**
24-pin 0.3in turned pin socket (tube 20)	Order code **22-1762**
28-pin 0.3in turned pin socket (tube 17)	Order code **22-1763**
24-pin 0.6in turned pin socket (tube 20)	Order code **22-1764**
28-pin 0.6in turned pin socket (tube 17)	Order code **22-1765**
32-pin 0.6in turned pin socket (tube 15)	Order code **22-1766**
40-pin 0.6in turned pin socket (tube 12)	Order code **22-1767**

No minimum order value
UK mainland only

Education

5

Electronic Kits & Components

Type	Order code	1+	10+	25+	100+
8-pin 0.3in tube of 60	22-1757	7.48	6.29	5.61	
14-pin 0.3in tube of 34	22-1758	7.48	6.29	5.61	
16-pin 0.3in tube of 30	22-1759	7.48	6.29	5.61	
18-pin 0.3in tube of 26	22-1760	7.48	6.29	5.61	
20-pin 0.3in tube of 24	22-1761	7.48	6.29	5.61	
24-pin 0.3in tube of 20	22-1762	7.48	6.29	5.61	
28-pin 0.3in tube of 17	22-1763	7.48	6.29	5.61	
24-pin 0.6in tube of 20	22-1764	7.48	6.29	5.61	
28-pin 0.6in tube of 17	22-1765	7.48	6.29	5.61	
32-pin 0.6in tube of 15	22-1766	7.48	6.29	5.61	
40-pin 0.6in tube of 12	22-1767	7.48	6.29	5.61	5.06

082699

TruConnect®

Low Profile Turned Pin DIL Sockets

Low profile high-quality machined contact DIL sockets. Each socket is fitted with gold-plated copper alloy contacts in a thermoplastic housing.

- Moulded in black glass-filled flame retardant polyester
- Height above PCB 4.3mm

Technical specification

Insulator material		Glass filled polyester Rated UL94V-0
Contact material	inner	4 finger gold plated beryllium copper
	outer	Tin plated brass
Current rating		1A
Contact resistance		10mΩ max.
Insulation resistance		1 x 109Ω min.
Dielectric strength		1000V
Operating temperature		–55°C to +125°C

		MOQ 5 - In Multiples of 5			
Type	Pitch	Order code	5+	50+	250+
8-pin	0.3in	22-1720	0.249	0.179	0.154
14-pin	0.3in	22-1721	0.596	0.452	0.362
16-pin	0.3in	22-1722	0.674	0.486	0.426
18-pin	0.3in	22-1723	0.774	0.568	0.452
20-pin	0.3in	22-1724	0.569	0.435	0.367
24-pin	0.3in	22-1725	0.674	0.513	
28-pin	0.3in	22-1726	0.79	0.634	0.503
24-pin	0.6in	22-1727	0.685	0.533	
28-pin	0.6in	22-1728	0.774	0.627	0.499
32-pin	0.6in	22-1729	0.908	0.66	0.591
40-pin	0.6in	22-1730	1.16	0.921	0.719

063764

TruConnect®

Wirewrap Turned Pin DIL Sockets

Professional quality turned pin wirewrap sockets with 13mm tin plated brass terminations to allow three wraps per pin.
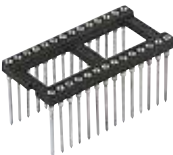
- Four finger gold plated (0.25 micron) inner contacts
- Technical specification as for low profile type **22-1720**
- Moulded in black glass-filled flame retardant polyester
- Height above PCB 4.9mm
- **Preci-dip type 123-87-3xx-41001** where xx is no of pins

Technical specification

Order code	Mftrs Part No.	Type	Pitch
22-1715	123-87-308-41001	8-pin	0.3in
22-1716	123-87-314-41001	14-pin	0.3in
22-1717	123-87-316-41001	16-pin	0.3in
22-1718	123-87-318-41001	18-pin	0.3in
22-1719	123-87-328-41001	28-pin	0.6in

		MOQ 5+			
Type	Pitch	Order code	5+	50+	250+
8-pin	0.3in	22-1715	0.595	0.524	0.465

		Price each			
Type	Pitch	Order code	1+	50+	250+
14-pin	0.3in	22-1716	0.80	0.71	
16-pin	0.3in	22-1717	1.10	1.02	
18-pin	0.3in	22-1718	1.32	1.13	1.02
28-pin	0.6in	22-1719	1.82	1.71	

063770

TruConnect®

2.54mm Pitch Single Row Long Pin Female Headers

These TruConnect **Long Pin Headers** with 2.54mm pitch have gold-plated brass contacts for PCB connection. They are available with either 6, 8 or 10 pins in a single row. The longer pins means these headers can be used with more than one PCB at the same time.
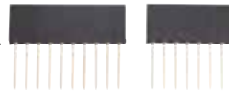
- Pin length 10.9mm
- Terminal height 8.5mm
- Straight terminals
- Current rating 3A max.
- Contact resistance ≤20mΩ
- Operating temperature -55 to +105°C

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	50+	100+	250+
6-way	19-0272	0.362	0.318	0.295	0.266
8-way	19-0273	0.538	0.477	0.433	0.409
10-way	19-0274	0.616	0.556	0.507	

531253

Terminal Blocks

TruConnect®

10A 3.5mm Terminal Blocks

If you mount terminal blocks on PCBs we can probably help you with our fine selection of terminal blocks. Rapid is pleased to offer you these 2, 3 and 5-way 3.5mm pitch vertical moulded types that are UL94V-0 approved.

Current carrying capacity of these pluggable terminal blocks is 10A per pole. They feature a tin-plated pin header and a Phosphor bronze wire guard. The terminals are housed in moulded green flame proof polyamide PA66.

- 3.5mm pitch
- Slotted screws
- Rated voltage 130V
- Rated current 10A
- Moulded housing in green flame retardant PA66
- Screws zinc plated steel
- Pin header tin plated brass
- Wire guard Phosphor bronze

Technical specification

Rated voltage	130V
Rated current	10A
Pitch	3.5mm
Screws	M2 slotted, zinc plated steel
Rated current at 130V	10A
Temperature rating	-40°C to +105°C
Housing	Moulded in green flame retardant PA66/UL94V-0
Wire guard	Phosphor bronze
Pin header	Tin plated brass
Strip length	5 - 6mm
Wire range	1.0mm²
UL94V-0 and CSA approved	

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	100+	500+	1000+
2-way terminal block	21-3000	0.176	0.117	0.102	0.084
3-way terminal block	21-3001	0.249	0.176	0.15	0.122
Type	Order code	5+	10+	25+	
5-way terminal block	21-3098	0.174	0.162	0.145	

082656

TruConnect®

16A Interlocking Terminal Blocks

These **5mm pitch** PCB **terminal blocks** from **TruConnect** interlock to give any number of connections.

- Current rating 16A
- Maximum voltage 300V
- Housing PBT (30% glass filled)
- Screw M2.6, steel, zinc plated
- 1.5mm² wire size

		MOQ 5 - In Multiples of 5			
Type		Order code	5+	100+	500+	1000+
2-way	Black	21-0440	0.126	0.098	0.06	0.057
3-way	Black	21-0442	0.176	0.118	0.09	0.072
5-way	Black	21-0445	0.289	0.232	0.145	0.135

069014

metway

16A Interlocking Terminal Blocks

Quality interlocking PCB terminal blocks on a standard 5mm pitch.

- 5mm pitch
- 16A rating
- Fitted with wire protectors
- Height of 10mm
- Low profile package
- **Metway 650tds** series

Technical specification

Current rating	16A
Conductor size	1.5mm²
Moulding material	Grey polycarbonate (UL94V-0)
Wire protector material	Nickel plated bronze
Insert/pin material	Tinned brass
Height	10mm
Width	7.5mm
Operating temperature	+120°C max.
Approvals	UL

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	100+	500+	1000+
2-way	21-0112	0.188	0.148	0.133	0.12
3-way	21-0114	0.288	0.228	0.209	0.188
4-way	21-0116	0.348	0.259	0.233	0.214
Type	Order code	5+	100+	500+	
6-way	21-0118	0.512	0.416	0.361	
12-way	21-0120	0.933	0.756	0.666	

063813

TruConnect®

Interlocking Terminal Blocks 16A

16A terminal blocks which interlock to provide any number of connections.
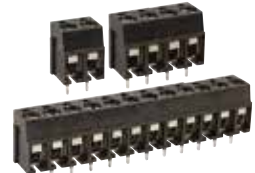
- 5mm pitch
- Cable wire protector

Technical specification

Rating	16A/250V	Solder pin	brass, tin plated
Wire acceptance	2.5mm²	Pin dimension	1.0mm x 0.6mm
Height above PCB	12.5mm	Screw	M3, steel, zinc plated
Width	9mm	Wire protector	0.2t, stainless steel
Housing	PBT (30% glass filled)		

	MOQ 10 - In Multiples of 10		
Type	Order code	10+	100+	500+
2-way 16A	21-1810	0.118	0.097	0.08
3-way 16A	21-1812	0.164	0.125	0.115
4-way 16A	21-1814	0.249	0.194	0.168
6-way 16A	21-1816	0.344	0.262	0.232
12-way 16A	21-1818	0.569	0.451	0.392

068090

≡Rapid
…where price meets quality

CAMDENBOSS
CONNECT. ENCLOSE. INNOVATE.

16A Interlocking Terminal Blocks

High quality, low-cost PCB terminal blocks offering wide versatility in a low profile package.

- 16A rating
- Stainless steel wire protectors fitted
- Height 10mm
- **5mm pitch**
- **Camden CTB5200** series

Technical specification

Current rating	16A
Maximum voltage	380V AC
Clamp screw	M2.5 steel x5 zinc plated steel and colour passivated
Pin terminal	5μ tinned, nickel plated copper flesh brass
PCB hole size	1.3mm
Conductor acceptance	1.5mm²
Colour	Black (UL94V-0 PA66)
Temperature range	–30°C to +125°C
Mftr. Part Nos.	2-way CTB5201/2BK
	3-way CTB5201/3BK
	4-way CTB5201/4BK
	6-way CTB5201/3BK
	12-way CTB5201/12BK

		MOQ 5 - In Multiples of 5			
Type	Length	Order code	5+	100+	500+	1000+
2-way	10mm	**21-0461**	0.177	0.145	0.106	0.096
3-way	15mm	**21-0463**	0.22	0.186	0.15	0.126
4-way	20mm	**21-0465**	0.249	0.175	0.155	
6-way	15mm	**21-0467**	0.416	0.298	0.262	

		MOQ 25 - In Multiples of 5			
Type	Length	Order code	25+	100+	500+	1000+
12-way	60mm	**21-0469**	0.789	0.581	0.494	0.438

079518

metway

Screwless Terminal Blocks

These **screwless** pushbutton terminal blocks from **Metway** offer customers many benefits.

- Speed, on average, screwless connections can be made in half the time
- Cuts installation costs in half
- No need for twisting and turning screws
- Easier on the installer's hands and arms
- Never have a problem with loose connections from loose screws again
- Provide a vibration proof connection
- Spring clamp conforms to the wire with constant tension, making it maintenance-free
- **5mm pitch**
- Side entry
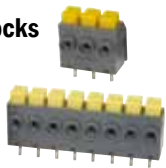
Technical specification

Current rating	6A
Contact spring	Stainless steel
Solder pins	Brass, electro tinned
Conductor size	1mm to 1.5mm²
Working temperature	+120°C
Mouldings	PBT, UL94 V0

	MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	50+	100+
2-pole	**21-2626**	0.348	0.268	0.24	0.223
3-pole	**21-2627**	0.584	0.468	0.415	0.387

073517

TruConnect®

3A 12-Way Terminal Blocks

Commercial quality polythene moulding terminal blocks.

- Current rating 3A
- 12-way which may be readily subdivided
- Max. temperature +60°C
- Dimensions 92.5 x 15.5 x 12mm

		MOQ 5 - In Multiples of 5			
Current rating	Dimensions	Order code	5+	10+	100+
3A	92.5x15.5x12	**21-0100**	1.20	0.898	0.747

063854

CAMDENBOSS
CONNECT. ENCLOSE. INNOVATE.

Easy Break Terminal Strips

These **easy break terminal strips** from **CamdenBoss** make life simpler for installers to create the exact number of poles required without having to use cutting tools when connecting copper conductors.

- Easily snapped into the required number of poles
- No remaining burrs
- No tools needed to cut to length
- Save time and money
- Supplied in strips of 12-poles
- Three sizes available encompassing insert sizes of 3, 3.5 and 4.4 diameter
- Available in black Polyamide 6,6 **UL94 V2**
- Standard insert is nickel-plated brass with zinc-plated steel screws
- Screws are supplied in open position
- Continuous working temperature range is –30°C to +110°C

Rapid is an official distributor of CamdenBoss products. The products listed here are those that Rapid hold in stock – but we have access to many more, including the company's complete range of terminal blocks.

Technical specification

Length	Width	Inset size	Mftrs. part no.	Order code
19.5mm	17.5mm	3mm	CTSOS431	**21-1697**
118.1mm	19mm	3.5mm	CTSOS433	**21-1698**
142.2mm	20.8mm	4.4mm	CTSOS434	**21-1699**

	MOQ 5 - In Multiples of 5		
Type	Order code	5+	25+
Inset size 3mm	**21-1697**	1.05	0.851
Inset size 3.5mm	**21-1698**	1.13	0.906
Inset size 4.4mm	**21-1699**	1.14	1.08

073776

hylec

12-Pole Kwik Snap Terminal Blocks

This range of 12-pole terminal blocks features **Kwik Snap** technology, enabling pole separation without the use of tools. This method of block separation means that the pole dividers are still strong enough to support screws for terminal block assembly.
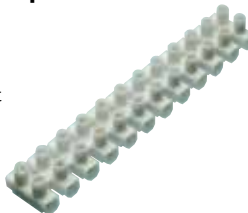
The connectors are available in 24, 32, 57 and 76A ratings and are manufactured from white **UL 94V-2** grade polypropylene.

- Kwik Snap technology for easy and clean break - no tools required
- Pole dividers support screws for assembly
- Formed, zinc plated steel insert
- **VDE** approved and rated to **T85-110**
- Complies with **IEC/EN60998-1,60998-2-1**
- Manufactured from **UL 94V-2** grade materials

Technical specification

Voltage (V)	Current (A)	Wiring capacity max. (mm²)	Pitch (mm)	H (mm)	W (mm)	L (mm)	Order code
450	24	4	8	12.2	93.5	17.8	**21-4269**
450	32	6	10	14	116.5	20	**21-4270**
450	57	10	12	16.3	139.3	23.4	**21-4271**
750	76	16	14.5	20.9	169.5	27.7	**21-4272**

		MOQ 5 - In Multiples of 5		
Current (A)	Wire size max. (mm²)	Order code	5+	25+	100+
24	4	**21-4269**	0.928	0.635	0.462
32	6	**21-4270**	1.00	0.696	0.50
57	10	**21-4271**	1.49	1.01	0.77
76	16	**21-4272**	2.31	2.09	

500711

Test Leads & Probes

TruConnect®

2mm Uninsulated Socket

Nickel plated 2mm chassis mounting socket.

- Mounting hole 4.2mm
- Contact surface: nickel-plated
- Rated 10A

	MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+
2mm Socket	**17-1043**	0.428	0.321

067719

TruConnect®

4mm Stackable Plugs

These 4mm plugs have a 4mm socket in the rear providing an in-line stacking facility.

- The lead wire is clamped in position by a screw
- Nickel plated brass insert with stainless steel plug spring
- 30A rating
- Spare screws are available

		MOQ 2		
Type	Order code	2+	100+	500+
Black stackable plug	**17-0400**	0.745	0.559	0.491
Blue stackable plug	**17-0405**	0.745	0.559	0.491
Green stackable plug	**17-0410**	0.745	0.559	0.491
Red stackable plug	**17-0420**	0.745	0.559	0.491
White stackable plug	**17-0425**	0.745	0.559	0.491
Yellow stackable plug	**17-0430**	0.745	0.559	0.491

		Price each		
Type	Order code	1+	5+	10+
Spare screws (Pack of 25)	**17-0398**	1.19	0.971	0.885

063885

electro-PJP

4mm Stackable Test Leads

Professional quality 4mm stackable test leads using 0.75mm² PVC cable terminated at each end with a stackable 4mm plug.

- Available in a variety of lead lengths and colours
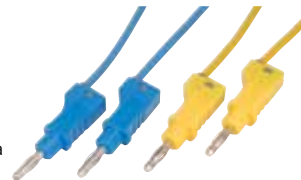
Technical specification

Maximum current	12A
Working voltage	30V AC/60V DC max.
Contact resistance	30mΩ
Contacts	Nickel plated brass/bronze
Cable employed	0.75mm² PVC
Temperature range	–20°C to +80°C

Length	Order code	1+	25+	100+
Red				
25cm	**17-2280**	2.77	2.57	
50cm	**17-2282**	2.98	2.79	
100cm	**17-2284**	3.08	2.87	
Black				
25cm	**17-2286**	2.68	2.47	
50cm	**17-2288**	2.98	2.79	
100cm	**17-2290**	3.08	2.87	

Length	Order code	1+	25+	100+
Blue				
25cm	**17-2291**	2.77	2.57	
50cm	**17-2292**	2.98	2.79	
100cm	**17-2294**	3.08	2.87	
Green				
25cm	**17-2295**	2.64	2.46	
100cm	**17-2298**	3.08	2.87	
White				
25cm	**17-2303**	2.27	2.15	
50cm	**17-2304**	2.98	2.79	
100cm	**17-2305**	3.08	2.87	
Yellow				
25cm	**17-2299**	2.59	2.41	
50cm	**17-2300**	2.86	2.70	2.47
100cm	**17-2302**	3.08	2.87	

076625

TruConnect
4mm Sockets
These 4mm panel mounting sockets have tin plated brass inserts designed to accept a wide range of 4mm plugs.

- Sockets have double flat to assist positive location in panel
- Supplied with panel mounting hardware
- Rated 10A 125V AC
- Solder termination
- **SCI R1-22** series

				MOQ 5	
Type	Order code	5+	20+	100+	500+
Black 4mm socket	**17-1920**	0.383	0.31	0.273	0.236
Blue 4mm socket	**17-1925**	0.36	0.321	0.273	0.236
Green 4mm socket	**17-1930**	0.323	0.254	0.223	
Red 4mm socket	**17-1935**	0.36	0.321	0.273	0.236
White 4mm socket	**17-1940**	0.36	0.321	0.273	0.236
Yellow 4mm socket	**17-1945**	0.323	0.254	0.223	

063893

TruConnect
4mm Stackable Test Plugs with Screw Termination

Build your own safety cable test leads with these high quality 4mm plugs. They can accept up to 4mm diameter cable and can either be terminated with a screw or solder. This stackable 4mm plug has a rigid insulating sleeve for easy self-assembly of the test lead. The hexangular body makes the connection more stable. They feature a spring loaded plug for good connection.

- Body: Brass
- Spring: Beryllium copper, nickel plated
- Housing: PE
- Cable diameter: 4mm
- Contact: Screw-in or solder
- Length: 52.5mm
- Voltage: 30V AC - 60V DC
- Maximum current rating: 30A
- Available in **black, blue, green, red**, and **yellow**

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	10+	25+
Black 4mm plug	**17-2641**	0.69	0.579	0.48
Blue 4mm plug	**17-2642**	0.556	0.466	0.386
Green 4mm plug	**17-2643**	0.69	0.579	0.48
Red 4mm plug	**17-2644**	0.69	0.579	0.48
Yellow 4mm plug	**17-2645**	0.556	0.466	0.386

083050

CLIFF
CL1500 Series 4mm Terminals
High quality moulded terminals in acetal.

- All metal parts bright nickel plated
- Rated at 10A
- Will accept our low-cost or standard 4mm plugs
- Height above panel 24-32mm
- 14mm diameter
- Maximum panel thickness 12.7mm
- Thread size 4BA clearance
- **Cliff CL1500** series

Type	Order code	1+	25+	100+
Red 4mm terminal	**17-0230**	0.992	0.892	0.764
Green 4mm terminal	**17-0235**	1.02	0.852	0.744
Blue 4mm terminal	**17-0240**	1.05	0.877	0.769
Black 4mm terminal	**17-0245**	0.992	0.852	0.744
White 4mm terminal	**17-0255**	1.02	0.852	0.744
Yellow 4mm terminal	**17-0260**	1.02	0.852	0.744

063905

TruConnect
Low Cost 4mm Plugs
Economically priced 4mm plugs.

- Can be used in conjunction with our 4mm terminals
- Solder connection
- Available in red, black and white

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	500+
4mm Red plug	**17-0130**	0.391	0.356	0.334
4mm Black plug	**17-0135**	0.402	0.356	0.334
4mm White plug	**17-0137**	0.391	0.334	

063883

TruConnect
4mm Binding Posts
These shrouded 4mm binding posts are ideal for panel mounting. They require a cut-out of 8.2mm and are terminated by means of twin nut fastening. Ideal for audio speaker connectors and other applications where robust high power connections are required. They have a 4mm end hole suitable for a wide variety of leads and probes terminals and a strong threaded insert for added reliability and to ensure a secure fixing.

- Body: Brass
- Spring: Nickel plated
- Insulation: ABS
- Mounting hole 8.2mm
- Contact: Twin nut fastening
- Length: 44mm
- Voltage: 30V AC - 60VDC
- Maximum current rating: 19A
- Available in **black, green** and **red**

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	25+	100+
Black	**17-2696**	0.501	0.418	0.348
Green	**17-2697**	0.412	0.367	0.331
Red	**17-2698**	0.433	0.386	0.349

083061

RVFM
Crocodile Lead Pack
A pack of 460mm long crocodile clip leads. Available in either a **pack of 10** leads in 5 colours, or a **pack of 20** leads in red and black.

- Terminated at each end with a vinyl covered crocodile clip
- Ideal for use as test clips

Type	Order code	1+	10+
Assorted pack 10	**17-0350**	2.66	2.16
Red/black pack 20	**17-0345**	5.00	4.33

063868

TruConnect
4mm Stackable Plugs to Miniature Shrouded Crocodile Clips 50cm

A choice of red or black test leads that feature one end with a 4mm stackable banana plug and the other end with a miniature shrouded crocodile clip. Length of bale between the connectors is 50cm, making this lead suitable for a wide range of test and prototyping applications.

- Available in red or black
- 50cm PVC Lead with 0.75mm² wire
- 4mm banana plug to miniature shrouded croc clip
- Max. rating 15A 30V AC/60V DC

Type	Order code	1+	25+	100+
Red 50cm test lead	**17-3279**	1.11	0.797	0.691
Black 50cm test lead	**17-3280**	1.11	0.797	0.691

500247

TruConnect
BNC Male/4mm Terminal Adaptor
A useful adaptor comprising a BNC plug terminated to twin 4mm terminals in red and black with 4mm sockets.

- Signal is connected to red terminal
- 19mm centres

Type	Order code	1+	25+
BNC/4mm Adaptor	**16-0295**	5.10	4.14

063653

TruConnect
Ready Assembled BNC Test Leads

A range of ready assembled test leads employing bright nickel plated connectors complete with moulded-on strain reliefs, using RG-58 cable.

- Black PVC shield
- 50Ω impedance
- See **www.rapidonline.com** for a range of ready assembled Network Cables employing Thin Ethernet cable

Technical specification

Type	Cable length	Order code
BNC plug to stackable 4mm plugs	1.2m	**16-0300**
BNC plug to crocodile clips	1.2m	**16-0315**
BNC plug to BNC plug	1.2m	**16-0330**
BNC plug to BNC plug	2.0m	**16-0340**

Type	Order code	1+	10+	50+
BNC 4mm Plugs	**16-0300**	7.45	6.10	5.51
BNC Croc Clips	**16-0315**	4.91	3.98	3.55
BNC-BNC 1.2m	**16-0330**	4.21	3.25	2.85
BNC-BNC 2m	**16-0340**	5.25	4.04	3.57

063654

LEDs

Kingbright

Super Bright LED 3mm

The Kingbright Super Bright LEDs employ the latest technology to produce LEDs that are highly visible and therefore suitable for a wide variety of applications.

Available with diffused, water clear, or transparent lenses in a variety of colours and luminous intensities, the Super Bright LEDs rugged design adds to their long life reliability. Meanwhile, these high intensity components have been manufactured using only the best materials - the color devices are made with GaN on Sapphire Light Emitting Diode.

Overall, these unique Super Bright LEDs, along with low power consumption, offer excellent value and are a clear market leader in their field - to find out more about the full range of Kingbright products please visit Rapid's Kingbright page.

- Cathode identified by short leg
- Particularly suitable for signalling applications and as an alternative to filament lamps
- Kingbright L-7104 series (Formerly L-934 series)
- Low power consumption
- Long life - solid state reliability
- 3.2mm length
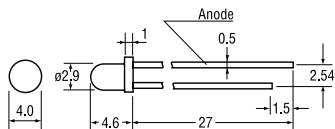
Technical specification

Order code	Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	View angle	Mftrs. pt. no.
Water clear lens								
55-9214	Super bright red	640	4500	30	2.1	2.5	34°	L-7104SRC-J4
55-0090	Super red	640	800	30	1.85	2.5	34°	L-7104SRC-E
56-0535	Red	640	600	30	1.85	2.5	34°	L-7104SRC-D
56-0530	Super red	640	400	30	1.85	2.5	34°	L-7104SRC-C
55-0104	Hyper orange	630	3500	30	2.2	2.8	34°	L-7104SEC-H
72-8942	Red	630	1300	30	1.9	2.5	34°	L-7104SURC-E
72-8940	Red	628	1300	50	2	2.2	50°	L-7104SURC
56-0570	Red	625	60 (@10mA)	30	2	2.5	34°	L-7104EC
72-8972	Orange	601	1300	30	2	2.5	34°	L-7104SEC
55-0080	Super yellow	589	900	30	2.3	2.8	34°	L-7104SYC-H
72-8974	Yellow	588	700	30	2	2.5	34°	L-7104SYC
56-0580	Yellow	588	20	30	2.1	2.5	34°	L-7104YC
55-1670	Mega green	568	700	30	2.1	2.5	34°	L-7104MGC
72-8970	Green	568	150	25	2.2	2.5	34°	L-7104SGC
56-0575	Green	568	60 (@10mA)	25	2.2	2.5	34°	L-7104GC
55-1478	Blue	470	1500	30	3.5	4	25°	L-7104QBC-D
55-1476	Blue	470	1000	30	3.2	4	20°	L-7104PBC-A
55-1630	White	0.31/0.31*	1200	30	3.2	4	34°	L-7104PWC-A
Diffused lens								
56-0500	Red	660	100	30	1.85	2.5	60°	L-7104SRD-C
72-8978	Red	640	350	30	1.85	2.5	40°	L-7104SRD-F
56-0505	Red	640	150	30	1.85	2.5	40°	L-7104SRD-D
55-0008	SB yellow	588	250	30	2	2.5	40°	L-7104SYD
55-0106	Super green	568	40	25	2.2	2.5	40°	L-7104SGD
55-1462	Blue	470	700	30	3.2	4	30°	L-7104PBD
Transparent lens								
55-1468	Blue	470	800	30	3.2	4	20°	L-7104PBT-A

Colour	Wavelength/Luminous Intensity	Order code	5+	100+	1000+	5000+
				MOQ 5 - In Multiples of 5		
Water clear lens						
SB Red	640/4500	**55-9214**	0.339	0.28	0.211	
Super red	640/800	**55-0090**	0.08	0.068	0.062	0.054
Red	640/600	**56-0535**	0.188	0.123	0.094	
Red	640/400	**56-0530**	0.079	0.065	0.048	0.041
Hyper orange	630/3500	**55-0104**	0.216	0.196	0.162	
Hyper red	630/1300	**72-8942**	0.13	0.111	0.104	
Red	625/60	**56-0570**	0.066	0.045	0.036	
Orange	601/1300	**72-8972**	0.167	0.111	0.086	
Super yellow	589/900	**55-0080**	0.399	0.362	0.30	
Yellow	588/700	**72-8974**	0.144	0.12	0.104	
Yellow	588/20	**56-0580**	0.104	0.07	0.041	
Mega green	568/700	**55-1670**	0.376	0.344	0.308	
Green	568/150	**72-8970**	0.091	0.081	0.055	0.052
Green	568/60	**56-0575**	0.078	0.055	0.036	
Blue	470/1500	**55-1478**	0.354	0.221	0.138	
Blue	470/1000	**55-1476**	0.153	0.13	0.118	0.104
White	0.31 0.31/1200	**55-1630**	0.507	0.466	0.396	

Colour	Wavelength/Luminous Intensity	Order code	5+	100+	1000+	5000+
Diffused lens						
Red	660/100	**56-0500**	0.115	0.08	0.065	
Red	640/350	**72-8978**	0.107	0.075	0.061	0.05
Red	640/150	**56-0505**	0.115	0.083	0.063	0.048
SB yellow	588/250	**55-0008**	0.115	0.089	0.072	
Super green	568/40	**55-0106**	0.105	0.064	0.048	
Blue	470/700	**55-1462**	0.323	0.246	0.19	
Transparent lens						
Blue	470/800	**55-1468**	0.30	0.228	0.176	

080113

Tru Opto

Rainbow Colour Cycling 3mm LED

Innovative, eye catching rainbow 3mm LEDs that contain an inbuilt IC that causes the LED to cycle through the red, green and blue elements, individually and then in combination. Colour cycles every 33 seconds.

- Water clear or diffused lens types
- Ideal for use in warning devices, indication panels, alarm systems, mood lighting, toys

Technical specification

Colour	Lens type	V_F typ. (V)	V_F max. (V)	Blinking cycle (s)	Lum. int. (mcd) @ I_F=20mA	View angle	Wavelength (nm)
Red	Water clear	4.5	5	33	5000	30°	624
Green	Water clear	4.5	5	33	5000	30°	525
Blue	Water clear	4.5	5	33	3000	30°	470
Red	Diffused	4.5	5	33	2500	30°	624
Green	Diffused	4.5	5	33	2500	30°	525
Blue	Diffused	4.5	5	33	1500	30°	470

Type	Lens type	Order code	5+	100+	500+
			MOQ 5 - In Multiples of 5		
Rainbow LED	Clear	**55-1905**	0.877	0.661	0.435
Rainbow LED	Diffused	**55-1907**	0.877	0.661	0.435

082702

Kingbright

Flashing 3mm LED

A range of 3mm LEDs housed in a diffused package with an in-built IC to produce a continuous flash at a frequency of 3Hz.

- Supply voltage 9 to 12V
- No series resistor is required
- **Kingbright L-36BD** series

Technical specification

Colour	I_F max.	V_F typ.	V_F max.	V_R max.	Lum. int (mcd) @ I_F (9V)	View angle	Wavelength
HE Red	38-56mA	9-12	13V	0.5V	32	60°	625
Super Red	38-56mA	9-12	13V	0.5V	300	60°	660
Green	38-56mA	9-12	13V	0.5V	32	60°	565
Yellow	38-56mA	9-12	13V	0.5V	20	60°	590

Type	Order code	5+	25+	500+	
		MOQ 5 - In Multiples of 5			
3mm HE red LED	**56-0760**	0.387	0.294	0.267	

Type	Order code	5+	25+	100+	500+
3mm Super red LED	**56-0765**	0.351	0.282	0.226	0.216
3mm Green LED	**56-0755**	0.315	0.243	0.234	0.216
3mm Yellow LED	**56-0805**	0.324	0.255	0.198	0.191

029350

Tru Opto

3mm White LEDs High Luminous Intensity

A range of white 3mm LEDs available in various luminous intensities and viewing angles.

Featuring high luminous intensities and long lifetime operation, these LEDs are suitable for a wide range of applications including: electronic sign and signals, small area illumination, back lighting and other lighting.

- 3mm Round standard directivity
- High luminous intensity
- Long lifetime operation
- Superior weather resistance
- UV Resistant epoxy
- Water clear lens

Technical specification

Type	Chromaticity coordinates	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	View angle	Order code
3mm White	0.31/0.33	1120	30	3.1	3.6	60°	**55-1541**
3mm White	0.31/0.33	4200	30	3.1	3.6	60°	**55-1545**
3mm White	0.31/0.33	10,000	30	3.1	3.6	30°	**55-1549**

Type	Lum.Int. (mcd)	Order code	5+	25+	100+	500+
3mm White	1120	**55-1541**	0.596	0.438	0.296	0.146
3mm White	4200	**55-1545**	0.659	0.511	0.365	0.224
3mm White	10,000	**55-1549**	0.628	0.487	0.347	0.214

MOQ 5 - In Multiples of 5

036655

Tru✹Opto

Miniature 3mm LEDs

A range of industry standard 3mm round LEDs housed in a diffused coloured package.

● Viewing angle 60°
● Supplied in **packs of 100** or **1000**

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	Order code
Red	690	10	50	2	2.4	**55-1770/55-1778**
Bright red	643	100	30	1.7	2.6	**55-1776/55-1784**
Yellow	590	50	50	2	2.4	**55-1774/55-1782**
Green	572	28	20	2.2	2.5	**55-1772/55-1780**
Blue	470	80	30	3.3	3.8	**55-1762**
White	x: 0.31, y: 0.30*	120	30	3.3	3.8	**55-1766**

* Chromaticity coordinates

Colour	Order code	1+	10+	25+
Red	**55-1770**	9.05	7.00	6.20
Bright red	**55-1776**	7.90	6.07	5.36
Yellow	**55-1774**	10.07	7.90	
Green	**55-1772**	10.50	7.90	6.96
Blue	**55-1762**	16.61	13.39	
White	**55-1766**	16.61	13.39	

Price per pack of 100

Colour	Order code	1+	5+
Red	**55-1778**	64.14	54.02
Bright red	**55-1784**	54.02	45.92
Yellow	**55-1782**	72.60	59.08
Green	**55-1780**	72.60	59.08

Price per pack of 1000

064821

Tru✹Opto

Standard 3mm Water Clear LEDs

A range of high power, industry standard 3mm LEDs in various colours. These LEDs are particularly suitable for automotive dashboard lighting and general backlighting purposes.

● Water clear lens
● Viewing angle 30°
● Superior weather-resistance
● Made from UV resistant epoxy
● Suitable for PCB or panel mounting applications

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	Order code
Red	625	3000	50	2	2.4	**55-0066**
Yellow	590	3000	50	2	2.4	**55-0068**
Green	525	8400	30	3.3	3.8	**55-0070**
Blue	470	4200	30	3.3	3.8	**55-0072**
White	x: 0.31, y: 0.30*	7000	30	3.3	3.8	**55-0076**
Warm white	x: 0.45, y: 0.41*	5800	30	3.3	3.8	**55-0074**
Pink	x: 0.40, y: 0.21*	2180	30	3.3	3.8	**55-0078**

* Chromaticity coordinates

Colour	Order code	5+	100+	1000+	5000+
Red	**55-0066**	0.128	0.112	0.057	0.041
Yellow	**55-0068**	0.128	0.112	0.057	
Green	**55-0070**	0.344	0.218	0.159	
Blue	**55-0072**	0.285	0.177	0.131	
White	**55-0076**	0.48	0.332	0.258	
Warm white	**55-0074**	0.569	0.378	0.281	
Pink	**55-0078**	0.296	0.239	0.167	

MOQ 5 - In Multiples of 5

082277

Nichia

NSPB Series Super Bright Blue LEDs

The tremendous luminous intensity of these superbright LEDs from Nichia's top-quality NSPB Series opens new application opportunities for analysis equipment in chemistry, medicine and photographic technology.

Size	Intensity	Order code	5+	100+	500+	1000+
5mm	5600mcd	**50-0712**	0.505	0.428	0.383	0.326
5mm	11000mcd	**50-0711**	0.525	0.444	0.397	

MOQ 5

519864

Tru✹Opto

Rainbow Colour Cycling 5mm LED

Innovative, eye catching colour change LEDs. The 5mm LED contains an inbuilt IC that causes the LED to cycle through the red, green and blue elements, individually and then in combination. Colour cycles in 33s.

● Water clear or diffused lens types
● Ideal for use in warning devices, indication panels, alarm systems, mood lighting, toys

Technical specification

55-1904

Colour	Red	Green	Blue
Wavelength (nm)	625	525	470
Lum. int. (mcd) @ I_F=20mA	3000	8400	2500
Blinking cycle	33s		
V_F typ. (V)	4.5		
V_F max. (V)	5		
Lens type	Water clear		
View angle	30°		

55-1906

Colour	Red	Green	Blue
Wavelength (nm)	625	525	470
Lum. int. (mcd) @ I_F=20mA	600	1000	500
Blinking cycle	33s		
V_F typ. (V)	4.5		
V_F max. (V)	5		
Lens type	White diffused		
View angle	30°		

Type	Lens type	Order code	5+	100+	500+	1000+
Rainbow LED	Clear	**55-1904**	0.847	0.631	0.423	
Rainbow LED	Diffused	**55-1906**	0.847	0.631	0.423	0.362

MOQ 5 - In Multiples of 5

075160

Tru✹Opto

5mm White LEDs

LEDs that are available in high luminous intensities of up to 30,000mcd at 20mA and provide white LED technology at the cost of lower technology indicators. Suitable for a wide range of illumination and indication applications where high luminous intensity is required, such as: small area illumination, back lighting and general purpose indication.

● Housed in an industry standard 5mm water clear package
● Viewing angle 15°
● Superior weather resistance
● UV resistant epoxy
● Suitable alternative for filament lamps

Technical specification

Chromaticity coordinates @ I_F (20mA)	Lum. int. (mcd) typ. @ I_F (20mA)	Lum. int. (mcd) max. @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	Order code
x = 0.31, y =0.32	6000	8000	30	3.4	4	**55-1820**
x = 0.27, y =0.28	10000	12000	30	3.4	4	**55-1886**
x = 0.31, y =0.30	30000	36000	30	3.3	3.8	**55-2216**

Type	Order code	5+	100+	500+	1000+
LED 6000mcd	**55-1820**	0.805	0.599	0.435	
LED 10,000mcd	**55-1886**	0.556	0.362	0.292	0.258
LED 30,000mcd	**55-2216**	0.935	0.785	0.631	

MOQ 5 - In Multiples of 5

064846

Education

5

Electronic Kits & Components

TruOpto
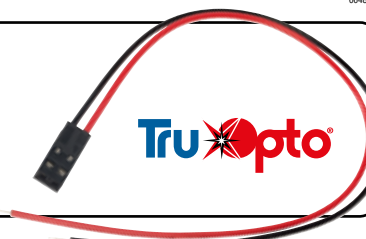
High Intensity LEDs

A range of high intensity LEDs in a 5mm package that features a blade cathode which acts as a heat sink to dissipate heat at high current levels.

- High luminous intensity for use in a wide range of indication and illumination applications requiring a high output
- Manufactured using the latest technologies for long life, energy efficiency and high reliability
- Suitable for PCB and panel mounting applications
- Water clear lens

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (30mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	V_R max. (V)	View angle
White	0.30/0.31 *	30000	50	3.6	4.2	5	15°
Warm white	0.5/0.43 *	28000	50	3.4	4	5	15°
Red	625	20000	50	2.2	2.6	5	15°
Orange	605	20000	50	2.2	2.6	5	15°
Yellow	590	20000	50	2.2	2.6	5	15°
Green	525	30000	50	3.3	3.6	5	15°
Cyan	505	30000	50	3.6	4.2	5	15°
Blue	470	12000	50	3.6	4.2	5	15°

* Chromaticity coordinates

			MOQ 5 - In Multiples of 5			
Type	Colour	Order code	5+	100+	500+	1000+
5mm LED	White	**55-2484**	0.657	0.497	0.415	0.353
5mm LED	Warm white	**55-2600**	0.79	0.48	0.421	
5mm LED	Red	**55-2476**	0.307	0.258	0.23	0.177
5mm LED	Orange	**55-2486**	0.372	0.25	0.224	0.177
5mm LED	Yellow	**55-2478**	0.307	0.258	0.23	0.177
5mm LED	Green	**55-2480**	0.424	0.292	0.258	0.239
5mm LED	Cyan	**55-2488**	0.423	0.292	0.25	
5mm LED	Blue	**55-2482**	0.424	0.292	0.258	0.239

073421

TruOpto

Standard 5mm LED

A range of industry standard 5mm diameter LEDs housed in a coloured diffused lens package.
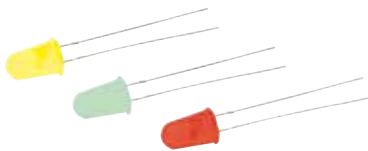
- Suitable for PCB or panel mounting applications
- Viewing angle 60°
- Cathode is shorter lead
- Supplied in **packs of 100** or **1000**

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	Order code
Red	700	10	15	2.2	2.8	**55-1790/55-1798**
Bright red	643	100	30	1.7	2.6	**55-1796/55-1804**
Yellow	590	20	50	2	2.4	**55-1794/55-1802**
Green	570	30	30	2.1	2.8	**55-1792/55-1800**
Blue	470	68	30	3.3	3.8	**55-1754/55-1756**
White	x: 0.31, y: 0.30*	100	30	3.3	3.8	**55-1758/55-1760**

* Chromaticity coordinates

		Price per pack of 100		
Type	Order code	1+	10+	25+
Red	**55-1790**	6.03	5.62	5.06
Bright red	**55-1796**	7.90	6.31	
Yellow	**55-1794**	10.50	8.23	
Green	**55-1792**	10.50	8.23	7.47
Blue	**55-1754**	16.57	13.49	
White	**55-1758**	16.98	13.83	

|		**Price per pack of 1000**	
Type	Order code	1+	5+
Red	**55-1798**	63.22	49.16
Bright red	**55-1804**	61.75	52.48
Yellow	**55-1802**	70.90	59.08
Green	**55-1800**	67.53	57.40
Blue	**55-1756**	111.47	92.72
White	**55-1760**	112.49	93.61

061374

Kingbright

Ultrabright LED 5mm

The Kingbright Ultrabright LED employs the latest technology to produce lamps that are highly visible and therefore suitable for a wide variety of applications.

Available with diffused, water clear, or transparent lenses in a variety of colours and luminous intensities, the Ultrabright LEDs rugged design adds to their long life reliability. Meanwhile,

these high intensity components have been manufactured with only the best materials - the color devices are made with Gallium Arsenide Phosphide.

Overall, these unique Ultrabright LEDs, along with low power consumption, offer excellent value and are a clear leader in their field - to find out more about the full range of Kingbright products please visit Rapid's Kingbright page.

- Cathode identified by flat on body
- Suitable for signalling applications and as an alternative to filament lamps
- General purpose leads
- Reliable and rugged
- Long life - solid state reliability
- Available on tape and reel
- RoHS compliant
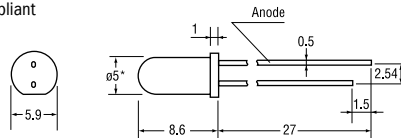
*ø4.7 for L-1633SURC-E

Technical specification

Order code	Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (10mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	V_R max. (V)	View angle	Mftrs. pt. no.
Diffused lens									
55-0132	SB Red	640	150	30	1.85	2.5	5	30°	L-7113SRD-C
55-0136	SB Red	640	250	30	1.85	2.5	5	30°	L-7113SRD-D
72-8984	SB Red	640	400	30	1.85	2.5	5	30°	L-7113SRD-E
72-8989	SB Red	640	1800	30	2.1	2.5	5	30°	L-7113SRD-J4
55-1520	SB Yellow	588	400	30	2	2.5	5	30°	L-7113SYD
55-1495	Blue	470	400	30	3.65	4.2	5	20°	L-7113PBD
55-1480	Blue	466	60	30	3.8	4.5	5	20°	L-7113MBD
Transparent lens									
55-1525	SB Yellow	588	2000	30	2	2.5	5	20°	L-7113SYT
55-1482	Blue	466	200	30	3.8	4.5	5	16°	L-7113MBDL
55-1485	Blue	430	70	30	3.8	4.5	5	16°	L-7113MBT
Water clear lens									
72-8990	SB Red	660	1000	30	1.85	2.5	5	20°	L-1513SRC-C
72-8995	SB Red	640	11,000	30	2.1	2.5	5	20°	L-1513SRC-J4
55-0130	SB Red	640	900	30	1.85	2.5	5	20°	L-7113SRC-C
55-0131	SB Red	640	1400	30	1.85	2.5	5	20°	L-7113SRC-DV
55-0133	SB Red	640	1700	30	1.85	2.5	5	20°	L-7113SRC-DW
55-9212	SB Red	640	5000	30	2.1	2.5	5	20°	L-7113SRC-J4
72-8946	Hyper Red	640	3000	40	2.45	2.6	5	50°	L-1633SURC-E
72-8948	Hyper red	640	4000	40	2.45	2.6	5	12°	L-2523SURC-E
55-1664	Red-orange	630	10000	30	2.4	2.8	5	20°	L-7113SEC-H
55-1530	SB Yellow	588	2000	30	2	2.5	5	20°	L-7113SYC
55-0135	SB Green	568	200	25	2.2	2.5	5	20°	L-7113SGC
55-1668	Green	525	3000	30	3.5	4.5	5	20°	L-7113VGC-E
55-1490	Blue	470	1000	30	3.65	4.2	5	16°	L-7113PBC
55-1662	Blue	470	2200	30	3.5	4	5	15°	L-7113QBC-D
55-1602	White	0.40/0.43*	200	30	3.8	4.5	5	20°	L-7113MWC
55-1640	White	0.34/0.35*	3200	30	3.5	4	5	20°	L-7114QWC-D

* Chromaticity coordinates

			MOQ 5 - In Multiples of 5			
Colour	Mftrs. pt. no.	Order code	5+	100+	1000+	5000+
Diffused lens						
SB red	L-7113SRD-C	**55-0132**	0.167	0.107	0.083	0.073
SB red	L-7113SRD-D	**55-0136**	0.123	0.082	0.063	0.054
SB red	L-7113SRD-E	**72-8984**	0.119	0.092	0.079	
SB Red	L-7113SRD-J4	**72-8989**	0.345	0.29	0.198	0.172
SB yellow	L-7113SYD	**55-1520**	0.357	0.271	0.193	
Blue	L-7113PBD	**55-1495**	0.573	0.492	0.41	
Blue	L-7113MBD	**55-1480**	0.457	0.382	0.336	
Transparent lens						
SB yellow	L-7113SYT	**55-1525**	0.293	0.238	0.176	
Blue	L-7113MBDL	**55-1482**	0.599	0.519	0.427	
Blue	L-7113MBT	**55-1485**	0.457	0.382	0.326	
Water clear lens						
SB red	L-1513SRC-C	**72-8990**	0.182	0.135	0.111	
SB Red	L-1513SRC-J4	**72-8995**	0.205	0.177	0.157	
SB red	L-7113SRC-C	**55-0130**	0.144	0.083	0.053	0.041
SB red	L-7113SRC-DV	**55-0131**	0.167	0.083	0.068	
SB red	L-7113SRC-DW	**55-0133**	0.167	0.083	0.068	
SB Red	L-7113SRC-J4	**55-9212**	0.221	0.19	0.155	
Hyp red	L-1633SURC-E	**72-8946**	0.24	0.162	0.143	
Hyp red	L-2523SURC-E	**72-8948**	0.342	0.26	0.196	
Red-orng	L-7113SEC-H	**55-1664**	0.304			
SB yellow	L-7113SYC	**55-1530**	0.323	0.246	0.175	0.149
SB green	L-7113SGC	**55-0135**	0.16	0.098	0.086	
Green	L-7113VGC-E	**55-1668**	0.41	0.321	0.285	
Blue	L-7113PBC	**55-1490**	0.364	0.30	0.231	
Blue	L-7113QBC-D	**55-1662**	0.503	0.296	0.225	
White	L-7113MWC	**55-1602**	0.457	0.425	0.344	

077694

≡Rapid
…where price meets quality

5mm White LEDs High Luminosity

These 5mm high intensity white LEDs are available in a choice of luminous intensities and are suitable for a wide range of applications such as: electronic signs and signals, small area illumination, and back lighting.

- High luminosity
- 5mm Round standard directivity
- Long operational lifetime
- Superior weather resistance
- UV Resistant epoxy
- Housed in a water clear package

Technical specification

Order code	Chromaticity coordinates	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	Power (mW)	View angle
55-1543	0.31/0.33	5800	30	2.9	3.1	108	60°
55-1547	0.31/0.33	1560	30	2.9	3.1	108	60°

			MOQ 5 - In Multiples of 5		
Type		Order code	5+	25+	100+	500+
5mm White LED 5800mcd		**55-1543**	0.659	0.511	0.365	0.224
5mm White LED 1560mcd		**55-1547**	0.659	0.511	0.365	0.224

036657

5mm High Brightness 15° LEDs

A range of 5mm high intensity LEDs that are suitable for a wide variety of illumination and indication applications such as: small area illumination, back lighting, general purpose indication.

- Housed in an industry standard 5mm water clear package
- Available in several colours including pink and violet
- Viewing angle 15°
- Superior weather resistance
- UV resistant epoxy
- Suitable alternative for filament lamps

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)
Red	625	14,400	50	2.2	2.6
Red	624	35,000	50	2.1	2.4
Orange	605	4200	50	2	2.4
Yellow	590	5800	30	2	2.4
Green	525	18,000	30	3.3	3.8
Blue	470	1200	25	3.6	4.2
Violet	405	68 (radiant intensity (mW/sr))	30	3.4	4
Pink	0.40/0.20 *	5000	30	3.4	4

* Chromaticity coordinates

			MOQ 5 - In Multiples of 5		
Type	Colour	Order code	5+	100+	500+	1000+
5mm LED (14cd)	Red	**55-1806**	0.207	0.177	0.131	0.10
5mm LED (35cd)	Red	**55-1807**	0.285	0.224	0.164	
5mm LED	Orange	**55-1808**	0.176	0.131	0.111	0.074
5mm LED	Yellow	**55-1814**	0.176	0.131	0.111	
5mm LED	Green	**55-1816**	0.424	0.353	0.27	
5mm LED	Blue	**55-1810**	0.628	0.543	0.476	
5mm LED	Violet	**55-1818**	0.35	0.291	0.208	
5mm LED	Pink	**55-1822**	0.285	0.239	0.195	

081462

5mm Flashing LEDs

A range of high brightness 5mm LEDs in a water clear package. Each LED contains an IC that produces a continuous blink at a frequency of 1.5Hz (1.8Hz for **55-1210**).

- Superior weather resistance
- Suitable for warning devices, alarms, indicators, etc.

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_{OP} max.	I_{SL} typ. (mA)	V_{DD} typ. (V)	V_{DD} max. (V)	View angle
Red	625	1560	40mA	10	5.0	6.0	30°
Yellow	590	1560	40mA	10	5.0	6.0	30°
Green	525	4200	40mA	10	5.0	6.0	30°
Blue	470	3000	40mA	10	5.0	6.0	30°
Pink	0.45/0.17 *	2500	10µA	–	3.3	5.0	30°
White	0.27/0.28 *	3000	40µA	10	5.0	6.0	30°

* Chromaticity coordinates

			MOQ 5 - In Multiples of 5		
Type	Colour	Order code	5+	100+	500+	1000+
Flashing LED	Red	**55-1892**	0.36	0.177	0.167	
Flashing LED	Yellow	**55-1894**	0.36	0.177	0.167	
Flashing LED	Green	**55-1896**	0.35	0.177	0.167	
Flashing LED	Blue	**55-1898**	0.35	0.177	0.167	0.151
Flashing LED	Pink	**55-1210**	0.727	0.543	0.365	
Flashing LED	White	**55-1891**	0.774	0.57	0.378	

076184

LED Low Current 5mm

Kingbright are a worldwide leading manufacturer of LEDs, offering a low current 5mm LED housed in diffused coloured packages.

These well designed components have been manufactured to last and are incredibly reliable, while using only the best materials, including source color devices made with Gallium Arsenide Phosphide.

The unique Kingbright LEDs have also been made RoHS compliant, while boasting low power consumption, in the process offering excellent value in the market place - to find out more about the full range of Kingbright products please visit Rapid's Kingbright page.

- Luminous intensity remains consistent down to 2mA
- Suited to portable equipment and are fully CMOS/MOS compatible
- General purpose leads
- Reliable and rugged
- Long life - solid state reliability
- Available on tape and reel

Technical specification

Colour	I_F max.	V_F typ.	V_F max.	V_R max.	Lum. int. (mcd) @ I_F (2mA)	View angle	Wavelength
Red	30mA	1.7V	2.0V	5V	5	60°	625
Super red	30mA	1.65V	1.95V	5V	20	60°	660
Yellow	30mA	1.8V	2.1V	5V	3.2	60°	590
Green	25mA	1.9V	2.2V	5V	3.2	60°	565
Super green	25mA	2.2V	2.5V	5V	15	30°	568

		MOQ 20 - In Multiples of 5	
Type	Order code	20+	100+	1000+
5mm Red	**56-0430**	0.095	0.071	0.055
5mm Super red	**56-0445**	0.144	0.089	0.073
5mm Yellow	**56-0440**	0.078	0.054	0.046
5mm Green	**56-0435**	0.104	0.072	0.055
Super Green	**56-0425**	0.127	0.096	0.082

Price per reel of 1000		
Type	Order code	1+
5mm Red	**56-0433**	47.32

029336

Flashing LED 5mm 14V

Kingbright are a worldwide leading manufacturer of LEDs, offering a superb range of flashing 5mm LEDs in a diffused package that have a built-in IC which produces continuous flashing at between 1.5 and 3.0Hz.

These well designed components from the L-56 Series have an operation voltage from 3.5V to 14V, and have been manufactured using only the best materials, including source color devices are made with Gallium Arsenide Phosphide.

These unique Kingbright LEDs do not require a series resistor, and offer excellent value in the market place - to find out more about the full range of Kingbright products please visit Rapid's Kingbright page.

- Supply voltage 3.5 to 14V
- Ideal for use in warning devices, alarms, etc
- Kingbright L-56 series
- With built-in blinking IC
- RoHS compliant

Technical specification

Colour	I_F typ. (mA)	V_F max. (V)	V_R max. (V)	Lum. int. (mcd) @ I_F	View angle	Wavelength
Red	22	14	0.5	5	60°	660
HE Red	22	14	0.5	40	60°	625
Green	22	14	0.5	20	60°	568
Yellow	22	14	0.5	20	60°	588

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	500+	1000+
5mm Red	**55-0140**	0.552	0.455	0.332	0.326
5mm HE red	**55-0138**	0.596	0.495	0.411	0.396
5mm Green	**55-0142**	0.588	0.367	0.327	0.294
5mm Yellow	**55-0144**	0.695	0.441	0.393	0.353

029294

Education

5

Electronic Kits & Components

TruOpto

5mm LED Warm White 1120mcd

An LED that has a warm white colour and a 5mm standard directivty design. Its very high luminosity and long lifetime operation makes it ideal for use in electronic signs and signals, small area illumination and back lighting.

- Luminosity 1120mcd
- Superior weather resistance
- UV Resistant epoxy
- Water clear lens
- Viewing angle 60°

Technical specification

Colour	Chromaticity coordinates	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D max. (W)
Warm white	x=0.45,y=0.41	1120	30	3.1	3.6	108

MOQ 5 - In Multiples of 5

Type	Order code	5+	100+	500+	1000+
5mm Warm white LED	**55-3000**	0.195	0.157	0.123	0.116

517653

TruOpto

AC 5mm LEDs High Brightness

5mm LEDs from **TruOpto** that are designed to work with an AC power supply. These LEDs, available in various colours, use 80%+ less energy than their incandescent counterparts. These LED lamps also have water clear lenses and standard directivity along with a 15° viewing angle.

With features such as high luminous intensity and low energy consumption there are many applications suitable for these 5mm LEDs, such as: AV equipment, lighting, indicator panels, games and toys, etc. The red and yellow LEDs have a 26mm leg length and the green, blue and white LEDs have a shorter 13.5mm leg length.

Caution: These LEDs are not to be used with a rectifier.

- AC LED
- 5mm Round standard directivity
- Water clear lens
- High luminous intensity
- Long lifetime operation
- Superior weather-resistance
- UV Resistant Epoxy
- Temperature range –30°C to +85°C

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D max. (mW)	View angle
Red	625	5800	30	2.1	2.6	78	15°
Yellow	590	5800	30	2.1	2.6	78	15°
Green	525	22,000	30	3.1	3.6	108	15°
Blue	470	5800	30	3.1	3.6	108	15°
White	0.27/0.28 *	10,000	30	3.1	3.6	108	15°

* Chromaticity coordinates

MOQ 5 - In Multiples of 5

Type	Leg length (mm)	Order code	5+	100+	1000+
5mm Red	26	**56-2311**	0.365	0.29	0.22
5mm Yellow	26	**56-2316**	0.365	0.29	0.22
5mm Green	13.5	**56-2309**	0.499	0.428	0.365
5mm Blue	13.5	**56-2307**	0.499	0.428	0.365
5mm White	13.5	**56-2314**	0.499	0.428	0.365

500652

Kingbright

LED Standard 5mm

Kingbright are a worldwide leading manufacturer of LED, offering a superb range of high efficiency 5mm LEDs that are suitable for PCB and panel mounting applications.

These well designed components from the Kingbright L-7113 series are available with diffused, transparent or water clear lenses in a variety of colours, while the source color devices are made with Gallium Arsenide Phosphide.

These unique Kingbright LEDs are also RoHS compliant, while boasting low power consumption, making them excellent value on the market place - to find out more about the full range of Kingbright products please visit Rapid's Kingbright page.

- All devices are intensity and colour matched
- Cathode identified by flat on body
- General purpose leads
- Reliable and rugged
- Long life - solid state reliability
- Available on tape and reel
- RoHS compliant

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (10mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	V_R max. (V)	View angle	Mftrs. pt. no.
Diffused lens								
Bright red	660	5	25	2.25	2.5	5	30°	L-7113HD
HE red	625	45	30	2	2.5	5	30°	L-7113ID
Amber	625	25	30	2	2.5	5	30°	L-7113ED
Pure orange	610	30	25	2.05	2.5	5	30°	L-7113ND
Yellow	588	20	30	2.1	2.5	5	30°	L-7113YD
Green	565	20	25	2.2	2.5	5	30°	L-7113GD
Pure green	555	5	25	2.25	2.5	5	30°	L-7113PGD
White	0.31, 0.31 *	1000 **	30	3.2	4	5	30°	L-7113PWW-A
Transparent lens								
Red	625	80	30	2	2.5	5	20°	L-7113IT
Yellow	588	40	30	2.1	2.5	5	20°	L-7113YT
Green	568	60	25	2.2	2.5	5	20°	L-7113GT
Water clear lens								
Red	625	80	30	2	2.5	5	20°	L-7113EC
Yellow	588	40	30	2.1	2.5	5	20°	L-7113YC
Green	568	60	25	2.2	2.5	5	20°	L-7113GC
Mega green	568	1000	30	2.1	2.5	5	20°	L-7113MGC

* Chromaticity coordinates
** @ 20mA

MOQ 10 - In Multiples of 5

Colour	Mftrs. pt. no.	Order code	10+	100+	1000+	5000+
Diffused lens						
Bright red	L-7113HD	**55-0117**	0.115	0.079	0.054	0.049
HE Red	L-7113ID	**55-0155**	0.096	0.067	0.054	
Amber	L-7113ED	**55-0127**	0.13	0.083	0.056	0.05
Pure orange	L-7113ND	**55-0124**	0.157	0.089	0.071	0.068
Yellow	L-7113YD	**55-0125**	0.081	0.058	0.055	
Green	L-7113GD	**55-0120**	0.131	0.086	0.057	
Pure green	L-7113PGD	**55-0122**	0.065	0.051	0.048	0.043
Transparent lens						
Red	L-7113IT	**56-0250**	0.115	0.082	0.066	0.057
Yellow	L-7113YT	**56-0260**	0.243	0.177	0.133	0.12
Green	L-7113GT	**56-0255**	0.115	0.077	0.054	0.052
Water clear lens						
Red	L-7113EC	**56-0200**	0.072	0.063	0.045	
Yellow	L-7113YC	**56-0210**	0.063	0.054	0.036	
Green	L-7113GC	**56-0205**	0.07	0.063	0.045	

MOQ 5 - In Multiples of 5

Colour	Mftrs. pt. no.	Order code	5+	100+	1000+	5000+
White	L-7113PWW-A	**55-2490**	0.429	0.382	0.326	0.272

077692

TruOpto

5mm Oval High Power LEDs

These 5mm high power, oval LEDs from **TruOpto** feature a directivity pattern that is ideally suited to applications such as: traffic signals and portable light sources, signage and channel lettering, decorating and entertainment lighting, architectural lighting, small area illumination and back lighting.

- High power suitable for many applications
- 5.1 x 4.3mm lens
- Superior weather resistance
- UV Resistant epoxy

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D max. (mW)	View angle
Red	624	2180	50	2.0	2.4	130	100°/40°
Yellow	590	2180	50	2.0	2.4	130	100°/40°
Green	525	2180	30	3.3	3.8	120	100°/40°
Blue	470	1560	30	3.3	3.8	120	100°/40°
White	0.27/0.28 *	2180	30	3.1	3.6	108	100°/40°
White	0.27/0.28 *	4200	30	3.1	3.6	108	100°/40°

* Chromaticity coordinates

MOQ 5 - In Multiples of 5

Colour	Lens	Order code	5+	100+	500+	1000+
Red	Diffused	**55-2190**	0.307	0.23	0.195	
Yellow	Diffused	**55-2191**	0.307	0.23	0.195	
Green	Diffused	**55-2192**	0.308	0.231	0.196	0.15
Blue	Diffused	**55-2193**	0.307	0.23	0.195	
White	Diffused	**55-2194**	0.478	0.378	0.317	
White	Water clear	**55-2195**	0.327	0.249	0.197	

082709

Kingbright

5mm RGB LED High Brightness

A high brightness RGB LED in
a 5mm through-hole package.
The LED has low power
consumption, a 50° viewing
angle and a water clear lens.

- T1¾ (5mm) full colour LED lamp
- Uniform light output
- Long life-solid state reliability

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D (mW)	View angle	Material
Red	630	1300	30	1.9	2.5	75	50°	InGaAlP
Green	525	3600	30	3.2	4	120	50°	InGaN
Blue	465	900	30	3.2	4	120	50°	InGaN

Type	Order code	1+	25+	100+	500+
5mm Full colour LED	**72-9661**	1.12	1.06	0.871	0.73

548984

TruOpto

5mm RGB Colour Changing LEDs
60s Cycle 30° 4.5V

These full colour RGB LEDs are 5mm round
standard directivity lamps that have a 60s colour
changing cycle. Ideal for applications such as toys,
games, audio equipment, decorative lighting, etc.

- Available with a white diffused or water clear lens
- High luminosity
- Superior weather resistance

Technical specification

Order code	Colour component	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	Lens
55-9206	Red	625	4000	White diffused
	Green	525	7000	
	Blue	470	2180	
55-9207	Red	625	8400	Water clear
	Green	525	14,400	
	Blue	470	4000	

Oscillator frequency (s)	V_F typ. (V)	V_F max. (V)	View angle
60	4.5	5.0	30°

Type	Order code	1+	100+	500+
LED Diffused	**55-9206**	0.426	0.365	0.327
LED Water clear	**55-9207**	0.426	0.365	0.327

560986

TruOpto

Full Colour 5mm LED 60°

Versatile full-colour RGB LEDs from
TruOpto that are suitable for a very wide
range of applications. These LED lamps
can be used in products such as toys, electronic games, AV equipment, indicator panels,
decorative lighting. These solid state LED lights also feature high luminous intensity and
a common anode configuration. These LEDs can produce red, green, blue and white light,
making them a versatile addition to any project.

- Full colour LED
- Available in water clear or diffused lens types
- Common anode type
- 5mm Round standard directivity
- Excellent weather resistance
- Wide 60° viewing angle

Technical specification

72-9643

Lens	Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D max. (mW)
Water clear	Red	625	1560	50	2.1	2.6	130
	Green	525	2180	30	3.1	3.6	108
	Blue	470	1120	30	3.1	3.6	108

72-9647

Lens	Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D max. (mW)
Diffused	Red	625	750	50	2.1	2.6	130
	Green	525	1000	30	3.1	3.6	108
	Blue	470	500	30	3.1	3.6	108

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	25+	100+
LED Water clear lens	**72-9643**	1.09	0.928	0.786
LED Diffused lens	**72-9647**	1.09	0.928	0.786

500653

TruOpto

High Brightness Tri-colour 5mm LED

Tri-colour LEDs that feature high luminous output.
Available in red and green or red and blue these
LEDs also provide a third colour when the two
primary colours are combined.

- Red and blue available with water clear or white diffused lens
- 5mm Standard directivity
- Superior weather-resistance
- Common cathode type
- Suitable for many applications including toys, games and audio

Technical specification

56-0350 Water clear lens

Colour	Wave length (nm)	Lum. int. (mcd) @I_F=20mA	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	View angle
Red	625	5800	30mA	2.0	2.4	30°
Pure green	525	8400	30mA	3.4	4.0	30°

56-0352 Water clear lens

Colour	Wave length (nm)	Lum. int. (mcd) @I_F=20mA	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	View angle
Red	625	5800	30	2.0	2.4	30
Blue	470	4200	30	3.4	4.0	30

56-0353 White diffused lens

Colour	Wave length (nm)	Lum. int. (mcd) @I_F=20mA	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	View angle
Red	625	4200	30	2.1	2.6	30
Blue	470	3000	30	3.1	3.6	30

			MOQ 5 - In Multiples of 5		
Colour	Lens	Order code	5+	100+	250+	1000+
Red/green	Water clear	**56-0350**	0.478	0.415	0.378	0.332
Red/blue	Water clear	**56-0352**	0.478	0.415	0.378	0.332
Red/blue	White diff.	**56-0353**	0.449	0.406	0.371	0.332

075158

Kingbright

L-53 Series 5mm LEDs

A range of 5mm LEDs from the
Kingbright L-53 Series, available
in different colours with a choice
of diffused, water clear and
transparent lenses. Rugged
construction offers long working life with solid state reliability.

- Low power consumption
- Popular T-1 ¾ diameter package
- General purpose leads
- RoHS compliant

Technical specification

Order code	Colour	Wavelength (nm)	Lum. int. (mcd) @I_F (20mA)	I_F (mA)	V_F typ. (V)	V_F max. (V)	P_D (mW)	Viewing angle	Mftrs part no.
55-0858	Orange	625	60	30	2	2.5	75	30°	L-53ED
55-0864	High Efficiency Red	625	50	30	2	2.5	75	30°	L-53ID
55-0872	Yellow	588	25	30	2.1	2.5	75	60°	L-53YD
55-0868	Green	568	30	25	2.2	2.5	62.5	30°	L-53GD
55-0860	High Efficiency Red	625	200	30	2	2.5	75	20°	L-53EC
55-0870	Yellow	588	80	30	2.1	2.5	75	20°	L-53YC
55-0866	Blue	466	150	30	3.8	4.5	135	16°	L-53MBC
55-0862	High Efficiency Red	625	180	30	2	2.5	75	20°	L-53IT
55-0874	Yellow	588	80	30	2.1	2.5	75	20°	L-53YT

		MOQ 10 - In Multiples of 5			
Colour	Mftrs part	Order code	10+	100+	1000+
Diffused					
Orange	L-53ED	**55-0858**	0.08	0.057	0.054
HE Red	L-53ID	**55-0864**	0.136	0.115	0.093
Yellow	L-53YD	**55-0872**	0.137	0.10	0.093
Green	L-53GD	**55-0868**	0.142	0.111	0.096
Water Clear					
HE Red	L-53EC	**55-0860**	0.077	0.059	0.055
Yellow	L-53YC	**55-0870**	0.083	0.063	0.058
Blue	L-53MBC	**55-0866**	0.644	0.479	0.428
Transparent					
HE Red	L-53IT	**55-0862**	0.072	0.059	0.051
Yellow	L-53YT	**55-0874**	0.072	0.059	0.051

519065

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Save time, and place your order at:

www.rapidonline.com

Kingbright

5mm 5V and 12V LEDs

The Kingbright 5mm LEDs are a superb, high quality range of components incorporating an inbuilt series resistor enabling the LED to be directly connected to 5V or 12V supply lines.

Tough, reliable and built to last, these high intensity components have been manufactured with only the best materials - the color devices are made with Gallium Arsenide Phosphide.

Overall, these unique 3mm LEDs, along with low power consumption, offer excellent value and are a clear leader in their field - to find out more about the full range of Kingbright products please visit Rapid's Kingbright page.

- High intensity
- Colour matched and housed in diffused coloured packages
- Cathode identified by shorter lead
- Low power consumption
- Long life - solid state reliability
- General purpose leads
- Kingbright L-7113 series

Technical specification

Colour	I_F max.	V_F max.	V_R max.	P_{TOT} max.	Lum. int. (mcd) @I_v (10mA)	View angle	Wave-length
5V HE Red	17.5mA	6V	5V	85mW	30	30°	625nm
5V Green	17.5mA	6V	5V	85mW	20	30°	568nm
5V Yellow	17.5mA	6V	5V	85mW	20	30°	588nm
12V HE Red	11.5mA	14V	5V	120mW	30	30°	625nm
12V Green	11.5mA	14V	5V	120mW	20	30°	568nm
12V Yellow	11.5mA	14V	5V	120mW	20	30°	588nm

MOQ 5 - In Multiples of 5

Type	Order code	5+	50+	100+	1000+
5mm 5V HE red	56-1500	0.185	0.158	0.133	0.109
5mm 5V Green	56-1505	0.199	0.165	0.146	0.105
5mm 5V Yellow	56-1510	0.147	0.131	0.12	0.105
5mm 12V HE red	56-1550	0.159	0.143	0.122	0.108
5mm 12V Green	56-1555	0.182	0.165	0.134	0.105
5mm 12V Yellow	56-1560	0.171	0.151	0.136	0.119

060113

Kingbright

5mm Cool White LED Low Current

A cool white LED that features low power consumption.

- High luminous intensity
- Low power consumption
- General purpose leads
- Reliable and rugged
- Long life - solid state reliability
- **Kingbright L-9294VR41C-CTS-C1** type

Technical specification

Colour temperature (°K)	Lum. int. (mcd) @ I_v (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_t max. (mW)	View angle	Mftrs. pt. no.
6000	2300	30	3.3	4.0	120	130°	L-9294VR41C-CTS-C1

MOQ 5 - In Multiples of 5

Type	Order code	5+	100+	1000+
LED L-9294VR41C-CTS-C1	56-0418	0.266	0.225	0.175

200113

Tru Opto

5mm Ultraviolet LED

A high power ultraviolet 5mm LED. The features of this LED make it particularly suitable for use in applications such as: backlighting, security and detection applications, and automotive dashboard lighting.

- Water clear lens
- General purpose leads on a 2.54mm (0.1in) pitch
- Superior weather-resistance
- Made from UV resistant expoxy

Technical specification

Wavelength (nm)	UV power @ 20mA typ. (mW)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	View angle
395	30	30	3.5	3.8	20°

MOQ 5 - In Multiples of 5

Type	Order code	5+	100+	500+	1000+
5mm UV LED	55-1835	0.97	0.857	0.752	0.562

082278

≣Rapid education **We bring STEM to life**

WÜRTH ELEKTRONIK

5mm LEDs Water Clear

These 5mm LEDs have an ultra high luminous efficacy and water clear lenses. Available in a choice of colours, these LEDs are suitable for a wide range of applications such as indicator lights, traffic signal light, marker lights, commercial outdoor advertising, energy saving lamp, backlighting, LED displays, electronic and optical indicators, etc.

- Low energy consumption
- High reliability
- Low current requirement
- Fast switching
- No UV/IR radiation
- Easy installation
- Versatile mounting on PC boards

Technical specification

Order code	Colour	Wavelength (nm)	Lum. int. (mcd) @20mA	I_F (mA)	V_F typ. (V)	V_F max. (V)	View angle
54-8486	Red	623	5000	30	1.9	2.6	30°
54-8487	Yellow	590	1500	30	2.1	2.6	45°
54-8488	Green	522	10,000	30	3.4	3.6	30°
54-8489	Blue	465	2000	30	2.7	3.6	45°

MOQ 5 - In Multiples of 5

Type	Order code	5+	100+	500+
Red 5mm LED	54-8486	0.198	0.146	0.123

MOQ 10 - In Multiples of 5

Type	Order code	10+	100+	500+
Yellow 5mm LED	54-8487	0.162	0.138	0.124

MOQ 5 - In Multiples of 5

Type	Order code	5+	100+	500+
Green 5mm LED	54-8488	0.201	0.149	0.123
Blue 5mm LED	54-8489	0.198	0.142	0.123

550407

Kingbright

5mm T-1 3/4 Super Bright LEDs

A range of low power consumption 5mm LEDs that are suitable for PCB and panel mounting applications.
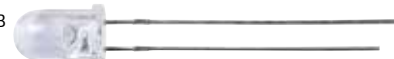
- Low power consumption
- Popular T-1 3/4 diameter package
- General purpose leads
- Reliable and rugged
- Long life - solid state reliability
- All devices are intensity and colour matched
- Cathode identified by flat on body
- **Kingbright L-53** series

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_v (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_t max. (mW)	View angle	Mftrs. pt. no.
Super bright red	640	1400	30	1.85	2.5	100	30°	L-53SRC-DV
Super bright green	568	200	25	2.2	2.5	105	30°	L-53SGC

MOQ 10 - In Multiples of 5

Type	Order code	10+	100+	1000+
Red L-53SRC-DV	55-1700	0.135	0.112	0.066
Green L-53SGC	55-1678	0.12	0.098	0.092

200111

Tru Opto

Piranha RGB LED
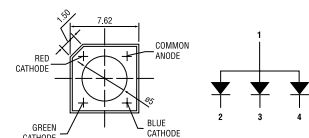
A high luminosity LED that can produce a full range of colours and tones by varying the current to each of the red, green and blue dies. Comes in a compact package ideal for use in the manufacture of toys, games, audio equipment and in general indication.

- Common anode
- Superior weather-resistance
- Water clear 5mm lens
- 7.62mm Square package

Technical specification

Component	Red	Green	Blue
DC Forward current max. (mA)	50	30	30
Pulse forward current max. (mA)	100	50	50
Forward voltage max. (V)	2.4	3.6	3.6
Dominant wavelength typ. (nm) (I_F=20mA)	625	525	470
Luminous intensity typ. (mcd) (I_F=20mA)	3000	4200	2180
Reverse current max. (µA)	10		
Reverse voltage max. (V)	5		
Power dissipation max. (mW)	150		
Half-power angle	100°		
Lead soldering temperature	260°C/3s		
Operating temperature range	–30°C to +85°C		
Storage temperature range	–30°C to +100°C		

Type	Order code	1+	25+	100+	500+
RGB LED	**72-8998**	1.22	0.956	0.809	0.663

076740

Kingbright

Ultrabright 8mm LEDs

A range of high brightness LEDs housed in 8mm water clear packages.

- These devices are particularly suited to warning devices, alarms, indication, etc.
- Red LEDs have GaAlAs dice, white LED has InGaN dice
- **Kingbright L-793/794** series

Technical specification

Order code	Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (20mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	View angle	Mftrs. pt no.
55-0435	Red	660	1600	30	1.85	2.5	40°	L-793SRC-C
55-0440	Red	660	2000	30	1.85	2.5	40°	L-793SRC-D
55-1888	White	0.31/0.31*	1500	30	3.2	4	20°	L-794PWC-A

* Chromaticity coordinates

Type		MOQ 5 - In Multiples of 5		
	Order code	5+	100+	1000+
8mm 1600mcd Red	**55-0435**	0.167	0.115	0.082
8mm 2000mcd Red	**55-0440**	0.218	0.163	0.103
8mm 1500mcd White	**55-1888**	0.573	0.534	0.437

064867

Kingbright

High Intensity 8mm LEDs

High efficiency 8mm LED in a diffused package.

- Particularly suited to warning devices, alarms, etc
- **Kingbright L-793** series

Technical specification

Colour	I_{FV} max.	V_F typ.	V_F max.	V_R max.	Lum. int. (mcd) If (20mA)	View angle	Wavelength
Red	30mA	2.5V	2.5V	5V	150	50°	625
Green	25mA	2.5V	2.5V	5V	70	50°	565
Yellow	30mA	2.5V	2.5V	5V	70	50°	590

Type		MOQ 5 - In Multiples of 5		
	Order code	5+	100+	1000+
8mm High intensity red	**55-0400**	0.201	0.148	0.113
8mm High intensity green	**55-0405**	0.192	0.14	0.106
8mm High intensity yellow	**55-0410**	0.205	0.15	0.111

064864

Tru Opto

Rainbow Colour Cycling 10mm LED

Innovative, eye catching colour change 10mm LED. Contains an inbuilt IC that causes the LED to cycle through the red, green and blue elements, individually and then in combination. Colours complete a cycle every 33 seconds. Ideal for use in audio systems, warning devices, indication panels, alarm systems, mood lighting, toys and games.

- Water clear lens
- High luminosity
- Superior weather resistance

Technical specification

Colour	V_F typ. (V)	V_F max. (V)	Lum. int. (mcd) @ I_F=20mA	Wave-length (nm)	View angle
Red	4.5	5	5800	625	30°
Green	4.5	5	5800	525	30°
Blue	4.5	5	4200	470	30°

Type		MOQ 5 - In Multiples of 5		
	Order code	5+	100+	500+
LED 10mm rainbow clear	**55-0780**	0.979	0.907	0.57

123540

Kingbright

Ultrabright 10mm LED

A range of high brightness LEDs housed in 10mm water clear packages.

- These devices are particularly suited to warning devices, alarms, indication, etc.
- Red LEDs have GaAlAs dice, white LED has InGaN dice
- **Kingbright L-813/814** series

Technical specification

Order code	I_F max.	V_F typ.	V_F max.	V_R max.	Lum. int. (mcd)	Viewing angle	Wavelength
55-0360	30mA	1.85V	2.5V	5V max.	1600	20°	660nm
Order code	I_F max.	V_F typ.	V_F max.	V_R max.	Lum. int. (mcd)	Viewing angle	Chromaticity
55-1890	30mA	3.65V	4.2V	5V max.	600	15°	x = 0.33 y = 0.34

*Typical values based on CIE1931

Type		MOQ 5 - In Multiples of 5		
	Order code	5+	100+	1000+
10mm 1600 mcd Red	**55-0360**	0.135	0.09	0.06
10mm 600mcd White	**55-1890**	0.77	0.669	0.59

029311

Kingbright

High Intensity LEDs 10mm

Kingbright are a worldwide leading manufacturer of LEDs, offering a superb range of high intensity 10mm diameter LEDs housed in a diffused package.

These well designed components from the Kingbright L-813 Series are particularly suited to warning devices and alarms, and have been manufactured using only the best materials, such as the source color devices that are made with Gallium Arsenide Phosphide.

These unique Kingbright LEDs also boast low power consumption, making them excellent value on the market place - to find out more about the full range of Kingbright products please visit Rapid's Kingbright page.

- 10mm diameter big lamp
- Low power consumption
- Reliable and rugged
- Long life - solid state reliability

Technical specification

	I_F max.	V_F typ.	V_F max.	V_R max.	Lum. int. (mcd) If (20mA)	View angle	Wavelength
Red	30mA	2.0V	2.5V	5V	150	50°	625
Green	25mA	2.2V	2.5V	5V	70	50°	565
Yellow	30mA	2.1V	2.5V	5V	70	50°	590
Amber	30mA	2V	2.5V	5V	150	50°	625

Type		MOQ 5 - In Multiples of 5		
	Order code	5+	100+	1000+
10mm High intensity red	**55-0300**	0.194	0.142	0.101
10mm High intensity green	**55-0305**	0.195	0.144	0.112
10mm High intensity yellow	**55-0310**	0.21	0.15	0.111
10mm High intensity amber	**55-0315**	0.24	0.16	0.091

064870

Tru Opto

Premium 10mm White LED Through-Hole

A through-hole LED with a 10mm lens and pure white colour. A high luminous output and long life make this large LED suitable for portable lighting, interior and exterior automotive lighting, illuminated advertising, and general lighting.

- T-3 10mm Standard directivity
- Water clear lens
- Superior weather resistance
- UV Resistant epoxy
- Operating temperature –30°C to +85°C

Technical specification

Colour	Chromaticity coordinates	Colour temp. (°K)	Luminous flux (lm)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D (mW)	½ Power angle
Pure white	x = 0.31, y = 0.34	6500	32	90	3.2	3.6	324	30°

Type		MOQ 5 - In Multiples of 5		
	Order code	5+	100+	500+
10mm Pure white LED	**55-2879**	0.345	0.295	0.269

532062

No minimum order value
UK mainland only

Education

5

Electronic Kits & Components

10mm White Diffused LED 10,000mcd 3.1V 30°

This **10mm White Diffused LED 10,000mcd 3.1V 30°** from **TruOpto** is a high luminous LED which is ideal for electronic signs and signals, small area illuminations and back lighting. Equipped with a host of excellent features such as the superior weather resistance, long lifetime operation and UV resistant epoxy.

- White diffused type
- High luminous intensity
- 10mm round standard directivity

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	10+	100+	500+
White diffused LED	**55-2885**	0.165	0.149	0.131	0.126

533023

Addressable RGB LED Strips

A range of LED strips containing data addressable full colour RGB LEDs. Using an SBC or development board with a suitable LED driver it is possible to build a simple and scalable light project that can achieve stunning effects, such as chasing, scanning and running water effects. There are two versions with either 30 LEDs per metre or 60 LEDs per metre. Each version comes in either 1m or 5m strips.

When choosing an SBC or development board it should be noted that the input data line has very specific timing requirements. The LED strip requires the use of a real-time microcontroller such as an AVR, Arduino, or PIC type device. Linux based single board computers such as the Raspberry Pi will not work without additional RTC hardware.

Each of the LEDs contains an integrated WS2812B constant current driver that can achieve 256 levels of brightness and up to 16.7m colours. The LEDs require an external power supply, with each LED using 60mA if the red, green and blue components are all on maximum brightness.

As a way to quickly get up and running, Adafruit have a very handy library that can be used (Adafruit call them NeoPixels, but they share the same WS2812B driver ICs).

- Control each colour separately
- High brightness
- Suitable for a wide range of commercial and artistic applications
- Terminated by 200mm of AWG22 cables
- Adhesive strip backing
- 5V Data signal required, to use 3.3V a logic level shifter is required

Note: *It is recommended that a large capacitor (1000µF, 6.3V or higher) is added across the + and – terminals. Also place a 300 to 500Ω resistor between the data output pin and the input to the strip.*

Technical specification

Order code	Length	LEDs per metre	Voltage	Current	Working temperature	Viewing angle
60-8810	1m	30	5V DC	1.8A/m	-40°C to +60°C	≥120°
60-8811	1m	60	5V DC	3.6A/m	-40°C to +60°C	≥120°
60-8812	5m	30	5V DC	1.8A/m	-40°C to +60°C	≥120°
60-8813	5m	60	5V DC	3.6A/m	-40°C to +60°C	≥120°

LEDs per metre	Length	Order code	1+
30	1m	**60-8810**	12.70
60	1m	**60-8811**	18.71
30	5m	**60-8812**	56.26
60	5m	**60-8813**	85.01

560551

HRM138BB5100 2.4-5.5V IR Reciever Module 38kHz

Miniaturised receivers for infra-red remote control systems.

- PIN diode and pre-amplifier are assembled on lead frame, the epoxy package is designed as IR filter
- Demodulated output signal can directly be decoded by a microprocessor
- Highly reliable
- No external parts, inner shield
- Highly sensitive
- Long transmission range
- High immunity against ambient light, power noise and electromagnetic interference
- Low power consumption
- TTL and CMOS compatibility

Technical specification

Supply voltage (max.)	6V	Storage temperature	–25°C to +85°C
Supply voltage (recommended)	2.4V to 5.5V	Power dissipation	50mW
Supply current (max.)	5mA	Soldering temperature	+260°C
Output voltage	6V	High output pulse width (typical)	600µs
Output current	5mA	Low output pulse width (typical)	600µs
Carrier frequency	38kHz	Receiving distance (typical)	33m
Operating temperature	–25°C to +85°C		

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	25+	100+
Photo module 2.4-5.5V	**55-0902**	0.774	0.665	0.57

071292

LDRs

Miniature Light Dependent Resistor

A compact low cost cadmium sulphide light dependent resistor (LDR) housed in a small package.

- 5mm diameter
- Clear epoxy finish
- Resistance reduces as the light falling on the device increases
- Note: This product contains cadmium sulphide, the use of which is restricted by the RoHS directive

Technical specification

Dark resistance	1MΩ	Max. voltage	150V peak AC or DC
Resistance @ 10 Lux	10-20kΩ	Power dissipation	100mW
Resistance @ 100 Lux	2-4kΩ	Lead pitch	3mm
Peak spectral response	540nm	Operating temperature	–30°C to +70°C

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	1000+
Miniature LDR	**58-0134**	0.589	0.482	0.365	0.316

034796

Silonex

Light Dependent Resistor NORPS12

Cadmium sulphide light dependent resistor (LDR).

- Housed in a robust plastic package with clear end window
- Resistance reduces as the light falling on the LDR increases
- **Silonex type NORPS12**
- Note: This product contains cadmium sulphide, the use of which is restricted by the RoHS directive

Technical specification

Dark resistance	1MΩ	Power dissipation	250mW max.
Resistance @ 1ftc	5.4kΩ min, 12.6kΩ max.	Operating temperature	–60°C to +75°C
Peak spectral response	550nm	Dimensions	14.35mm dia. x 7.0mm high
Max. voltage	250V peak AC or DC		9.53mm pitch pins

Type	Order code	1+	25+	100+	500+
NORPS12	**58-0132**	1.48	1.26	1.14	0.961

034793

Miniature Light Dependent Resistor
Lead Free Terminals

A compact cadmium sulphide light dependent resistor (LDR) housed in a compact 5mm diameter package.

- Radial leads with 3.4mm pitch
- Lead free terminals
- Note: This product contains cadmium sulphide, the use of which is restricted by the RoHS directive

Technical specification

Light resistance at 10 Lux	50-100KΩ
Dark resistance (10 sec. after shut off 10 Lux)	20MΩ
Gamma value at 10-100 Lux	0.8 ± 1
Peak spectral response	540nm
Power dissipation	100mW
Maximum voltage	150V

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	500+
LDR (lead free)	**58-0128**	0.815	0.737	0.704	0.537

029399

Tru Opto

12mm Light Dependent Resistor Non-RoHS

A CdS (Cadmium Sulphide) light dependent resistor (LDR) that is housed in a small package. Typical applications for this device include: camera automatic photometry, photelectric control, annunciator, light control switch, industrial control, and electronic toys.

- Resistance reduces as the light falling on the device increases
- Small volume
- Clear epoxy finish
- Fast response
- High sensitivity
- Very reliable
- Note: This product contains cadmium sulphide, the use of which is restricted by the RoHS directive

Technical specification

Peak spectral response (nm)	560
Voltage max. (V)	250
Power dissipation max. (mW)	200
Response time (ms)	30
Operating temperature	–30°C to +70°C
Dimensions (mm)	12.1 x 10.3 x 2.1 high
	8.55 pitch pins

Light resistance @ 10 Lux (kΩ)	Dark resistance (MΩ)	Gamma (10-100 Lux)
5 - 10	1	0.6
10 - 20	2	0.6
20 - 30	3	0.7
30 - 50	5	0.7
50 - 100	8	0.8

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	500+
LDR Non-RoHS	**58-0135**	1.28	1.19	1.11

082713

LASER FUCHS®

Red Laser Modules Aluminium Housing Battery Powered

A range of low cost, fixed focus laser modules that are battery powered and provide a constant illumination from a compact aluminium body. The modules are available in a choice of beam types (line, dot or cross) and all modules have an acrylic lens that helps to produce a sharp beam without the need for rotating polygonal mirrors or motors. The compact size and battery power makes these modules suitable for applications where space and accessibility are an issue.

- Wavelength 650nm
- Diode laser technology
- Acrylic lens
- Divergence 1mrad
- Long lifetime >3000h
- Dimensions ø15 x 68mm
- Operating temperature -20°C to +40°C

Powered by 2x LR44 alkaline button cells (included).

Technical specification

Order code	57-5881	57-5882	57-5884	57-5885
Wavelength (nm)	650	650	650	650
Optical power (mW)	5	5	1	5
Voltage (V)	2.8 to 4.5	3 to 4.5	3 to 4.5	2.7 to 4.5
Current (mA)	20	20	20	20
Laser class	1	1	2	1
Beam shape	Line	Line	Dot	Cross
Line thickness	<1mm @0.25m	<1.2mm @1m	-	<1.2mm @1m
Laser dot size	-	-	<4.6mm @5m	-
Focus point (mm)	250	1000	5000	1000
Fan angle	90°	90°	-	45°
ø Beam	-	-	2.5mm	-
Operating distance (m)	0.25	1	10	1

Type	Operating distance	Order code	1+
Line 90°	0.25m	**57-5881**	19.20
Line 90°	1m	**57-5882**	19.39
Class 2 dot	10m	**57-5884**	14.39
Cross 45°	1m	**57-5885**	24.04

545518

LASER FUCHS®

Red Laser Modules Brass Housing

A range of high quality laser modules that project a red beam in one of three types - line, spot or cross. The modules use a special acrylic lens that produces a sharp beam without the use of rotating polygonal mirrors or motors. The lens and electronics are built-in to a robust brass housing and can be operated under dusty and harsh industrial environments. Operation is possible without series resistors or control electronics, the module simply being connected to a power supply. Suitable

applications include laser levels, laser marking systems, robotics, and laser entertainment areas.

- Diode laser technology
- Acrylic lens
- Divergence 1mrad
- Long lifetime >3000h
- Cable length 100mm
- Dimensions ø9 x 20mm
- Operating temperature -20°C to +40°C

Technical specification

Order code	57-5862	57-5863	57-5864	57-5865	57-5867	57-5869	57-5868
Wavelength (nm)	650	650	650	635	650	650	650
Optical power (mW)	5	3.5	3.5	3.5	0.3	3.5	1
Voltage (V)	3-12	3-12	3-12	3-6	3-12	3-12	3-12
Current (mA)	20	15	20	40	15	20	25
Laser class	1	1	1	1	1	1	2
Beam shape	Line	Line	Line	Line	Dot	Cross	Dot
Line thickness	<1mm @1m	<1.2mm @1m	<1.2mm @1m	<1.2mm @1m	-	<1.2mm @1m	-
Laser dot size	-	-	-	-	<4.5mm @ 5m	-	<3.4mm @ 5m
Focus point (mm)	250	1000	1000	1000	5000	1000	5000
Fan angle	90	90	60	60	-	45	-
ø Beam	-	-	-	-	3	-	3
Operating distance (m)	0.25	1	1	2	10	1	10

Type	Operating distance	Order code	1+
Line 90°	0.25m	**57-5862**	14.39
Line 90°	1m	**57-5863**	13.07
Line 60°	1m	**57-5864**	13.13
Line 60°	2m	**57-5865**	17.26
Dot Class 1 0.3W	10m	**57-5867**	10.65
Cross 45°	1m	**57-5869**	13.94
Dot Class 2	10m	**57-5868**	6.05

545514

Displays

Kingbright

LED Display 14.2mm

Kingbright are a worldwide leading manufacturer of LEDs, offering a range of 14.2mm (0.56in high) seven segment displays available in red, high efficiency red, super red or green.

These well designed components have been categorised for luminous intensity, and use only the best materials with the source colour devices made of Gallium Phosphide on Light Emitting Diode. On top of that, the connectors along top and bottom simplify wiring in multi-digit applications.

The unique Kingbright LED Display is also economical to use, in the process making it excellent value on the market place - to find out more about the full range of Kingbright products please visit Rapid's Kingbrightpage.

- Low current operation
- White segments and grey display surface to maximise on/off contrast
- Attractive character appearance
- Easy mounting on PC Boards or sockets
- I.C. Compatible
- 14mm (0.56 inch) digit height

Technical specification

Per segment	I_F max.	V_F typ.	V_F max.	V_R max.	Lum. int. (mcd) @ I_F (10mA)	Wavelength
Red	25mA	2.0V	2.5V	5V	1.4	700
HE red	30mA	2.0V	2.5V	5V	5.6	625
Super red	30mA	1.85V	2.5V	5V	21	660
SB red	30mA	1.65V	2.5V	5V	6	640
Green	25mA	2.2V	2.5V	5V	5.6	565

			MOQ 5 - In Multiples of 5			
Type	Mftrs. suffix	Order code	5+	25+	100+	500+
Common anode						
CA Red	11HWA	**57-0120**	0.725	0.703	0.577	0.511
HE red	11EWA	**57-0122**	1.12	1.02	0.808	0.635
Super red	11SRWA	**57-0124**	0.779	0.728	0.656	0.51
Green	11GWA	**57-0170**	1.10	0.981	0.782	
Common cathode						
Red	11HWA	**57-0125**	1.57	1.39	1.20	
HE red	11EWA	**57-0127**	1.23	1.03	0.81	0.664
Super red	11SRWA	**57-0129**	1.17	0.921	0.849	0.64
Green	11GWA	**57-0172**	1.13	0.951	0.814	0.596
			MOQ 400			
Type	Mftrs. suffix	Order code	400+			
Green	21GWA	**57-0176**	0.594			
			MOQ 5 - In Multiples of 5			
Type	Mftrs. suffix	Order code	5+	25+	100+	
SB Red 1-digit	11LSRWA	**57-1448**	0.897	0.803	0.642	

029374

Tru Opto

14.2mm Single Digit Displays

A range of seven segment LED displays that are 14.2mm (0.56in high) and available in red, high output red, yellow, yellow green, pure green, blue and white.

- Available in common anode or common cathode configurations
- Right hand decimal point
- Long lifetime operation
- IC Compatible
- Low power dissipation

Technical specification

Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F=20mA	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D (mW)	Order code Common anode	Order code Common cathode
Red	630	20	20	2.1	2.5	44	**57-0126**	**57-0121**
High output red	625	100	20	2.1	2.5	44	**57-0128**	**57-0123**
Yellow	590	60	20	2.1	2.5	44	**57-0136**	**57-0133**
Pure green	525	200	20	3.3	4.0	66		**57-0131**
Blue	470	50	20	3.3	4.0	66	**57-0138**	**57-0137**
White	0.30/0.34 *	65	20	3.3	4.0	44	**57-0143**	**57-0141**

* Chromaticity coordinates

		MOQ 5 - In Multiples of 5			
Colour	Order code	5+	25+	100+	500+
Common anode					
Red (20mcd)	**57-0126**	0.594	0.50	0.355	
Red (100mcd)	**57-0128**	0.486	0.408	0.29	0.24
Yellow	**57-0136**	0.486	0.408	0.29	
Blue	**57-0138**	1.11	0.982	0.851	
White	**57-0143**	0.952	0.832	0.732	
Common cathode					
Red (20mcd)	**57-0121**	0.828	0.742	0.643	
Red (100mcd)	**57-0123**	0.601	0.496	0.352	
Yellow	**57-0133**	0.486	0.408	0.348	0.295
Pure green	**57-0131**	0.843	0.742	0.656	
Blue	**57-0137**	0.843	0.742	0.656	
White	**57-0141**	1.12	0.969	0.855	

200089

Kingbright

25.4mm LED Display

A range of 25.4mm (1in high) seven segment displays available in red, high efficiency red, super red and green.

- Available with a choice of pinouts
- Right hand decimal point
- All displays are categorised for luminous intensity with white segment and grey display surface to maximise on/off contrast
- Each segment contains two LED chips, decimal point has one
- **Kingbright SA/SC10** series

Technical specification
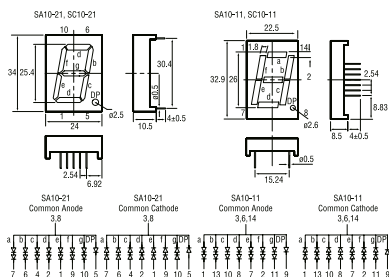
Pinout configuration	Colour	Wavelength (nm)	Lum. int. (mcd) @ I_F (10mA)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	Order code
Common anode							
SA10-21	SB red	640	60	30	3.7	5	**57-0204**
SA10-11	HE red	625	16	30	4	5	**57-0212**
SA10-21	HE red	625	16	30	4	5	**57-0202**
SA10-21	Green	568	24	25	4.4	5	**57-0186**
Common cathode							
SC10-21	Red	660	2.925	25	4.5	5	**57-0205**
SC10-11	SB red	640	60	30	3.7	5	**57-0218**
SC10-21	SB red	640	60	30	3.7	5	**57-0222**
SC10-21	HE red	625	16	30	4	5	**57-0207**
SC10-21	Green	568	24	25	4.4	5	**57-0188**

Colour	Pinout	Order code	1+	25+	100+	500+
Common anode						
SB red	SA10-21	**57-0204**	2.28	1.87	1.51	
Green	SA10-21	**57-0186**	2.18	1.79	1.43	
Common cathode						
Red	SC10-21	**57-0205**	1.06	0.902		
SB red	SC10-11	**57-0218**	1.47	1.27	1.02	
SB red	SC10-21	**57-0222**	2.06	1.70	1.57	1.38
HE red	SC10-21	**57-0207**	1.80	1.04	0.99	
Green	SC10-21	**57-0188**	1.60	1.47	1.39	

064939

Kingbright

45mm (1.8in) LED Display

A range of 45mm (1.8in high) seven segment displays available in high efficiency red or super red employing advanced GaAlAs technology to produce a very high output display.

- Right hand decimal point
- Connections running along the top and bottom of the display simplifying wiring in multi-digit applications
- All displays are categorised for luminous intensity
- White diffused segments on a grey background
- **Kingbright S18** series
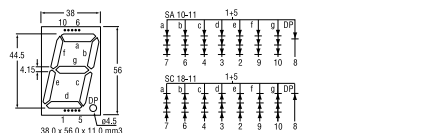
Technical specification

Per segment	I_F max.	V_F typ.	V_F max.	V_R max.	Lum. int. (mcd) @ I_F (10mA)	Wavelength
HE red	30mA	6.0V	7.5V	15V	21	625
Super red	30mA	5.6V	7.5V	15V	31	660

Type	Order code	1+	25+	100+
CC HE red	**57-0525**	3.15	3.10	2.56
CA Super red	**57-0530**	4.79	3.75	3.10

029386

Kingbright

38.1mm (1.5in) LED Display

38.1mm (1.5in high) seven segment displays available in high efficiency red or bi-colour red/green.

- Right hand decimal point
- Connections run along the top and bottom of the display simplifying wiring in multidigit applications
- All displays are categorised for luminous intensity with white diffused segments on a grey background
- Red version has common cathode configuration
- Bi-colour version has independent common anode pins for red and green segments
- **Kingbright types SC15-11EWA** (red) and **SBA23-11EGWA** (red/green)
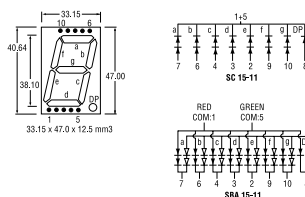
Technical specification

Order code	57-0495	57-0498
Colour	HE Red	HE Red/green
Wavelength (nm)	625	625/568
Luminous intensity (mcd)	21	18
I_F (mA)	30	30/25
V_F typ. (V)	2.0	2.0/2.2
V_F max. (V)	2.5	2.5/2.5
P_D (mW)	105	105/105

Type	Order code	1+	25+	100+
CC HE red	**57-0495**	1.69	1.51	1.37
CA HE red/green	**57-0498**	5.19	3.85	2.76

029385

Antex UF8J470 CS 18 Iron, ST4 Stand & Plug-in PSU Set

Only

£42.95

Order code 85-0912

Page 189

Power LEDs

Tru✶opto®

Flexible LED Strips 30-way

A range of separable LED strips on a flexible printed circuit board. The whole strip contains 30 LEDs and associated circuitry, and the strips are available in a spectrum of colours. Each strip can be separated in to 10 x 3 LEDs pieces and are adhesive backed.

The versatility and operating performance of these LEDs make them ideally suited to a wide range of applications including: channel letter signs, indirect accent decor light, large area back lighting, under counter lighting, building contour delineation, substitution for neon lighting and signage.

● Simple to use, just connect to suitable voltage
● Self-adhesive backing can be fixed almost anywhere
● High intensity output with low power consumption
● Energy saving
● Excellent beam control
● Long life
● Each LED has 120° viewing angle for even light distribution

Technical specification

Colour	Wavelength (nm)	Lum. int. (per LED) (mcd)	Order code
Red	625	500	**56-0482**
White	0.30/0.33 *	750	**56-0480**
Warm white	0.44/0.41 *	600	**56-0478**

* Chromaticity coordinates

Input voltage range	12V to 14V DC
Input current range	200mA to 300mA
Power dissipation max.	4.2W
View angle	120°
Operating temperature	–30°C to +50°C
Estimated life	20,000 hours
Dimensions (mm)	500 x 8

Colour	Order code	1+	10+	25+
White	**56-0480**	13.62	12.72	10.85
Warm white	**56-0478**	10.78	10.10	10.05
Red	**56-0482**	5.22		

081568

Tru✶opto®

Flexible LED Strips 24-way

A range of separable LED strips on a flexible printed circuit board. The whole strip contains 24 LEDs and associated circuitry, and the strips are available in white or warm white colours. Each strip can be separated in to 8 x 3 LEDs pieces and are adhesive backed.

The versatility and operating performance of these LEDs make them ideally suited to a wide range of applications including: channel letter signs, indirect accent decor light, large area back lighting, under counter lighting, building contour delineation, substitution for neon lighting and signage.

● Simple to use, just connect to suitable voltage
● Self-adhesive backing can be fixed almost anywhere
● High intensity output with low power consumption
● Energy saving
● Excellent beam control
● Long life
● Each LED has 120° viewing angle for even light distribution

Technical specification

Colour	Chromaticity coordinates	Lum. int. (per LED) (mcd)	Order code
White	0.30/0.33	750	**56-0452**
Warm white	0.44/0.41	600	**56-0450**

Input voltage range	12V to 14V DC
Input current range	166mA to 250mA
Power dissipation max.	3W
View angle	120°
Operating temperature	–30°C to +50°C
Estimated life	30,000 hours
Dimensions (mm)	480 x 8

Colour	Order code	1+	10+	25+
White	**56-0452**	11.80	10.89	9.07
Warm white	**56-0450**	11.80	10.89	9.07

081567

Tru✶opto®

5m LED Strips

These 5m LED strips are high brightness lighting systems that are available in a selection of colours, including RGB, and with a choice of LED quantity. The low voltage and power consumption together with the high level light output make these LED strips suitable for a wide range of illuminative and indicative lighting applications.

● Each 5m length is terminated by 2.1mm DC jack socket
● Extremely low cost
● Can be cut to length
● Viewing angle 120°
● Available in 300 LEDs per 5m or 600 LEDs per 5m

Technical specification

Order code	Colour	Length (m)	LED quantity	LED type	Colour temp.	Output (lm/m)	Voltage (V DC)	Current (A/m)	Power max. (W/m)
56-1012	Natural white	5m	300	3528	4000K	330	12	0.4	4.8
56-1014	White	5m	300	3528	5500K	390	12	0.4	4.8
56-1016	Warm white	5m	300	3528	3000K	320	12	0.4	4.8
56-1018	Red	5m	300	3528	-	90	12	0.4	4.8
56-1022	Blue	5m	300	3528	-	80	12	0.4	4.8
56-1028	White	5m	600	3528	5500K	780	12	0.8	9.6
56-1030	Warm white	5m	600	3528	3000K	660	12	0.8	9.6
56-1032	Red	5m	600	3528	-	170	12	0.8	9.6

Colour	No. of LEDs	Order code	1+
Natural white	300	**56-1012**	19.95
White	300	**56-1014**	19.95
Warm white	300	**56-1016**	19.95
Red	300	**56-1018**	22.94
Blue	300	**56-1022**	22.94
White	600	**56-1028**	29.47
Warm white	600	**56-1030**	28.07

526195

TT Electronics

12V LED Strip Power Supplies

These 12V power supplies from TT Electronics are ideal for use with the range of LED strips available from Rapid. The various power supply units can tackle anything from 1 to 20 metres of LED tape.

● Variety of fixing options available

Type	Order code	1+
60W	**56-2434**	19.81
90W	**56-2436**	27.77

519228

Tru✶opto®

1W High Luminosity Power LED Stars

These power star LEDs are high luminosity modules that are mounted on an PCB substrate. Being more energy efficient than incandescent and most halogen lamps and available in a range of colours, including white and warm white, these LEDs are ideal for a wide range of applications including: electronic signs and signals, small area illumination, back lighting and other lighting, bollards, security and garden uses, traffic signalling and beacons.

● High luminous flux
● Super energy efficiency
● Long operational life
● Superior ESD protection
● Superior UV resistance

Technical specification

Colour	Wavelength (nm)	Lum. flux typ. (lm)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	View angle
Red	625	50	400	2.5	3.0	120°
Pure green	525	75	400	3.3	4.0	120°
Blue	470	15	400	3.3	4.0	120°
White	0.31/0.33 *	100	400	3.3	4.0	120°
Warm white	0.45/0.41 *	90	400	3.3	4.0	120°

* Chromaticity coordinates

Colour	Order code	1+	25+	100+	250+
Red	**55-2243**	2.49	2.36	2.08	1.85
Green	**55-2245**	2.31	2.18	1.92	
Blue	**55-2247**	2.49	2.36	2.08	
White	**55-2239**	2.49	2.36	2.08	1.85
Warm white	**55-2241**	2.49	2.36	2.08	1.85

200093

Education

5

Electronic Kits & Components

Tru Opto

3W High Luminosity Power LED Stars

These power star LEDs are high luminosity modules that are mounted on an PCB substrate. Being more energy efficient than incandescent and most halogen lamps and available in a range of colours, including white and warm white, these LEDs are ideal for a wide range of applications including: electronic signs and signals, small area illumination, back lighting and other lighting, bollards, security and garden uses, traffic signalling and beacons.

- High luminous flux
- Super energy efficiency
- Long operational life
- Superior ESD protection
- Superior UV resistance

Technical specification

Colour	Wavelength (nm)	Lum. flux typ. (lm)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	View angle
Red	625	80	800	2.5	3.0	120°
Pure green	525	130	800	3.3	4.0	120°
Blue	470	30	800	3.3	4.0	120°
White	0.31/0.33 *	200	800	3.3	4.0	120°
Warm white	0.45/0.41 *	180	800	3.3	4.0	120°

* Chromaticity coordinates

Colour	Order code	1+	25+	100+	250+
Red	55-2455	3.13	2.91	2.70	
Green	55-2457	3.13	2.91	2.70	
Blue	55-2253	3.13	2.91	2.70	2.57
White	55-2249	3.13	2.91	2.70	2.57
Warm white	55-2251	3.07	2.89	2.63	2.51

200094

Tru Opto

1W High Luminous Flux Power LEDs

A range of 1W LEDs that feature high luminous flux with super energy efficient operation.

Suitable applications for these LEDs include: reading lights, portable lighting, security/bollard/garden, traffic signalling and beacons, signage, etc.

- Silicon lenses
- High luminous flux
- Super energy efficiency
- Long lifetime operation
- Superior ESD protection
- Superior UV resistance
- Beam angle 120°

Technical specification

Colour	Wavelength (nm)	Luminous flux (lm) @ I_F=350mA	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D (mW)	Order code
Red (silicon lens)	625	50	400	2.5	3.0	1200	55-1867
Green	525	80	400	3.3	4.0	1600	55-1869
Blue	470	15	400	3.3	4.0	1600	55-1871
White	0.31/0.33 *	80	400	3.3	4.0	1600	55-1873
Warm white	0.45/0.41 *	90	400	3.3	4.0	1600	55-1865

* Chromaticity coordinates

Type	Order code	1+	25+	100+	250+
High flux red	55-1867	2.08	1.85	1.65	
High flux blue	55-1871	1.65	1.47	1.31	
White 80lm	55-1873	1.77	1.60	1.31	
Warm white 90lm	55-1865	2.08	1.85	1.65	1.50

200100

Tru Opto

3W 3-LED Round Module

These round type LED modules consist of three power LEDs arranged on an aluminium substrate to produce a module that is ideal for a wide range of applications such as: small space lighting and mechanical equipment lights.

Also available are high efficiency lenses suitable for use with both LED modules. The lenses are available with either a diffused, transparent or crystal diffused surface treatment.

- Super bright
- Green light source
- Fast response
- Long lifetime
- Easy installation
- Large viewing angle
- Superior ESD protection
- Superior UV resistance

Note: For longer periods of use it is recommended that thermal management (e.g. heatsink) is employed.

Technical specification

Order code	Colour	Chromaticity coordinates	Luminous flux (lm)	I_F max. (mA)	V_F typ. (V)	V_F max. (V)	P_D max. (W)	View angle
55-2413	White	0.31/0.33	300	400	10	12	4.8	120°
55-2415	Warm white	0.45/0.41	270	400	10	12	4.8	120°

Operating temperature –10°C to +40°C
PCB ø 31.5mm
Weight 5g

Type	Colour	Order code	1+	5+	10+	15+
3W LED Module	White	55-2413	6.30	5.06	4.43	
3W LED Mod.	Warm white	55-2415	6.30	5.06	4.43	4.17
Diffused LED Lens		55-2421	0.625	0.596	0.539	0.50
Transparent LED Lens		55-2422	0.625	0.596	0.539	

500235

LED Accessories

Kingbright

LED Bezel 5mm

Attractive push fit panel clips for 5mm LEDs in black nylon offering professional appearance at low cost.

- Available in either recessed or prominent position styles
- Mounting hole is 8mm
- **Kingbright types RTF 5010** (prominent) and **RTF 5020** (recessed)
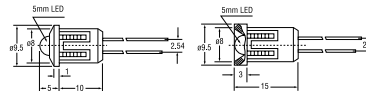
		MOQ 5 - In Multiples of 5			
Type	Order code	5+	100+	1000+	5000+
5mm Prominent clip	55-0260	0.287	0.233	0.19	0.18
5mm Recessed clip	55-0265	0.497	0.377	0.312	

029304

Tru Opto   **EXTENDED RANGE**

Solderless LED Holders

Novel LED connectors, with 200mm pre-stripped and tinned leads.

The connectors simply clip to the rear of a panel- mounted LED and are retained in position by a patented clamping device.

- Suitable for use with all LEDs with leads on a 2.54mm pitch
- Significantly reduces panel assembly time
- Dimensions 14.5 x 2.6mm
- Moulded in Toray
- **UL 94V-0** rating

		MOQ 5 - In Multiples of 5			
Cable size	Order code	5+	25+	100+	1000+
26 AWG	55-0167	0.596	0.512	0.454	0.425
		MOQ 5			
22 AWG	N 55-9290	0.59	0.52	0.45	0.43

029296

Tru Opto

Rapid Assembly LED Clip

A panel mounting single part LED clip available in a 5mm style employing a novel design enabling the user to mount the LED assembly from front or rear.

- Panel cut-out 8mm
- Maximum panel thickness 1.2mm
- Manufactured in black samporene

		MOQ 10 - In Multiples of 5			
Type	Order code	10+	100+	1000+	5000+
5mm Rapid assembly clip	55-0295	0.132	0.121	0.102	0.065

029308

Free Delivery*

on all orders over £30 (excl. VAT) – (UK mainland only)

* See Terms & Conditions for full details - **www.rapidonline.com/terms**

Tru✳opto

5mm Panel Clips

A two part panel clip to secure 5mm LEDs. Insert the clip from the panel front and insert the LED front the rear and secure with the retaining ring. This will leave the LED protruding 2.5mm beyond the clip ring

- Panel thickness 2.8mm
- Panel hole 6mm dia
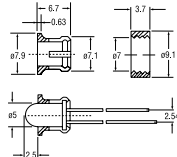
	MOQ 20 - In Multiples of 5		
Type	Order code	20+	100+	1000+
5mm Clip	**55-0165**	0.079	0.05	0.04

029295

Kingbright

8mm LED Bezel Panel Clip

Attractive push fit panel clip for 8mm LEDs in black nylon offering professional appearance at low cost.

- Mounting hole is 12mm
- **CML-IT type RTF8080**

	MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	1000+
8mm Prominent clip	**55-0280**	0.34	0.18	0.112

029306

Kingbright

10mm LED Bezel Panel Clips

Attractive push fit panel clips for 10mm LEDs in black nylon offering professional appearance at low cost.

- Mounting hole 14mm diameter
- **CML-IT type RTF1010**

	MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	1000+
10mm Prominent clip	**55-0285**	0.14	0.102	0.073

029307

Tru✳opto

Bezel LED Holders

Attractive chrome plated brass recessed LED bezels which form a high quality panel product when incorporated with our 3 or 5mm LEDs. The LED is held in position by retaining mount which push fits into the rear of the holder.

- Supplied complete with mounting nut and washer
- Maximum panel thickness 4mm
- Panel cut-out for 5mm type 8mm and 6.3mm for 3mm

	MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	1000+
3mm Recessed bezel	**55-0270**	0.597	0.466	0.416
5mm Recessed bezel	**55-0275**	0.459	0.361	0.304

029305

Miniature Lamps

KL

BA15D SBC Lamps

A range of 12V filament lamps in a BA15D fitting.

- Available in a choice of wattages
- Ideally suited to many applications in education
- Lamp holders, either unmounted or mounted are also available

Technical specification

Voltage	Wattage	Filament style	Order code
12	21	Radial (horizontal)	41-0454
12	24	Axial (vertical)	41-0455
12	36	Axial (vertical)	41-0456

Type	Order code	1+	5+	10+	100+
12V 21W Lamp	**41-0454**	1.70	1.59	1.50	
12V 24W Lamp	**41-0455**	3.16	2.94	2.60	2.06
12V 36W Lamp	**41-0456**	3.16	2.94	2.60	

517585

≡RVFM

MES Lampholder (E10)

A robust MES lampholder with cross head screw connections.

- Spring loaded contact
- Diameter 10mm
- Fixing centres 23mm
- Black ABS

	MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	500+
MES Lampholder	**41-0070**	0.523	0.336	0.274	0.228

032664

≡RVFM

MES (E10) Lamp base

A miniature MES lampholder terminated by solder tags at the base of the holder.

- Will accept all MES lamps
- 10.6mm diameter, 12.8mm high

	MOQ 10 - In Multiples of 10			
Type	Order code	10+	100+	500+	1000+
MES Lamp base	**41-0090**	0.125	0.075	0.071	0.067

029262

KL

MES (E10) G3½ 11mm Lamps

A range of miniature MES lamps in a wide range of voltages.

- 11mm diameter, 23mm overall length

Technical specification

Voltage (DC)	Current	Power	Nominal Life (hrs)	Order code
1.5V	300mA	0.45W	50	41-0130
2.5V	200mA	0.5W	100	41-0120
3.5V	200mA	0.7W	100	41-0132
3.5V	300mA	1.05W	1000	41-0125
6.0V	60mA	0.36W	10000	41-0105
6.0V	100mA	0.6W	100	41-0136
6.5V	150mA	0.6W	70	41-0138
6.5V	300mA	0.97W	70	41-0140
12.0V	100mA	1.2W	50	41-0142
12.0V	200mA	2.4W	3000	41-0110
24.0V	125mA	3W	50	41-0146

		MOQ 10 - In Multiples of 10		
Type	Order code	10+	100+	500+	1000+
1.5V MES Lamp	**41-0130**	0.15	0.10	0.087	0.084
2.5V MES Lamp	**41-0120**	0.15	0.10	0.087	0.084
3.5V MES Lamp	**41-0132**	0.15	0.10	0.087	
3.5V MES Lamp	**41-0125**	0.15	0.10	0.087	0.083
6.0V MES Lamp	**41-0105**	0.125	0.112	0.10	0.083
6.0V MES Lamp	**41-0136**	0.137	0.112	0.10	0.088
6.5V MES Lamp	**41-0138**	0.137	0.112	0.10	
Spare bulb 6.5V	**41-0140**	0.137	0.112	0.10	0.088
12V 100mA MES Lamp	**41-0142**	0.20	0.137	0.112	0.099
12V 200mA MES Lamp	**41-0110**	0.125	0.112	0.10	0.083
24V MES Lamp	**41-0146**	0.25	0.174	0.137	

029264

Barthelme

E10 Globe lamps

A range of E10 base, spherically-bulbed lamps available in a range of voltages and current ratings. There are lamps suitable for torches (including coloured lamps), bicycle lamps and for general purpose use.

- Clear lens
- Dimensions 11.5 x 24mm

Technical specification

Order Code	Base	Dimensions (mm)	Voltage (V)	Current (mA)	Power (W)	Other
57-6536	E10	11.5 x 24	1.2	150	-	Torch lamps
57-6524	E10	11.5 x 24	1.5	200	-	Torch lamps
57-6537	E10	11.5 x 24	2.2	200	-	Torch lamps
57-6538	E10	11.5 x 24	2.5	100	-	Torch lamps
57-6525	E10	11.5 x 24	2.5	200	-	Torch lamps
57-6528	E10	11.5 x 24	2.5	300	-	Torch lamps
57-6529	E10	11.5 x 24	3.5	200	-	Torch lamps
57-6530	E10	11.5 x 24	3.5	200	-	Red
57-6531	E10	11.5 x 24	3.5	200	-	Yellow
57-6532	E10	11.5 x 24	3.5	200	-	Green
57-6533	E10	11.5 x 24	3.5	200	-	Blue
57-6534	E10	11.5 x 24	3.8	70	-	Torch lamps
57-6535	E10	11.5 x 24	3.8	300	-	Torch lamps
57-6526	E10	11.5 x 24	4.5	100	-	Torch lamps
57-6527	E10	11.5 x 24	4.8	300	-	Torch lamps
57-6539	E10	11.5 x 24	6.2	300	-	Bicycle lamps
57-6540	E10	11.5 x 24	8	50	-	Bicycle lamps
57-6541	E10	11.5 x 24	14	200	-	Bicycle lamps
57-6542	E10	11.5 x 24	6	50	0.3	General purpose
57-6543	E10	11.5 x 24	6	330	2	General purpose
57-6544	E10	11.5 x 24	6	500	3	General purpose
57-6545	E10	11.5 x 24	12	250	3	General purpose
57-6546	E10	11.5 x 24	24	50	1.2	General purpose
57-6547	E10	11.5 x 24	24	125	3	General purpose

		MOQ 5 - In Multiples of 5		
Rating	Usage	Order code	5+	25+	50+
1.2V 150mA	Torch	**57-6536**	0.21	0.199	0.189
		MOQ 5			
1.5V 200mA	Torch	**57-6524**	0.232	0.21	0.204
		MOQ 5 - In Multiples of 5			
2.2V 200mA	Torch	**57-6537**	0.207	0.196	0.186
2.5V 100mA	Torch	**57-6538**	0.21	0.199	0.189
		MOQ 5			
2.5V 200mA	Torch	**57-6525**	0.232	0.21	0.204
2.5V 300mA	Torch	**57-6528**	0.232	0.21	0.204
3.5V 200mA	Torch	**57-6529**	0.232	0.21	0.204
		MOQ 5 - In Multiples of 5			
3.5V 200mA	Red torch	**57-6530**	0.354	0.331	0.315
3.5V 200mA	Yel. torch	**57-6531**	0.366	0.343	0.331
3.5V 200mA	Green torch	**57-6532**	0.354	0.331	0.315
3.5V 200mA	Blue torch	**57-6533**	0.378	0.352	
3.8V 70mA	Torch	**57-6534**	0.21	0.199	0.189
3.8V 300mA	Torch	**57-6535**	0.21	0.199	0.189
4.5V 100mA	Torch	**57-6526**	0.232	0.21	0.204
		MOQ 5 - In Multiples of 5			
4.8V 300mA	Torch	**57-6527**	0.21	0.199	0.189
6.2V 300mA	Bicycle	**57-6539**	0.21	0.199	0.189
8V 50mA	Bicycle	**57-6540**	0.212	0.201	
14V 200mA	Bicycle	**57-6541**	0.261	0.239	
6V 0.3W	GP	**57-6542**	0.265	0.243	0.236
6V 2W	GP	**57-6543**	0.265	0.243	0.236
6V 3W	GP	**57-6544**	0.265	0.243	0.236
12V 3W	GP	**57-6545**	0.265	0.243	0.236
24V 1.2W	GP	**57-6546**	0.268	0.245	
24V 3W	GP	**57-6547**	0.268	0.245	

545893

Tru✹Opto

LED Miniature Lamps MES

High brightness LED lamps that come with an MES base. These solid state lamps have a lifespan of up to eight times that of conventional filament lamps, as well as being more robust, making them an extremely cost effective alternative. These lamps can be used in a wide range of applications as a direct replacement for filament lamps and are suitable for both illumination and indication for torches, indicator panels, automotive and backlighting.

- Water clear lens
- AC/DC Operation
- 240mW Power consumption
- Long lifespan
- Low power consumption
- Shockproof
- 30° or 100° Viewing angle

Note: **LED lamps are polarity sensitive, please ensure correct wiring polarity is observed**.

1+ ANODE
2– CATHODE
Unit: mm
Tolerance: ±0.3mm

Technical specification
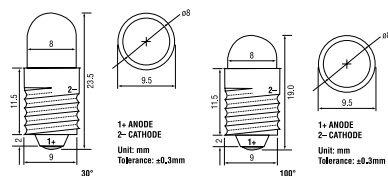
Colour	Voltage AC typ.	Voltage DC max.	Viewing angle	Luminous intensity typ. (mcd)	Chromaticity coordinates/dominant wavelength
White	6V	8V	30°	8400	0.29, 0.28
White	6V	8V	100°	2180	0.29, 0.28
White	12V	16V	30°	8400	0.29, 0.28
White	12V	16V	100°	2180	0.29, 0.28
Warm white	12V	16V	100°	1960	0.5, 0.43

MOQ 5 - In Multiples of 5

Colour	Viewing angle	Order code	5+	10+	25+	100+
6V						
White	30°	**41-0810**	1.04	0.962	0.853	0.786
White	100°	**41-0838**	1.04	0.962	0.853	0.786
12V						
White	30°	**41-0812**	1.04	0.962	0.853	
White	100°	**41-0840**	1.04	0.962	0.853	0.786
Warm white	100°	**41-0842**	1.04	0.962	0.853	0.786

077938

Solar

Tru✹Opto

Solar Module 3V 100mA 60 x 48 x 3mm with 20cm Flying Leads

The **TruOpto 3V solar module** measures only 60 x 48 x 3mm (2.36 x 1.90 x 0.12in) making it ideal for compact outdoor jobs. Made from high efficiency crystalline silicon this module is designed to be durable, with a long working life.

- Supplied with 20cm output leads (red and black)
- Protected to **IP65**

Technical specification

Mftrs. part no.	OPL25A09101
Voltage (V)	3
Current (mA)	100
Power (W)	0.3
Dimension (mm)	60 x 48 x 3
Dimension (in)	2.36 x 1.90 x 0.12
Power tolerance (%)	±3
Temp. Coeff (%/°C)	-0.45

Type	Order code	1+	10+	25+	50+
Solar module 2.5V	**56-0124**	2.71	2.37	2.22	1.97

547652

Tru✹Opto

Solar Cell Modules

These solar cell modules will gather natural or artificial light and produce an output voltage. The solar panels use crystalline silicon solar cells and have output leads soldered in place. The light weight and high efficiency of these modules make them suitable for a range of low voltage power generation applications.

- Small size enables easy series or parallel connection for higher voltage/current output
- Two Pre-wired output leads 300mm X 24AWG black and red
- Resin laminated solar cell
- **IP65** Ingress protection

Technical specification

Order code	55-0010	55-0012	55-0014	55-0016
Voltage (V)	1.5	2.0	2.0	5.0
Current (mA)	250	250	500	230
Power (W)	0.37	0.5	1	1.15
Dimensions (mm)	90 x 50 x 3	90 x 60 x 3	90 x 105 x 3	90 x 125 x 3
Power tolerance (%)	±3	±3	±3	±3
Temp. coefficient (%/°C)	–0.45	–0.45	–0.45	–0.45

Voltage	Power	Order code	1+	5+	10+	25+
1.5V	0.37W	**55-0010**	4.19	3.83	3.55	
2V	0.5W	**55-0012**	5.09	4.96	4.53	4.19
2V	1W	**55-0014**	7.83	7.30	6.87	
5V	1.15W	**55-0016**	7.83	7.30	6.87	6.26

502676

≡RVFM

Solar Cells

Fully encapsulated solar cell modules mounted in black polycarbonate cases.
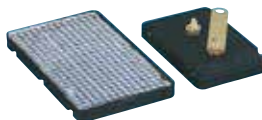
- Output of 0.45V
- Fitted with threaded stud terminals and a copper busbar

Technical specification

			Dimensions (mm)			
Module type	Output current	length	width	height		Order code
G200	200mA	53	36	7.5		**37-0432**
G400	400mA	75	45	7.5		**37-0434**

Voltage	Current	Order code	1+	25+	100+
0.45V	200mA	**37-0432**	2.10	1.68	1.58
0.45V	400mA	**37-0434**	3.16	2.91	2.51

064795

Capacitors

Suntan®

Ceramic Disc Capacitors

General purpose disc capacitors manufactured from high dielectric constant ceramics.

- Linear temperature coefficient
- High stability
- Low loss
- Durez coated
- High temperature wax impregnated
- Available in 2.5mm and 5.0mm pitch

Note: Additional discounts are available for high volume purchases. Please contact us with your requirements.

Technical specification

Order code	Value	Tolerance	Voltage	Temp. char.	Lead spacing	ø max.
08-0040	10pF	5%	50V	NPO	2.5mm	5.5mm
08-0042	15pF	10%	50V	NPO	2.5mm	5.5mm
08-0046	22pF	10%	50V	NPO	2.5mm	5.5mm
08-0050	33pF	10%	50V	SL	2.5mm	5.5mm
08-0054	47pF	10%	50V	SL	2.5mm	5.5mm
08-0058	68pF	10%	50V	SL	2.5mm	6.5mm
08-0140	100pF	10%	50V	SL	2.5mm	7.5mm
08-0150	150pF	10%	50V	SL	2.5mm	8.5mm
08-0160	220pF	10%	50V	SL	2.5mm	10.5mm
08-0170	330pF	10%	50V	Y5P	2.5mm	5.5mm
08-0180	470pF	10%	50V	Y5P	2.5mm	5.5mm
08-0185	560pF	10%	50V	Y5P	2.5mm	5.5mm
08-0200	1nF	10%	50V	Y5P	2.5mm	5.5mm
08-0232	10nF	-20 +80%	50V	Z5V	2.5mm	6.5mm
08-0210	2.2nF	10%	50V	Y5P	5mm	6.5mm
08-0230	10nF	-20 +80%	50V	Z5V	5mm	6.5mm
08-0237	47nF	20%	50V	Y5U	5mm	6.5mm
08-0241	47nF	20%	50V	Y5V	5.08mm	6.5mm
08-0235	100nF	20%	25V	Y5V	5mm	6.5mm

Operating temperature -25°C to +85°C
Insulation resistance ≥10,000 MΩ

MOQ 10 - In Multiples of 10

Type	Order code	10+	100+	1000+	5000+
2.5mm pitch					
10pF	**08-0040**	0.03	0.0149	0.0065	
15pF	**08-0042**	0.014	0.0091	0.0045	0.0029
22pF	**08-0046**	0.0142	0.0093	0.0046	
33pF	**08-0050**	0.0259	0.0134	0.0068	0.0045
47pF	**08-0054**	0.0259	0.0134	0.0068	0.0045
68pF	**08-0058**	0.0128	0.0077	0.004	
100pF	**08-0140**	0.0128	0.0105	0.004	
150pF	**08-0150**	0.0137	0.011	0.0042	0.0038
220pF	**08-0160**	0.0137	0.011	0.0042	0.0038
330pF	**08-0170**	0.0028			
470pF	**08-0180**	0.0163	0.0135	0.0051	
560pF	**08-0185**	0.0023			
1n	**08-0200**	0.0188	0.0118	0.0057	0.0043
10n	**08-0232**	0.0294	0.0106	0.0073	0.0045
5.0mm pitch					
2n2	**08-0210**	0.034	0.0121	0.0093	
10n	**08-0230**	0.0128	0.0098	0.0068	0.0042
47n	**08-0237**	0.033	0.0154	0.0104	0.0089
47n (5.08mm)	**08-0241**	0.034	0.0162	0.0115	0.0094
100n	**08-0235**	0.0264	0.0118	0.0111	0.0073

062494

Forever

Axial 85°C Electrolytic Capacitors

Miniature axial lead electrolytic capacitors manufactured to high technical and quality standards.

- Fully sleeved
- 85°C general purpose
- **Forever RT** series

Technical specification

Tolerance	±20%
Temperature range	–40°C to +85°C
Climatic category	40/085/56 (IEC 688)
Shelf life	Minimum 2 years
Manufactured to spec.	IEC 384-4, DIN 41316

Case code	L	D	Lead diameter (max.)
A	12	6	0.5
B	13	8	0.6
C	17	8	0.6
D	18	10	0.6
E	21	10	0.6
F	21	13	0.6
G	26	13	0.6
H	27	16	0.8
I	33	16	0.8
J	36	16	0.8

Value (µF)	Case	Ripple	Order code	1+	25+	100+	250+
10V							
1000	D	1000mA	**11-0180**	0.488	0.292	0.183	0.143
2200	F	1560mA	**11-0185**	0.814	0.49	0.304	
16V							
100	A	330mA	**11-0015**	0.256	0.155	0.135	0.099
220	C	490mA	**11-0020**	0.357	0.216	0.135	0.099
470	D	740mA	**11-0025**	0.452	0.272	0.168	0.151
2200	G	1750mA	**11-0035**	0.926	0.556	0.349	0.252
4700	I	2220mA	**11-0040**	1.67	1.01	0.63	0.459

25V							
10	A	90mA	**11-0120**	0.208	0.124	0.078	0.068
22	A	160mA	**11-0125**	0.217	0.129	0.082	0.058
47	A	240mA	**11-0130**	0.255	0.153	0.122	0.106
100	B	360mA	**11-0135**	0.289	0.174	0.122	0.106
220	C	540mA	**11-0140**	0.364	0.221	0.137	0.102
470	E	810mA	**11-0145**	0.547	0.33	0.204	0.149
1000	F	1130mA	**11-0150**	0.715	0.43	0.269	
2200	H	1870mA	**11-0155**	1.23	0.742	0.464	0.336
4700	J	2690mA	**11-0160**	2.38	1.43	0.892	
35V							
100	C	400mA	**11-0060**	0.305	0.185	0.122	0.106
220	D	600mA	**11-0065**	0.502	0.303	0.191	0.137
470	F	290mA	**11-0070**	0.599	0.358	0.226	0.163
63V							
1	A	5mA	**11-0105**	0.211	0.126	0.086	0.067
2.2	A	45mA	**11-0110**	0.208	0.124	0.088	0.067
4.7	A	80mA	**11-0115**	0.208	0.124	0.078	0.068
10	A	120mA	**11-0075**	0.211	0.125	0.085	0.067
100	D	450mA	**11-0090**	0.509	0.307	0.193	0.139

062539

Forever
Radial Electrolytic Capacitor Kit 93-Piece

This 93-piece capacitor kit contains a range of micro-miniature radial leaded electrolytic capacitors. The capacitors have a high capacitance per unit volume and are ideal for applications where high density packaging and low profile capacitors are required.

- Each value individually packed
- A total of 12 different values
- 7mm height
- Tolerance ±20%
- Temperature Range -40°C to +85°C

Technical specification

Number	Value	Voltage	Number	Value	Voltage
15x	100µF	16V	5x	22µF	25V
5x	220µF	16V	10x	47µF	25V
5x	470µF	16V	3x	1000µF	25V
3x	1000µF	16V	10x	1µF	63V
2x	2220µF	16V	10x	2.2µF	63V
15x	10µF	25V	10x	4.7µF	63V

Type	Order code	1+	5+
Electrolytic capacitor kit	**13-0220**	7.96	6.90

062537

Forever
85°C Radial Lead Aluminium Electrolytic Capacitor

Miniature radial lead aluminium electrolytic capacitors for mounting directly to PCBs. Manufactured to high technical and quality standards.

- All types are fully sleeved
- 85°C general purpose
- **Forever RB** series

Technical specification

Voltage	Value (µF)	Ripple (mA)	L (mm)	D (mm)	Pitch (mm)	Order code
10V	47	100	11	5	2	**11-0305**
	100	140	11	5	2	**11-0310**
	220	230	11	6	2.5	**11-1400**
	470	-	12	8	2.5	**11-0271**
	1000	-	14	8	3.5	**11-0316**
	2200	1080	20	10	5	**11-0320**
16V	47	100	11	5	2	**11-0325**
	100	-	11	5	2	**11-0246**
	220	290	11	6	2.5	**11-0260**
	220	-	11	6	3.5	**11-0261**
	330	350	11	8	3.5	**11-1404**
	470	460	11	8	3.5	**11-0275**
	1000	820	17	10	5	**11-0290**
	2200	1160	21	13	5	**11-0300**
	4700	1900	26	16	7.5	**11-0750**

Middle column table

25V	10	50	11	5	2	**11-0220**
	22	75	11	5	2	**11-0230**
	47	110	11	5	2	**11-0235**
	100	180	11	6	2.5	**11-0250**
	220	310	11	8	3.5	**11-0265**
	330	-	14	8	3.5	**11-1411**
	470	-	14	8	3.5	**11-0281**
	1000	880	21	10	5	**11-0295**
	2200	1350	26	13	5	**11-0330**
35V	3.3	35	11	5	2	**11-1414**
	22	90	11	5	2	**11-0340**
	47	-	11	6	2	**11-0346**
	100	230	11	8	3.5	**11-0350**
	330	-	16	10	5	**11-1413**
	470	670	17	10	5	**11-0360**
	1000	990	21	13	5	**11-0760**
	2200	1700	26	16	7.5	**11-0765**
	4700	2380	36	18	7.5	**11-1418**
63V	0.47	15	11	5	2	**11-1420**
	1	22	11	5	2	**11-0205**
	2.2	32	11	5	2	**11-0210**
	4.7	47	11	5	2	**11-0215**
	10	60	11	5	2	**11-0225**
	22	100	11	6	2.5	**11-0335**
	33	130	11	6	2.5	**11-1422**
	330	620	21	13	5	**11-1424**
	470	820	26	12	5	**11-0390**
	1000	1360	31	16	7.5	**11-1426**
100V	1	22	11	5	2	**11-1428**
	3.3	39	11	5	2	**11-1432**
	4.7	47	11	5	2	**11-1434**
	10	80	11	6	2.5	**11-1436**
	22	130	11	8	3.5	**11-1438**
	47	230	17	10	5	**11-1442**
	100	380	21	10	5	**11-1444**

		MOQ 5			
Type	Order code	5+	10+	100+	500+
10V					
47µ	**11-0305**	0.038	0.0282	0.0206	0.0169
100µ	**11-0310**	0.037	0.0272	0.0199	0.0163
220µ	**11-1400**	0.073	0.055	0.047	0.04
470µ	**11-0271**	0.068	0.053	0.046	0.041
1000µ	**11-0316**	0.106	0.079	0.057	
2200µ	**11-0320**	0.218	0.163	0.143	0.121
16V					
47µ	**11-0325**	0.037	0.0272	0.0199	0.0163
100µ	**11-0246**	0.036	0.0263	0.0194	0.0158
220µ	**11-0260**	0.057	0.051	0.047	0.042
220µ	**11-0261**	0.068	0.054	0.049	0.04
330µ	**11-1404**	0.073	0.055	0.047	0.04
470µ	**11-0275**	0.073	0.055	0.048	0.04

		MOQ 5 - In Multiples of 5			
1000µ	**11-0290**	0.145	0.109	0.079	0.068
2200µ	**11-0300**	0.303	0.227	0.166	0.137

		Price each			
Type	Order code	1+	10+	100+	500+
4700µ	**11-0750**	0.519	0.389	0.286	0.235

		MOQ 5			
Type	Order code	5+	10+	100+	500+
25V					
10µ	**11-0220**	0.037	0.0277	0.0203	0.0164
22µ	**11-0230**	0.038	0.0282	0.0206	0.0169
47µ	**11-0235**	0.038	0.0282	0.0206	0.0169
100µ	**11-0250**	0.075	0.06	0.05	0.043
220µ	**11-0265**	0.109	0.081	0.067	0.053
330µ	**11-1411**	0.04			

		MOQ 5 - In Multiples of 5			
470µ	**11-0281**	0.135	0.102	0.074	0.068
1000µ	**11-0295**	0.223	0.166	0.122	0.101

		MOQ 5			
2200µ	**11-0330**	0.414	0.311	0.228	0.187

		Price each			
Type	Order code	1+	10+	100+	500+
4700µ	**11-0755**	0.742	0.556	0.408	0.334

		MOQ 5			
Type	Order code	5+	10+	100+	500+
35V					
3µ3	**11-1414**	0.038	0.0282	0.0206	
22µ	**11-0340**	0.038	0.0282	0.0206	
47µ	**11-0346**	0.068	0.054	0.047	0.041
100µ	**11-0350**	0.076	0.055	0.041	0.034
330µ	**11-1413**	0.102	0.076	0.068	

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	10+	100+	500+
470µ	**11-0360**	0.19	0.143	0.122	0.106

		Price each			
Type	Order code	1+	10+	100+	500+
1000µ	**11-0760**	0.334	0.25	0.184	0.152
2200µ	**11-0765**	0.603	0.451	0.332	0.272
4700µ	**11-1418**	1.31	0.99	0.725	

Right column tables

		MOQ 5			
Type	Order code	5+	10+	100+	500+
63V					
0.47µ	**11-1420**	0.038	0.0282	0.0206	0.0169

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	10+	100+	
1µ	**11-0205**	0.048	0.0245	0.0186	

		MOQ 5			
Type	Order code	5+	10+	100+	500+
2µ2	**11-0210**	0.038	0.0282	0.0206	0.0169
4µ7	**11-0215**	0.038	0.0282	0.0206	0.0169
10µ	**11-0225**	0.038	0.0282	0.0206	0.0169
22µ	**11-0335**	0.07	0.054	0.046	0.04
33µ	**11-1422**	0.073	0.055	0.047	0.04
100µ	**11-0256**	0.135	0.102	0.074	0.068
220µ	**11-0385**	0.223	0.166	0.122	0.101

		Price each			
Type	Order code	1+	10+	100+	500+
470µ	**11-0390**	0.444	0.334	0.246	0.20
1000µ	**11-1426**	0.816	0.611	0.449	

		MOQ 5			
Type	Order code	5+	10+	100+	500+
100V					
1µ	**11-1428**	0.038	0.0282	0.0206	0.0169
3µ3	**11-1432**	0.038	0.0282	0.0206	0.0169
4µ7	**11-1434**	0.038	0.0282	0.0206	0.0169
10µ	**11-1436**	0.073	0.055	0.047	0.04
22µ	**11-1438**	0.114	0.085	0.063	0.05
47µ	**11-1442**	0.19	0.143	0.105	
100µ	**11-1444**	0.227	0.169	0.124	

062556

Forever
Forever Microminiature 85°C Electrolytic Capacitors

These microminiature radial electrolytic capacitors offer high capacitance per unit volume.

- 7mm height
- Tolerance ±20%
- Temperature Range -40°C to +85°C

Technical specification

Voltage	Value (µF)	Ripple (mA)	ø (mm)	L (mm)	Pitch (mm)	Order code
10V	22	36	4	7	1.5	**11-0810**
	47	-	-	7	-	**11-0816**
	100	100	6	7	2.5	**11-0820**
	220	125	6	7	2.5	**11-0870**
16V	10	26	4	7	1.5	**11-0825**
	22	44	4	7	1.5	**11-0830**
	22	-	-	7	1.5	**11-1509**
	47	74	5	7	2	**11-0835**
	100	90	6	7	2.5	**11-0875**
35V	10	36	5	7	2	**11-0840**
	22	-	-	7	-	**11-0846**
50V	0.47	7	4	7	1.5	**11-0850**
	1	11	4	7	1.5	**11-0855**
	2.2	16	4	7	1.5	**11-0860**
	4.7	20	4	7	1.5	**11-0865**

		MOQ 5			
Value (µF)	Order code	5+	50+	100+	500+
10V					
22	**11-0810**	0.05	0.038	0.034	0.0257
47	**11-0816**	0.071	0.055	0.047	0.04
100	**11-0820**	0.071	0.055	0.047	0.04
220	**11-0870**	0.071	0.055	0.047	0.04
16V					
10	**11-0825**	0.039	0.0289	0.0252	0.0198
22	**11-0830**	0.043	0.032	0.0275	
22	**11-1509**	0.0179			
47	**11-0835**	0.071	0.055	0.047	0.04
100	**11-0875**	0.071	0.055	0.047	0.04
35V					
10	**11-0840**	0.071	0.055	0.047	0.04
22	**11-0846**	0.071	0.055	0.047	0.04
50V					
0.47	**11-0850**	0.057	0.035	0.0252	
1	**11-0855**	0.057	0.035	0.0252	0.0215
2.2	**11-0860**	0.043	0.032	0.0275	0.0215
4.7	**11-0865**	0.057	0.035	0.0252	0.0215

062531

KEMET
The Capacitance Company
CHARGED®

R82 Series Miniature Metallised Polyester Capacitors

A range of miniature metallised polyester capacitors from the Kemet R82 series.

The R82 series are encapsulated in thermosetting resin in a UL 94V-0 rated case and have radial leads of 5mm pitch. These capacitors are ideal for inline use in applications such as blocking, coupling, decoupling, timing and oscillator circuits.

- Width 7.2mm - ideal for high packing density
- Working voltage 100V
- Self-healing
- Formerly Arcotronics R82 series

Note: Not for new designs. Contact **Rapid** for details and samples of the replacement series.

Technical specification

Tolerance	5% / 10%
Dielectric	Polyester film
Pitch	5mm
Case size	1nF - 100nF	7.2 x 6.5 x 2.5mm
	150nF - 220nF	7.2 x 7.5 x 3.5mm
	330nF - 470nF	7.2 x 9.5 x 4.5mm
	680nF	7.2 x 10 x 5mm
	1µF	7.2 x 11 x 6mm
Case material	Plastic, resin filled UL 94-V0
Operating temperature	–55°C to +105°C

MOQ 5 - In Multiples of 5

Value	Tolerance	Order code	5+	100+	1000+	5000+
63V						
100nF	10%	10-3260	0.153	0.099	0.076	0.072
150nF	10%	10-3262	0.152	0.104	0.088	
220nF	10%	10-3264	0.177	0.118	0.095	0.079
220nF	5%	10-5828	0.086	0.071	0.057	
330nF	10%	10-3266	0.212	0.158	0.137	
330nF	5%	10-5830	0.148	0.116	0.103	
470nF	10%	10-3268	0.224	0.105	0.075	
470nF	5%	10-5833	0.144	0.12	0.108	
680nF	10%	10-3270	0.212	0.163	0.122	
1uF	10%	10-3272	0.18	0.149	0.118	
100V						
1nF	10%	10-3240	0.123	0.071	0.062	
1nF	5%	10-5810	0.073	0.046	0.039	
1n5	10%	10-3242	0.076	0.069	0.054	
2n2	10%	10-3244	0.061	0.04	0.033	
3n3	10%	10-3246	0.141	0.103	0.095	
3n3	5%	10-5816	0.078	0.072	0.066	
4n7	10%	10-3248	0.065	0.044	0.035	
10nF	10%	10-3250	0.061	0.039	0.032	0.0298
15nF	10%	10-3252	0.141	0.103	0.091	
22nF	10%	10-3254	0.143	0.09	0.072	
22nF	5%	10-5822	0.072	0.047	0.04	
33nF	10%	10-3256	0.22	0.185	0.172	
47nF	10%	10-3258	0.142	0.089	0.069	
47nF	5%	10-5824	0.076	0.069	0.065	
68nF	10%	63-1159	0.144	0.082	0.072	
100nF	5%	10-5826	0.078	0.072	0.066	

061744

SAM WHA

High Capacity Condenser Capacitors

High-capacity condensers, which can serve as a replacement or as a supplement for battery systems.

Technical specification

Order Code	Capacitance Tolerance (%)	Dimensions (ø x L) (mm)	Capacitance (F)	Grid pitch (mm)	Nominal Voltage (V DC)	Temperature range (°C)
50-7480	±20	8 x 20	3	3.5	2.5	-25 to +70
50-7482	±20	10 x 30	10	5	2.5	-25 to +70
50-7483	±20	16 x 25	25	7.5	2.5	-25 to +70
50-7487	±20	10 x 30	10	5	2.7	-40 to +60
50-7491	±20	35 x 60	400	10	2.5	-25 to +70
50-7492	±20	22 x 45	100	10	2.7	-40 to +60
50-7493	±20	30 x 45	200	10	2.7	-40 to +60
50-7494	±20	35 x 50	300	10	2.7	-40 to +60
50-7495	±20	35 x 60	400	10	2.7	-40 to +60
50-7496	±20	63.5 x 130	2700	28.6	2.5	-25 to +60
50-7497	±20	51 x 100	1400	22	2.5	-25 to +60
50-7498	±20	63.5 x 100	2700	28.6	2.5	-25 to +60

Value (F)	WV (V)	Order code	1+	50+
Radial				
3	2.5	**50-7480**	0.802	0.754
10	2.5	**50-7482**	1.66	1.58
25	2.5	**50-7483**	1.97	
10	2.7	**50-7487**	1.73	
Snap-in				
400	2.5	**50-7491**	15.58	14.80
100	2.7	**50-7492**	8.51	8.08
200	2.7	**50-7493**	9.93	9.42
Screw terminal				
2700	2.5	**50-7496**	162.31	154.11
1400	2.5	**50-7497**	91.73	87.10

519710

Resistors & Potentiometers

TruΩhm

CR25 0.25W Carbon Film Resistors Boxes of 1000

Miniature high stability 0.25W carbon film resistors for industrial and consumer electronic equipment. A zero-Ohm resistor is also available which is a useful alternative to jumper or wire links on PCBs.

- 5% tolerance
- 0.25W rated
- Supplied in **boxes of 1000**

Technical specification

Order code	Mftrs Part No.	Value (Ω)	Order code	Mftrs Part No.	Value (Ω)
62-0312	CR-025 1R	1R	**62-0385**	CR-025 3K3	3K3
62-0297	CR-025 1R2	1R2	**62-0387**	CR-025 3K9	3K9
62-0298	CR-025 1R5	1R5	**62-0389**	CR-025 4K7	4K7
62-0299	CR-025 1R8	1R8	**62-0391**	CR-025 5K6	5K6
62-0300	CR-025 2R2	2R2	**62-0393**	CR-025 6K8	6K8
62-0301	CR-025 2R7	2R7	**62-0395**	CR-025 8K2	8K2
62-0302	CR-025 3R3	3R3	**62-0397**	CR-025 10K	10K
62-0311	CR-025 3R9	3R9	**62-0399**	CR-025 12K	12K
62-0323	CR-025 4R7	4R7	**62-0401**	CR-025 15K	15K
62-0315	CR-025 5R6	5R6	**62-0403**	CR-025 18K	18K
62-0327	CR-025 6R8	6R8	**62-0405**	CR-025 22K	22K
62-0318	CR-025 8R2	8R2	**62-0407**	CR-025 27K	27K
62-0329	CR-025 10R	10R	**62-0409**	CR-025 33K	33K
62-0321	CR-025 12R	12R	**62-0411**	CR-025 39K	39K
62-0331	CR-025 15R	15R	**62-0413**	CR-025 47K	47K
62-0325	CR-025 18R	18R	**62-0415**	CR-025 56K	56K
62-0333	CR-025 22R	22R	**62-0417**	CR-025 68K	68K
62-0335	CR-025 27R	27R	**62-0419**	CR-025 82K	82K
62-0337	CR-025 33R	33R	**62-0421**	CR-025 100K	100K
62-0339	CR-025 39R	39R	**62-0423**	CR-025 120K	120K
62-0341	CR-025 47R	47R	**62-0425**	CR-025 150K	150K
62-0343	CR-025 56R	56R	**62-0427**	CR-025 180K	180K
62-0345	CR-025 68R	68R	**62-0429**	CR-025 220K	220K
62-0294	CR-025 75R	75R	**62-0431**	CR-025 270K	270K
62-0347	CR-025 82R	82R	**62-0433**	CR-025 330K	330K
62-0349	CR-025 100R	100R	**62-0435**	CR-025 390K	390K
62-0351	CR-025 120R	120R	**62-0437**	CR-025 470K	470K
62-0353	CR-025 150R	150R	**62-0439**	CR-025 560K	560K
62-0355	CR-025 180R	180R	**62-0441**	CR-025 680K	680K
62-0357	CR-025 220R	220R	**62-0443**	CR-025 820K	820K
62-0359	CR-025 270R	270R	**62-0445**	CR-025 1M	1M
62-0361	CR-025 330R	330R	**62-0447**	CR-025 1M2	1M2
62-0363	CR-025 390R	390R	**62-0449**	CR-025 1M5	1M5
62-0365	CR-025 470R	470R	**62-0451**	CR-025 1M8	1M8
62-0367	CR-025 560R	560R	**62-0453**	CR-025 2M2	2M2
62-0369	CR-025 680R	680R	**62-0455**	CR-025 2M7	2M7
62-0371	CR-025 820R	820R	**62-0457**	CR-025 3M3	3M3
62-0373	CR-025 1K	1K	**62-0459**	CR-025 3M9	3M9
62-0375	CR-025 1K2	1K2	**62-0461**	CR-025 4M7	4M7
62-0377	CR-025 1K5	1K5	**62-0463**	CR-025 5M6	5M6
62-0379	CR-025 1K8	1K8	**62-0465**	CR-025 6M8	6M8
62-0381	CR-025 2K2	2K2	**62-0467**	CR-025 8M2	8M2
62-0383	CR-025 2K7	2K7	**62-0469**	CR-025 10M	10M

		Price each	
Value (Ω)	Order code	1+	5+
1R	**62-0312**	7.48	5.91
1R2	**62-0297**	7.48	5.91
1R5	**62-0298**	7.25	5.72
1R8	**62-0299**	2.22	
2R2	**62-0300**	7.48	5.91
2R7	**62-0301**	7.25	
3R3	**62-0302**	7.48	5.91
3R9	**62-0311**	7.31	5.79
4R7	**62-0323**	7.48	5.91
5R6	**62-0315**	1.73	
6R8	**62-0327**	2.18	
8R2	**62-0318**	2.11	
10R	**62-0329**	7.48	5.91
12R	**62-0321**	7.48	
15R	**62-0331**	7.48	5.91
18R	**62-0325**	7.48	5.91
22R	**62-0333**	7.48	5.91
27R	**62-0335**	7.48	5.91
33R	**62-0337**	7.48	5.91
39R	**62-0339**	7.48	5.91
47R	**62-0341**	7.48	5.91
56R	**62-0343**	7.48	5.91
68R	**62-0345**	7.48	5.91
75R	**62-0294**	7.31	
82R	**62-0347**	7.48	
100R	**62-0349**	7.48	5.91
120R	**62-0351**	7.48	
150R	**62-0353**	7.48	5.91
180R	**62-0355**	7.48	
220R	**62-0357**	7.48	5.91
270R	**62-0359**	7.48	5.91
330R	**62-0361**	7.48	5.91
390R	**62-0363**	7.48	5.91
470R	**62-0365**	7.48	5.91
560R	**62-0367**	7.48	5.91
680R	**62-0369**	7.48	5.91
820R	**62-0371**	7.48	5.91
1K	**62-0373**	7.48	5.91
1K2	**62-0375**	7.48	5.91
1K5	**62-0377**	7.48	5.91
1K8	**62-0379**	7.48	5.91
2K2	**62-0381**	7.48	5.91
2K7	**62-0383**	7.48	5.91
3K3	**62-0385**	7.48	5.91
3K9	**62-0387**	7.48	5.91
4K7	**62-0389**	7.48	5.91
5K6	**62-0391**	7.48	5.91
6K8	**62-0393**	7.48	5.91
8K2	**62-0395**	7.48	
10K	**62-0397**	7.48	5.91
12K	**62-0399**	7.48	
15K	**62-0401**	7.48	5.91
18K	**62-0403**	7.48	
22K	**62-0405**	7.48	5.91
27K	**62-0407**	7.48	5.91
33K	**62-0409**	7.48	5.91
39K	**62-0411**	7.48	5.91
47K	**62-0413**	7.48	5.91
56K	**62-0415**	7.48	
68K	**62-0417**	7.48	5.91
82K	**62-0419**	7.48	
100K	**62-0421**	7.48	5.91
120K	**62-0423**	7.48	5.91
150K	**62-0425**	7.48	5.91
180K	**62-0427**	7.48	5.91
220K	**62-0429**	7.48	5.91
270K	**62-0431**	7.48	
330K	**62-0433**	7.48	5.91

MOQ 20		
Value (Ω)	Order code	20+
390K	**62-0435**	4.70

		Price each	
Value (Ω)	Order code	1+	5+
470K	**62-0437**	7.48	5.91
560K	**62-0439**	7.48	
680K	**62-0441**	7.48	5.91
820K	**62-0443**	2.08	
1M	**62-0445**	7.48	5.91
1M2	**62-0447**	7.48	5.91

Price each			
Value (Ω)	Order code	1+	5+
1M5	62-0449	7.48	5.91
1M8	62-0451	7.48	
2M2	62-0453	7.48	5.91
2M7	62-0455	7.25	
3M3	62-0457	7.23	
3M9	62-0459	7.48	5.91
4M7	62-0461	7.48	
5M6	62-0463	2.16	
6M8	62-0465	7.23	
8M2	62-0467	7.25	
10M	62-0469	7.48	5.91

561943

TruΩhm

CR25 0.25W Carbon Film Resistors Packs of 100

Miniature high stability 0.25w carbon film resistors for industrial and consumer electronic equipment. A zero-Ohm resistor is also available which is a useful alternative to jumper or wire links on PCBs.

- 5% tolerance
- 0.25W rated
- Supplied in **packs of 100**

Technical specification

Power rating		0.25W
Resistance range		0Ω – 10MΩ
Tolerance		±5%
Temperature coefficient		±400 ppm/°C
Operating voltage max.		300V
Temperature range		−25°C to +70°C
Dimensions	body	6.5 x 2.3mm
	leads	30 x 0.6mm

Price per pack of 100		
Value (Ω)	Order code	1+
0R-82R		
1R	62-0303	0.78
1R2	62-0304	0.78
1R5	62-0305	0.78
1R8	62-0306	0.78
2R2	62-0307	0.78
2R7	62-0308	0.78
3R3	62-0309	0.78
3R9	62-0310	0.78
4R7	62-0320	0.78
5R6	62-0313	0.78
6R8	62-0324	0.78
8R2	62-0316	0.78
10R	62-0326	0.78
12R	62-0319	0.78
15R	62-0328	0.78
18R	62-0322	0.78
22R	62-0330	0.78
27R	62-0332	0.78
33R	62-0334	0.78
39R	62-0336	0.78
47R	62-0338	0.78
56R	62-0340	0.78
68R	62-0342	0.78
75R	62-0295	0.78
82R	62-0344	0.78
100R-820R		
100R	62-0346	0.78
120R	62-0348	0.78
150R	62-0350	0.78
180R	62-0352	0.78
220R	62-0354	0.78
270R	62-0356	0.78
330R	62-0358	0.78
390R	62-0360	0.78
470R	62-0362	0.78
560R	62-0364	0.78
680R	62-0366	0.78
820R	62-0368	0.78
1K-8K2		
1K	62-0370	0.78
1K2	62-0372	0.78
1K5	62-0374	0.78

Price per pack of 100		
Value (Ω)	Order code	1+
1K8	62-0376	0.78
2K2	62-0378	0.78
2K7	62-0380	0.78
3K3	62-0382	0.78
3K9	62-0384	0.78
4K7	62-0386	0.78
5K6	62-0388	0.78
6K8	62-0390	0.78
8K2	62-0392	0.78
10K-82K		
10K	62-0394	0.78
12K	62-0396	0.78
15K	62-0398	0.78
18K	62-0400	0.78
22K	62-0402	0.78
27K	62-0404	0.78
33K	62-0406	0.78
39K	62-0408	0.78
47K	62-0410	0.78
56K	62-0412	0.78
68K	62-0414	0.78
82K	62-0416	0.78
100K-820K		
100K	62-0418	0.78
120K	62-0420	0.78
150K	62-0422	0.78
180K	62-0424	0.78
220K	62-0426	0.78
270K	62-0428	0.78
330K	62-0430	0.78
390K	62-0432	0.78
470K	62-0434	0.78
560K	62-0436	0.78
680K	62-0438	0.78
820K	62-0440	0.78
1M-10M		
1M	62-0442	0.78
1M2	62-0444	0.78
1M5	62-0446	0.78
1M8	62-0448	0.78
2M2	62-0450	0.78
2M7	62-0452	0.78
3M3	62-0454	0.78
3M9	62-0456	0.78
4M7	62-0458	0.78
5M6	62-0460	0.78
6M8	62-0462	0.78
10M	62-0466	0.78

065193

TruΩhm

CR50 0.5W Carbon Film Resistors Box of 1000

Miniature high stability 0.5W carbon film resistors for industrial and consumer electronic equipment.

- 5% tolerance
- 0.5W rated
- Supplied in **boxes of 1000**

Technical specification

Power rating @ 70°C		0.5W	
Resistance range		4.7Ω to 8.2MΩ	
Tolerance		±5%	
Temperature coefficient		10Ω below ±200ppm/°C	56KΩ below ±300ppm/°C
		68K-470KΩ −500ppm/°C	560K-1MΩ −700ppm°C
		1M2Ω up −1000ppm°C	
Operating voltage max.		350V	
Temperature range		−25°C to +70°C	
Dimensions	body	8.8 x 2.8m	
	leads	27 x 0.6mm	

Price each			
Value (0)	Order code	1+	5+
4R7	62-0513	6.54	5.53
5R6	62-0501	7.72	
10R	62-0521	7.72	
Value (0)	Order code	1+	10+
15R	62-0525	6.77	5.65
22R	62-0527	7.72	6.43

Price each			
Value (0)	Order code	1+	10+
33R	62-0529	5.83	
47R	62-0531	7.72	
MOQ 10			
Value (0)	Order code	10+	
56R	62-0517	5.14	
MOQ 5			
Value (0)	Order code	5+	
68R	62-0535	4.86	
Price each			
Value (0)	Order code	1+	10+
82R	62-0519	6.34	5.28
100R	62-0537	7.72	6.43
120R	62-0533	7.72	
150R	62-0541	3.82	
180R	62-0543	7.72	
220R	62-0545	7.72	6.43
270R	62-0547	7.72	6.43
330R	62-0549	7.72	
390R	62-0539	7.72	
470R	62-0551	7.72	
560R	62-0553	7.72	
680R	62-0555	7.72	
820R	62-0557	8.12	6.77
1K	62-0559	7.72	6.43
1K2	62-0561	7.72	
MOQ 10			
Value (0)	Order code	10+	
1K5	62-0563	3.85	
Price each			
Value (0)	Order code	1+	10+
1K8	62-0565	6.54	5.44
2K2	62-0567	7.72	6.43
2K7	62-0569	3.38	
3K3	62-0571	7.72	
3K9	62-0573	3.60	
4K7	62-0575	7.72	
5K6	62-0577	7.36	
6K8	62-0579	7.72	
8K2	62-0581	7.72	
10K	62-0583	7.72	
MOQ 10			
Value (0)	Order code	10+	
12K	62-0585	3.83	
Price each			
Value (0)	Order code	1+	10+
15K	62-0587	3.34	
18K	62-0589	6.49	
22K	62-0591	7.72	
27K	62-0593	7.72	
33K	62-0595	7.72	
39K	62-0597	3.98	
47K	62-0599	7.72	
56K	62-0601	7.36	
68K	62-0603	7.72	6.43
82K	62-0605	3.38	
100K	62-0607	7.72	
120K	62-0609	3.98	
150K	62-0611	7.72	
220K	62-0615	3.34	
270K	62-0617	3.84	
330K	62-0619	8.22	6.83
MOQ 10			
Value (0)	Order code	10+	
390K	62-0621	5.62	
Price each			
Value (0)	Order code	1+	10+
430K	62-0492	7.72	6.43
470K	62-0623	3.30	
560K	62-0625	3.98	
680K	62-0627	8.22	6.83
820K	62-0629	3.66	
1M	62-0631	7.72	
MOQ 10			
Value (0)	Order code	10+	
1M2	62-0633	6.70	
Price each			
Value (0)	Order code	1+	
2M2	62-0639	3.83	
4M7	62-0647	3.53	

561944

Tru**Ω**hm

CR25 Carbon Film Resistor Kit

CR25 TruOhm CR25 series carbon film resistor kit containing 1000 pieces supplied in 8 packs containing 0.25W 5% Carbon Film Resistors.

These range from 4.7R to 10M, equalling a total of 63 different values throughout the resistor range provided.

- Values ranging from 4.7Ω through to 10MΩ
- A total of 63 different values
- Supplied in **8 packs**

See www.rapidonline.com for suitable storage cabinets.

Technical specification

10 x 4R7	10 x 150R	15 x 1K2	30 x 10K	15 x 68K	25 x 470K
10 x 10R	15 x 180R	15 x 1K5	15 x 12K	10 x 82K	10 x 560K
10 x 15R	20 x 220R	10 x 1K8	15 x 15K	30 x 100K	10 x 680K
10 x 22R	20 x 270R	25 x 2K2	15 x 18K	20 x 120K	5 x 820K
10 x 33R	20 x 330R	20 x 2K7	20 x 22K	15 x 150K	20 x 1M
20 x 47R	10 x 390R	20 x 3K3	15 x 27K	15 x 180K	10 x 2M2
10 x 56R	30 x 470R	15 x 3K9	20 x 33K	20 x 220K	5 x 3M3
10 x 68R	20 x 560R	25 x 4K7	10 x 39K	15 x 270K	10 x 4M7
10 x 82R	20 x 680R	20 x 5K6	30 x 47K	15 x 330K	5 x 6M8
20 x 100R	10 x 820R	15 x 6K8	20 x 56K	10 x 390K	20 x 10M
10 x 120R	30 x 1K	10 x 8K2			

Type	Order code	1+	5+
CR25 0.25W Resistor kit	**13-0200**	17.03	14.33

028374

Tru**Ω**hm

CR50 Carbon Film Resistor Kit

A pack containing a total of 1000 0.5W 5% carbon film resistors.

- A total of 58 different values

See www.rapidonline.com for suitable storage cabinets.

Technical specification

10 x 4R7	10 x 120R	10 x 820R	20 x 5K6	10 x 39K	15 x 330K
15 x 10R	10 x 150R	30 x 1K	15 x 6K8	30 x 47K	10 x 390K
10 x 15R	10 x 180R	15 x 1K2	10 x 8K2	20 x 56K	25 x 470K
10 x 22R	20 x 220R	15 x 1K5	40 x 10K	15 x 68K	10 x 560K
10 x 33R	20 x 270R	10 x 1K8	15 x 12K	10 x 82K	10 x 680K
20 x 47R	20 x 330R	25 x 2K2	15 x 15K	40 x 100K	25 x 1M
10 x 56R	10 x 390R	20 x 2K7	15 x 18K	20 x 120K	10 x 2M2
10 x 68R	30 x 470R	20 x 3K3	20 x 22K	15 x 150K	15 x 4M7
10 x 82R	20 x 560R	15 x 3K9	15 x 27K	20 x 220K	
20 x 100R	20 x 680R	30 x 4K7	20 x 33K	15 x 270K	

Type	Order code	1+	5+
CR50 0.5W Resistor kit	**13-0260**	13.22	11.07

065195

ARCOL

25W 5% Arcol Power Resistor (Aluminium Clad) HS Series

25W Aluminium clad resistors designed for applications requiring high power dissipation in a limited space. These resistors are designed for direct heatsink mounting using thermal compound to achieve maximum performance. To find out more about our range of Arcol resistors, please visit our Arcol brand page at www.rapidonline.com.

- Resistance tolerance 5%
- High power to volume
- Wound to maximise high pulse capacity
- Temperature coefficient =1k 100ppm/°C, >1k 25ppm/°C
- Solder terminations
- Wide range of resistances
- Manufactured in line with the requirements of **IEC 115** and **MIL-18546**

Technical specification

Power rating @25°C	25W
Max AC working voltage	550V
Dimensions (body) L x H x D (mm)	27.3 x 14.6 x 14
Fixing centres (mm)	18.3 x 19.8
Fixing holes	x2
Standard heatsink area (cm²)	535

		Price each		
Value	Order code	1+	10+	25+	50+
0R1	62-8100	1.35	1.20	1.06	
0R22	**62-8102**	1.50	1.25	1.11	1.08
0R33	**62-8103**	1.29	1.13	1.01	
0R47	**62-8104**	1.50	1.20	1.07	
1R	**62-8106**	2.06	1.85	1.62	1.52
2R2	**62-8108**	1.93	1.73	1.52	1.44
3R3	**62-8109**	2.17	1.87	1.59	
4R7	**62-8110**	1.86	1.59	1.36	
6R8	**62-8111**	1.93	1.73	1.52	
10R	**62-8112**	1.78	1.58	1.42	1.34
15R	**62-8430**	1.82	1.57	1.36	1.29
22R	**62-8114**	1.86	1.59	1.36	1.29
33R	**62-8116**	1.92	1.65	1.37	1.29
47R	**62-8118**	2.13	1.84	1.57	1.47
68R	**62-8120**	1.82	1.61	1.44	
75R	**62-8435**	1.30	1.16	1.03	
100R	**62-8122**	1.12	1.00	0.892	0.843
120R	**62-8440**	2.38	2.04	1.69	
150R	**62-8445**	2.16	1.91	1.71	1.62
220R	**62-8124**	2.06	1.85	1.62	1.52
270R	**62-8450**	2.45	2.09	1.75	

	MOQ 100	
Value	Order code	200+
330R	**62-8455**	1.50

		Price each		
Value	Order code	1+	10+	25+	50+
470R	**62-8126**	2.00	1.77	1.58	1.50
560R	**62-8460**	2.93	2.55	2.10	
680R	**62-8465**	1.90	1.64	1.40	1.29
1K	**62-8128**	2.00	1.73	1.50	1.43
2K2	**62-8400**	1.78	1.61	1.45	

	MOQ 100 - In Multiples of 100	
Value	Order code	200+
3K3	**62-8405**	1.48

		Price each	
Value	Order code	1+	10+	25+
4K7	**62-8130**	2.43	2.13	1.81

	MOQ 200	
Value	Order code	200+
5K6	**62-8410**	1.22

		Price each		
Value	Order code	1+	10+	25+	50+
10K	**62-8415**	2.42	2.17	1.91	1.71
15K	**62-8420**	1.92	1.66	1.37	1.29
25K	**62-8425**	0.656			

517872

Tru**Ω**hm

W Axial Ceramic Resistors

Axial ceramic 7W power resistors.

- Heat and flame resistant
- 7W power rating

Technical specification

Dimensions	35 x 10 x 9mm
Power rating at 70°C	7W
Resistance tolerance	5%
Temperature coefficient	±300ppm/°C
Temperature range	−55°C to +155°C
Max. working voltage	500V

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	500+
R47	**62-8250**	0.233	0.196	0.17	
1R	**62-8252**	0.233	0.196	0.17	
4R7	**62-8254**	0.21	0.149	0.126	
10R	**62-8256**	0.23	0.163	0.138	
22R	**62-8258**	0.21	0.149	0.126	
33R	**62-8260**	0.239	0.179	0.139	0.127
47R	**62-8262**	0.222	0.167	0.154	0.139
100R	**62-8264**	0.256	0.215	0.187	0.132
1K	**62-8268**	0.218	0.17	0.153	
4K7	**62-8270**	0.218	0.17	0.153	
10K	**62-8272**	0.21	0.149	0.126	
22K	**62-8274**	0.218	0.17	0.153	

066480

Tru**Ω**hm

KNP Series 3W Wirewound Resistors 5%

Wirewound resistors wound on a ceramic former with flame retardant silicone resin coating that offers high resistance stability, excellent heat dissipation and low noise.

- 5% tolerance
- 3W rated (2.5W for **62-0236**)
- Maximum working voltage 300V
- **TruOhm KNP** series

Technical specification

Power rating @ 70°C		3W (2.5W for 62-0236) (derate to zero @ 275°C)
Working voltage max.		300V
Resistance tolerance		5%
Max. temp coefficient		±300ppm/°C
Temperature range		−40°C to +200°C
Dimensions:	body	15.0(L) x 5.0(D)mm
	leads	35(L) x 0.8(D)mm

		MOQ 5 - In Multiples of 5			
Value (Ω)	Order code	5+	100+	500+	1000+
0R1	**62-0210**	0.172	0.135	0.082	
0R12	**62-1350**	0.171	0.134	0.081	
0R15	**62-0266**	0.172	0.135	0.082	0.075
0R18	**62-0267**	0.172	0.135	0.082	
0R22	**62-0215**	0.172	0.135	0.082	
0R33	**62-0220**	0.172	0.135	0.082	
0R47	**62-0225**	0.172	0.135	0.082	0.075
0R56	**62-0268**	0.172	0.135	0.082	
0R68	**62-1353**	0.171	0.134	0.081	
0R82	**62-1354**	0.171	0.134	0.081	
1R	**62-0230**	0.172	0.135	0.082	
1R2	**62-1355**	0.171	0.134	0.081	
1R5	**62-0270**	0.172	0.135	0.082	
1R8	**62-1356**	0.171	0.134	0.081	
2R	**62-0271**	0.172	0.135	0.082	
2R2	**62-0235**	0.172	0.135	0.082	0.075
2R7	**62-1357**	0.171	0.134	0.081	
3R3	**62-0272**	0.172	0.135	0.082	
3R9	**62-1358**	0.171	0.134	0.081	
4R7	**62-0240**	0.172	0.135	0.082	0.075
5R6	**62-1359**	0.171	0.134	0.081	
6R8	**62-0275**	0.172	0.135	0.082	
8R2	**62-1360**	0.171	0.134	0.081	
10R	**62-0245**	0.172	0.135	0.082	
12R	**62-1361**	0.171	0.134	0.081	
15R	**62-1362**	0.171	0.134	0.081	
18R	**62-1363**	0.171	0.134	0.081	

≡**Rapid**
e d u c a t i o n

We bring STEM to life

		MOQ 5 - In Multiples of 5			
Value (Ω)	Order code	5+	100+	500+	1000+
22R	62-0250	0.172	0.135	0.082	
27R	62-1364	0.171	0.134	0.081	
33R	62-1365	0.171	0.134	0.081	
39R	62-1366	0.171	0.134	0.081	
47R	62-0255	0.172	0.135	0.082	
56R	62-1367	0.024			
68R	62-1368	0.171	0.134	0.081	
82R	62-1369	0.171	0.134	0.081	
100R	62-0260	0.172	0.135	0.082	
120R	62-1370	0.171	0.134	0.081	
150R	62-0265	0.173	0.138	0.085	
180R	62-1371	0.171	0.134	0.081	
220R	62-1372	0.171	0.134	0.081	
270R	62-1373	0.171	0.134	0.081	
330R	62-1374	0.171	0.134	0.081	
470R	62-1376	0.171	0.134	0.081	
560R	62-1377	0.031			
680R	62-1378	0.172	0.134	0.081	
820R	62-1379	0.172	0.134	0.081	
1K	62-1380	0.172	0.134	0.081	
1K2	62-1381	0.172	0.134	0.081	
1K5	62-1382	0.034			
2K2	62-1384	0.034			

029577

ALPHA

16mm Commercial Potentiometers 20% Metal Case PCB Mounting

A range of ø16mm carbon track single potentiometers suitable for PCB mounting in commercial applications. Offered in a range of popular values with 20% tolerance.

- Choice of Linear or Log taper
- Metal case
- Supplied with serrated 6mm diameter shaft
- Bush mount
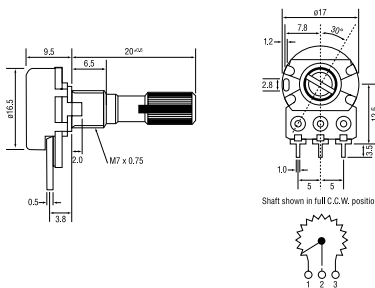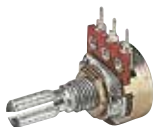
Technical specification

Dimensions	17 x 16.5mm
Pitch	5mm
Tolerance	20%
Power rating	0.125W linear, 0.06W log.
Maximum voltage	150V
Electrical rotation	300° ±5°
Rotation torque	20-200gm/cm
Temperature range	−25°C to +70°C

Value (Ω)	Taper	Order code	1+	50+	250+
470R	Lin	65-0700	0.907	0.68	0.567
1K	Lin	65-0705	0.907	0.68	0.567
4K7	Lin	65-0710	0.907	0.68	0.567
10K	Lin	65-0715	0.907	0.68	0.567
22K	Lin	65-0720	0.907	0.68	0.567
47K	Lin	65-0725	0.907	0.68	0.567
100K	Lin	65-0730	0.907	0.68	0.567
220K	Lin	65-0735	0.907	0.68	0.567
470K	Lin	65-0740	0.907	0.68	0.567
1M	Lin	65-0745	0.907	0.68	0.567
4K7	Log	65-0810	0.907	0.68	0.567
10K	Log	65-0811	0.907	0.68	0.567
22K	Log	65-0820	0.907	0.68	0.567
47K	Log	65-0812	0.907	0.68	0.567
100K	Log	65-0830	0.907	0.68	0.567
470K	Log	65-0813	0.907	0.68	0.567
1M	Log	65-0845	0.907	0.68	0.567

065222

ALPHA

EXTENDED RANGE

24mm Commercial Potentiometers 20% Metal Case

A range of ø24mm carbon track single potentiometers suitable for panel mounting in commercial applications. Offered in a range of popular values with 20% tolerance.

- Choice of Linear or Log taper
- Metal case
- Supplied with 6mm shaft
- Shaft length (including bush) 50mm
- Solder tag termination

Technical specification

Dimensions	ø 24mm
Tolerance	20%
Power rating	0.5W linear, 0.25W log.
Maximum voltage	125V AC
Electrical rotation	300° ±5°
Rotation torque	20 to 200gm/cm
Temperature range	−25°C to +70°C

Value	Taper	Order code	1+	50+	250+
470Ω	Lin	65-0500	0.839	0.669	0.60
1K	Lin	65-0505	0.839	0.669	0.60
4K7	Lin	65-0510	0.839	0.669	0.60
10K	Lin	65-0515	0.839	0.669	0.60
22K	Lin	65-0520	0.839	0.669	0.60
4K7	Lin	65-0525	0.839	0.669	0.60
100K	Lin	65-0530	0.839	0.669	0.60
220K	Lin	65-0535	0.839	0.669	0.60
470K	Lin	65-0540	0.839	0.669	0.60
1M	Lin	65-0545	0.884	0.702	0.634
2M2	Lin	65-0550	0.884	0.702	0.634
2M2	Lin	N 65-3019	0.83	0.66	0.60

Value	Taper	Order code	1+	50+	100+
1K	Log	65-2661	0.816	0.658	0.594
4K7	Log	65-2662	0.816	0.658	0.594

Value	Taper	Order code	1+	50+	250+
10K	Log	65-0615	0.839	0.669	0.60
22K	Log	65-0651	0.839	0.669	0.60
47K	Log	65-0625	0.839	0.669	0.60
100K	Log	65-0630	0.839	0.669	0.60
220K	Log	65-0652	0.839	0.669	0.60
470K	Log	65-0635	0.839	0.669	0.60
1M	Log	65-0645	0.884	0.702	0.634
2M2	Log	65-0650	0.884	0.702	0.634

065224

TT Electronics

Wirewound Potentiometers

Wirewound potentiometers in various values. The encased pots have a nominal width of 24 mm.

- Solder tag terminals
- Angle of rotation (electrical) 280° (±5°)
- Metal axle diameter 6mm
- Electrical load capacity 4W
- Nominal resistances 10Ω to 25kΩ
- Resistance tolerance ±10%
- Linearity ±2%
- Continuous voltage 500V
- Electrical adjustment range 280° (±5°)
- Case diameter 24mm
- Spindle length 42mm
- Spindle diameter 6mm
- Thread size M10 x 0.75
- Test voltage 1kV/AC

Technical specification

Order code	Resistance value	Order code	Resistance value
50-3980	10Ω	50-3984	500Ω
50-3981	25Ω	50-3985	1kΩ
50-2303	50Ω	50-3986	5kΩ
50-3982	100Ω	50-3988	25kV
50-3983	250Ω		

Value	Order code	1+	25+	50+
10R	50-3980	5.99	5.61	
25R	50-3981	5.60	4.17	
50R	50-2303	4.84	4.35	
100R	50-3982	6.84	6.35	5.59
250R	50-3983	5.36	4.35	
500R	50-3984	6.34	5.99	
1K	50-3985	7.75	6.50	
5K	50-3986	5.74	4.55	
25K	50-3988	5.10	4.90	

519692

TruΩhm

Carbon Preset Potentiometers

Miniature single turn carbon track preset potentiometers.

- Horizontal mounting
- Linear law
- 30% tolerance
- 0.1W rated

Technical specification

Dimensions	8.2 x 11.2 x 2.6mm
Pitch	5 x 10mm
Tolerance	±30%
End resistance	>20Ω
Power rating	0.1W
Maximum operating voltage	100V AC, 20V DC
Electrical rotation	250 ±5°
Rotational torque	30-60 gf/cm

		MOQ 5 - In Multiples of 5			
Value (Ω)	Order code	5+	100+	500+	1000+
100R	67-0400	0.114	0.091	0.062	
220R	67-0402	0.114	0.091	0.062	
470R	67-0404	0.114	0.091	0.062	
1K	67-0406	0.114	0.091	0.062	
2K2	67-0408	0.146	0.113	0.089	
4K7	67-0410	0.114	0.091	0.062	0.055
10K	67-0412	0.114	0.091	0.062	0.055
22K	67-0414	0.114	0.091	0.062	
47K	67-0416	0.146	0.113	0.089	0.072
100K	67-0418	0.114	0.091	0.062	0.055
200K	67-0420	0.114	0.091	0.062	
500K	67-0422	0.114	0.091	0.062	0.055
1M	67-0424	0.114	0.091	0.062	0.055

060265

Suntan®

3/8in Single Turn Finger Adjustable Cermet Potentiometer

A range of fully enclosed single turn potentiometers that feature a finger adjustment knob with adjustment slot. Suitable for a wide range of applications.

- Single turn adjustment
- 10% tolerance
- 0.1 x 0.2in pitch spacing
- **UL 94V-0** flammability

Technical specification

Withstand voltage	600V AC
Insulation resistance	≥1GΩ
Effective travel	300°
Power rating	0.5W
Temperature range	−55°C to +125°C
Temperature coefficient	±100ppm/°C
Starting torque	≤35mN m

Type	Order code	1+	25+	100+	500+
3386FT series					
500R	68-0238	0.742	0.621	0.552	
1K	68-0239	0.742	0.621	0.552	0.498
2K	68-0240	0.742	0.621	0.552	
5K	68-0241	0.742	0.621	0.552	0.498
10K	68-0242	0.599	0.496	0.441	0.401
20K	68-0243	0.724	0.606	0.539	0.488
50K	68-0244	0.742	0.621	0.552	
100K	68-0245	0.742	0.621	0.552	
1M	68-0248	0.742	0.621	0.552	

081452

≡Rapid
…where price meets quality

Education

5

Electronic Kits & Components

Discretes

Selected brands

Low Power NPN Transistors

Low power, small signal, general purpose and RF, NPN transistors.

● Low power NPN transistors

Technical specification

Device	Mftr.	Case style	V_{CE} max. (V)	V_{CB} max. (V)	V_{EB} max. (V)	I_C max. (mA)	P_{tot} max. (mW)	h_{FE} min. @I_C(mA)	f_T MHz
2N2222A	CDIL	TO-18	30	60	5	800	500	100@150	250
2N3053	CDIL	TO-39	40	60	5	700	500	50@150	100
2N3704	CDIL	TO-92 (A)	30	50	5	600	625	100@50	100
2N3705	CDIL	TO-92 (A)	30	50	5	600	625	50@50	100
2N3904	TRU	TO-92 (B)	40	60	6	200	625	100@10	30
2N4401	TRU	TO-92 (B)	40	60	5	600	625	100@150	250
2N4401	CDIL	TO-92	40	60	6	600	625	100 to 300@150	250
BC107	CDIL	TO-18	45	50	6	200	600	100@2	150
BC107B	CDIL	TO-18	45	50	6	200	600	200@2	150
BC108	CDIL	TO-18	25	30	5	200	600	100@2	150
BC108B	CDIL	TO-18	25	30	5	200	600	200@2	150
BC108C	CDIL	TO-18	25	30	5	200	600	420@2	150
BC109	CDIL	TO-18	25	30	5	200	600	200@2	150
BC182L	FCH	TO-92 (A)	50	60	6	100	350	120@2	150
BC183L	CDIL	TO-92 (A)	30	45	6	100	350	120@2	150
BC184	CDIL	TO-92 (C)	30	45	6	100	350	250@2	150
BC184L	FCH	TO-92 (A)	30	45	6	100	350	250@2	150
BC238B	CDIL	TO-92 (C)	25	30	5	100	350	200@2	150
BC337-16	TRU	TO-92 (C)	45	50	5	800	625	100@100	210
BC337-16	DIO	TO-92	50	45	5	800	625	100@100	100
BC337-25	DIO	TO-92	50	45	5	800	625	100@100	100
BC547	CDIL	TO-92	45	50	6	100	500	110@2	100
BC547B	TRU	TO-92	45	50	6	100	500	110@2	300
BC548B	CDIL	TO-92 (C)	30	30	6	100	500	220@2	150
BC548B	TRU	TO-92	30	30	6	100	500	110@2	300
BC548C	ONS	TO-92	30	30	6	100	625	300@100	300
BC549B	TRU	TO-92	30	30	5	100	625	450@2	250
BC549C	TRU	TO-92 (C)	30	30	5	100	625	420@2	-
MPSA42	FCH	TO-92 (B)	300	300	6	500	625	40@30	50
P2N2222A	ONS	TO-92	40	75	6	600	625	40@500	300

MOQ 5 - In Multiples of 5

Type	Order code	5+	25+	100+	500+
2N2222A	81-0256	0.394	0.367	0.331	0.267
2N3053	81-0264	0.417	0.403	0.364	0.325
BC107	81-0010	0.31	0.282	0.255	0.232
BC108	81-0014	0.272	0.246	0.241	0.235
BC108B (CDIL)	81-0016	0.319	0.293	0.28	
BC108C	81-0018	0.323	0.299	0.288	0.276
BC109	81-0020	0.983	0.698	0.556	0.453
BC548C (ONS)	50-0297	0.149	0.126	0.101	

MOQ 20 - In Multiples of 10

Type	Order code	20+	50+	100+	500+
2N3704	81-0272	0.11	0.085	0.07	0.048
Type	**Order code**	**20+**	**60+**	**100+**	**500+**
2N3705	81-0274	0.088	0.076	0.048	0.045
Type	**Order code**	**20+**	**50+**	**100+**	**500+**
2N3904 (TRU)	81-0484	0.122	0.084	0.058	0.046
Type	**Order code**	**20+**	**60+**	**100+**	**500+**
2N4401 (CDIL)	81-0487	0.048	0.04	0.035	0.0279
Type	**Order code**	**20+**	**50+**	**100+**	**500+**
2N4401 (TRU)	81-0486	0.128	0.103	0.066	0.034
BC107B	81-0012	0.245	0.227	0.215	
BC182L	81-0034	0.144	0.116	0.062	0.048
BC183L	81-0036	0.122	0.096	0.051	0.04
BC184	81-0038	0.097	0.07	0.042	0.0273
BC184L	81-0040	0.096	0.069	0.041	0.0298
BC238B	81-0048	0.16	0.113	0.051	0.039
BC337-16 (TRU)	81-0472	0.071	0.048	0.034	0.028
BC337-16 (Diotec)	81-0395	0.079	0.041	0.0252	0.023
BC337-25 (Diotec)	81-0397	0.076	0.04	0.0252	0.023
BC547 (CDIL)	81-0469	0.063	0.034	0.0238	0.0225
BC547B (TRU)	81-0468	0.071	0.041	0.0286	0.0247
BC548B (CDIL)	81-0066	0.07	0.043	0.031	0.0274
BC548B (TRU)	81-0466	0.091	0.073	0.045	0.03
BC549B (TRU)	81-0068	0.057	0.047	0.0299	0.0191
BC549C (TRU)	81-0441	0.0294			
MPSA42	81-0144	0.091	0.061	0.054	
P2N2222A (ONS)	81-0257	0.119	0.091	0.078	0.065

066245

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Selected brands

Medium Power NPN Transistors

Medium power, NPN transistors.

Technical specification

Device	Mftr.	Case style	V_{CE} max. (V)	V_{CB} max. (V)	V_{EB} max. (V)	I_C max. (A)	P_{tot} max. (W)	h_{FE} min. @I_C(mA)	f_T (MHz)
ZTX689B	Zetex	E LINE	20	20	5	3	1.5	400@2A	150
BFY51	CDIL	TO-39	30	60	6	1	0.8	40@150	50
ZTX450	Zetex	E LINE	45	60	5	1	1	100@150	150
ZTX451	Zetex	E LINE	60	80	5	1	1	150@150	150
BFX85	CDIL	TO-39	60	100	6	1	0.8	70@150	50
ZTX651	Zetex	E LINE	60	80	5	2	1	100@500	140
BC639	CDIL	TO-92 (A)	80	80	5	1	1	40@150	200

MOQ 5 - In Multiples of 5

Type	Order code	5+	25+	100+	500+
ZTX689B	81-0228	0.624	0.51	0.388	0.355
BFY51	81-0122	0.393	0.345	0.307	0.27
ZTX450	81-0202	0.39	0.355	0.254	0.202
ZTX451	81-0204	0.449	0.418	0.256	
BFX85	81-0116	0.681	0.61	0.516	0.447
ZTX651	81-0224	0.656	0.586	0.359	0.336
BC639	81-0080	0.161	0.117	0.076	0.05

066248

Selected brands

Darlington NPN Transistors

NPN Darlington transistors.

Technical specification

Order code	Device	Mftr.	Case	V_{CE}	V_{CB}	V_{EB}	I_C	P_{tot}	h_{FE}	F_T
81-0143	TMPSA13	CDIL	TO-92	30	30	10	0.5	0.625	5000@10	125
81-0004	BCX38C	Zetex	E-line	60	60	10	0.8	1	5000@100	100
81-0106	BD679	ST	TO-126	80	80	5	4	40	750@1.5A	–
81-0168	TIP120	ST	TO-220	60	60	5	5	65	1000@3A	–
81-0170	TIP121	CDIL	TO-220	80	80	5	5	65	1000@3A	–
38-2027	TIP121	ST	TO-220	80	80	5	5	65	1000@3A	–
81-0179	TIP126	Tru	TO-220	80	80	5	5	65	1000@3A	–
81-0186	TIP122	ST	TO-220	100	100	5	5	65	1000@3A	–
81-0428	BDX33C	FCS	TO-220	100	100	2.5	10	70	750@3A	–
81-0190	TIP142	ST	TO-220	100	100	5	10	125	1000@5A	–
81-0110	BDW93C	ST	TO-220	100	100	4	12	80	750@5A	–
81-0376	ZTX614	Zetex	TO-92	120	120	10	0.8	1	5000@100	–
81-0220	ZTX605	Zetex	E-line	120	140	10	1	1	5000@500	150

MOQ 5 - In Multiples of 5

Type	Order code	5+	25+	100+	500+
TMPSA13 (CDIL)	81-0143	0.224	0.207	0.173	0.16
BCX38C (ZETEX)	81-0004	0.36	0.279	0.247	0.222
BD679	81-0106	0.62	0.57	0.427	
TIP120 (ST)	81-0168	0.49	0.38	0.23	0.19
TIP121 (CDIL)	81-0170	0.492	0.434	0.321	
Type	**Order code**	**5+**	**50+**	**100+**	
TIP121 (ST)	38-2027	0.341	0.245	0.218	
Type	**Order code**	**5+**	**25+**	**100+**	**500+**
TIP122 (ST)	81-0186	0.405	0.294	0.191	
TIP126	81-0179	0.49	0.44	0.28	0.23
BDX33C	81-0428	1.02	0.717	0.638	
TIP142 (ST)	81-0190	1.29	1.19	0.943	
BDW93C	81-0110	0.658	0.598	0.526	
ZTX614	81-0376	0.359	0.322	0.247	
ZTX605	81-0220	0.543	0.474	0.43	0.389

066250

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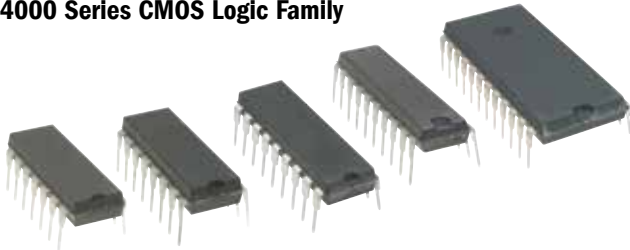
Integrated Circuits

4000 Series CMOS Logic Family

4000 Series CMOS logic devices with a DC supply voltage rating of up to 20V. The family has a large number of functions including analogue switches, monostable multivibrators, level converters, counters, timers, display drivers, and phase-locked loops (PLLs).

- Through hole packages
- CMOS technology for low power consumption
- Wide operating voltage range
- Applications include instrumentation, control and communications

Type	Function	Order code	5+	25+	100+	500+
		MOQ 5 - In Multiples of 5				
4001B	Quad 2 input Nor gate	83-0316	0.357	0.261	0.195	
4011B	Quad 2-input NAND gate	83-0328	0.237	0.211	0.183	
4013BE	Dual D type flip flop	83-0332	0.516	0.387	0.321	
4014B	8-bit shift register	83-0334	0.398	0.303	0.222	
4015B	Dual 4 stage shift reg. (serial in/parallel out)	83-0337	0.346	0.327	0.226	
4017B	Decade counter/divider	83-0340	0.381	0.332	0.22	0.198
4023B	Triple 3-input NOR gate	83-0353	0.363	0.331	0.225	
4024B (TI)	7 stage binary counter	83-0354	0.363	0.303	0.232	
4025B	Triple 3-input NOR gate	83-0356	0.317	0.224	0.187	
4026B	Decade ctr w dec 7 seg output	83-0359	0.366	0.257	0.208	
4027BE	Dual JK master/slave flip flops	51-6312	0.40	0.281	0.216	
4030B	Quad XOR gate	83-0366	0.354	0.258	0.215	
4035BE	4 stage shift register (parallel in/parallel out)	51-6318	1.02	0.908	0.715	
4042B	Quad clocked D-type latches	83-0370	0.667	0.505	0.394	
4044BE	Quad NAND SR latches	51-6014	0.454	0.357	0.325	
4046B	Micropower PLL	83-0376	0.40	0.319	0.211	
4049UB (TI)	Hex inverters/buffers	83-0380	0.372	0.246	0.199	
4051B	Analogue MUX/DEMUX	83-0384	0.441	0.336	0.194	
4053B (TI)	Analogue MUX/DEMUX	83-0388	0.365	0.28	0.197	0.186
4056B	7-segment display driver	83-0812	0.39	0.284	0.269	
4060B (TI)	14 stage ripple carry binary ctr	83-0390	0.257	0.206	0.158	
4070B	Quad 2-input XOR gate	83-0400	0.319	0.212	0.16	
4081B	Quad 2-input AND gate	83-0414	0.363	0.263	0.195	0.149
4093B	Quad 2-input NAND Schmitt	83-0420	0.306	0.233	0.174	0.166
4094B	8 stage shift+store bus register	83-0422	0.402	0.268	0.21	0.205
40106B (TI)	Hex Schmitt trigger	83-0482	0.319	0.255	0.20	0.195
4510B	BCD up/down counter	83-0442	0.397	0.314	0.215	
4511B	BCD to 7 segment dec/driver	83-0436	0.395	0.22	0.171	
4516B (TI)	Binary up/down counter	83-0445	0.387	0.306	0.211	
4536BE	Programmable 24bit timer	51-6323	0.415	0.395	0.369	0.349
4538B	Dual monostable multivibrator	83-0466	0.684	0.497	0.399	
4541B	Programmable timer	83-0468	0.503	0.376	0.315	

Type	Function	Order code	1+	25+	100+	500+
			Price each			
4508B	Dual 4-bit latch	83-0848	2.51	1.48	1.15	0.84

077018

ST Stepper Motor Control/Driver

The L293D is a monolithic integrated, high voltage, high current, 4-channel driver.

- L293E is a quad push-pull driver capable of delivering output currents up to 1A per channel
- L297 generates four phase drive signals for two phase bipolar and four phase unipolar stepper motors in microcomputer controlled applications

Technical specification

Device	Function	Package	Order code
L293D	Accepts DTL/TTL logic levels, will drive inductive loads, DC and stepper motors, switching power transistors.	DIL-16	82-0192
L293E	TTL compatible control, inhibit input on each pair of drivers, external connections for sensing resistors.	DIL-20	82-0194
L297	Motor can be driven in half-step, normal and wave drive modes, on-chip PWM chopper circuits permit switch-mode control of the current in the windings. Requires only clock, direction and mode input signals.	DIL-20	82-0198

Type	Order code	1+	10+	25+	100+
L293D	82-0192	3.71	2.39	2.08	1.60
L293E	82-0194	2.97	2.38	2.24	
L297	82-0198	7.24	6.05	5.79	

034479

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5

Electronic Kits & Components

Relays & Solenoids

finder
SWITCH TO THE FUTURE

Miniature Relays DPDT

A range of industry standard vertical PCB or socket mounted relays.

- The **Finder 40.52** series incorporate 8mm isolation gap between coil and contacts as required by **VDE0700**
- Housed in a dustproof **IP40** tinted case (AC versions have an orange tint)
- Widely approved including **VDE, BEAB, UL, CSA, SEV, NF-USE, SETI, IMQ, SEMKO** and **DEMKO**
- **Finder 40.52** series

Technical specification

Dimensions	29 x 12.4 x 25mm
Contact rating	8A at 240V AC/30V DC
Contact arrangement	Double pole changeover
Contact material	Silver nickel
Operate/release time	10ms/7ms
Coil operating range	70-150%
Coil consumption	500mW*/650mW/1.2VA**
Temperature range	–20°C to +70°C

Coil	Resistance	Order code	1+	25+	100+	250+
6V DC	55Ω	**60-1110**	4.70	3.70	3.39	
12V DC	300Ω	**60-1115**	3.60	2.80	2.48	
24V DC	1200Ω	**60-1140**	3.30	2.35	2.23	2.17
48V DC	3500Ω	**60-1145**	4.56	3.54	3.15	
60V DC	5500Ω	**49-4248**	3.31	2.94	2.65	
12V AC	80Ω	**49-4250**	6.44	5.76	4.32	
24V AC	320Ω	**60-1170**	4.48	3.65	3.20	
120V AC	9000Ω	**49-4251**	8.60	7.87	7.39	
240V AC	31500Ω	**60-1180**	7.70	7.05	6.87	6.66

029524

GOODSKY

Miniature PCB Power Relay SPDT

Power relay with a very low power consumption, 360mW coil for PCB mounting.

- Offered in two switching capacities with either 10A or 15A contacts
- Sealed construction suitable for flow soldering
- **UL** approved

Technical specification

Contact ratings

Series	RW	RWH
Rated current	10A	15A
Voltage max.	240V AC 110V DC	240V AC 110V DC
Power max.	1500VA 240W	1800VA 360W
Minimum switching load	10mA 5V DC	15mA 5V DC
Contact material	Ag alloy	AgSnO$_2$
Contact form	SPDT	SPDT

Coil specification

Series	Voltage nom. (V DC)	Current nom. (mA)	Coil resistance (Ω)	Power (W)	Pull-in voltage (V DC)	Drop-out voltage (V DC)	Voltage max. (V DC)	Order code
RW	6	60	100	0.36	75% max.	5% min.	130%	**60-4660**
RW	12	30	400	0.36	75% max.	5% min.	130%	**60-4662**
RW	24	15	1600	0.36	75% max.	5% min.	130%	**60-4664**
RWH	5	73	70	0.36	75% max.	5% min.	130%	**60-4661**
RWH	6	60	100	0.36	75% max.	5% min.	130%	**60-4666**
RWH	12	30	400	0.36	75% max.	5% min.	130%	**60-4668**
RWH	24	15	1600	0.36	75% max.	5% min.	130%	**60-4670**

Performance

Contact resistance	100mΩ max.
Dielectric strength (coil and contact)	1000V AC
Surge resistance	3000V
Insulation resistance	100MΩ min.
Temperature range	–30°C to +55°C
Mechanical life	10^7
Electrical life	10^5
Dimensions	19 x 15.4 x 15.5mm
Weight	11g

Coil	Resistance	Order code	MOQ 5 - In Multiples of 5			
			5+	25+	100+	250+
RW Series 10A contacts						
6V DC	100Ω	**60-4660**	0.834	0.785	0.724	
12V DC	400Ω	**60-4662**	0.644	0.604	0.574	0.554
24V DC	1600Ω	**60-4664**	0.755	0.707	0.661	
RWH Series 15A contacts						
5V DC	70Ω	**60-4661**	0.737	0.691	0.643	0.566
6V DC	100Ω	**60-4666**	0.819	0.75	0.689	
12V DC	400Ω	**60-4668**	0.656	0.591	0.554	0.503
24V DC	1600Ω	**60-4670**	0.649	0.604	0.574	0.554

035148

GOODSKY

Subminiature Relay DPCO 1A - GS

A range of compact, lightweight double pole changeover relays to give high density PCB mounting.

- Coil consumption is 360mW
- 92/8 gold silver alloy on silver palladium contacts allows low level switching (1V DC 1mA)
- Casing is epoxy resin sealed for washing
- **BT47** style relays
- **GS-D** series

Technical specification

Dimensions		20.3 x 10.1 x 15.6mm
Contact rating		1A 24V DC/120V AC
Max. switching power		30W
Contact arrangement		Double pole changeover
Contact material		Ag Alloy
Operate/release time		6ms/4ms max.
Pull in voltage		75% max.
Drop out voltage		10% min.
Life expectancy	mechanical	10^7 operations
	electrical	10^5 operations

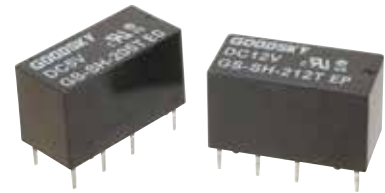| Coil	Resistance	Order code	1+	25+	100+	240+
5V DC	70Ω	**60-4690**	1.01	0.862	0.80	
12V DC	400Ω	**60-4692**	1.01	0.913	0.851	0.80
24V DC	1600Ω	**60-4694**	1.28	1.07	0.884	

035156

GOODSKY

Subminiature DPDT 2A Relays

A compact lightweight relay for high density PCB mounting.

- Low coil power consumption
- Available in 5V, 12V and 24V versions
- Fully sealed construction
- Applications include telecommunications and audio equipment
- **UL** approved

Technical specification

	GS-SH-205T	GS-SH-212T	GS-SH-224T
Nominal voltage	5V DC	12V DC	24V DC
Max. allowable voltage	150%	150%	150%
Coil resistance	125Ω ±10%	720Ω ±10%	2880Ω ±10%
Contact arrangement	DPDT	DPDT	DPDT
Contact material	Ag alloy	Ag alloy	Ag alloy
Operate time	8ms max.	8ms max.	8ms max.
Release time	4ms max.	4ms max.	4ms max.
Nominal current	40mA	16.7mA	8.3mA
Coil operating range	150% max.	150% max.	150% max.
Temperature range	–30°C to +80°C	–30°C to +80°C	–30°C to +80°C
Mechanical life	10^7 operations at no load condition	10^7 operations at no load condition	10^7 operations at no load condition
Electrical life	10^5 operations at rated resistive load	10^5 operations at rated resistive load	10^5 operations at rated resistive load
Dimensions	21 x 12 x10mm	21 x 12 x10mm	21 x 12 x10mm

Mftrs. pt. no.	Coil	Order code	1+	25+	100+	250+
GS-SH-205T	5V DC	**60-4754**	1.63	1.31	1.13	0.995
GS-SH-212T	12V DC	**60-4756**	1.30	1.16	0.995	0.903
GS-SH-224T	24V DC	**60-4758**	1.57	1.26	1.16	1.08

071347

Intertec
Components

Linear Solenoids Open Frame

This series of open-frame linear solenoids are economical and lightly constructed devices that are suitable for a very wide range of applications.

- Metal bracket
- Includes damping ring
- Open mounting position with closed yoke

Technical specification

Order code	**50-6097**	**50-6090**
Type	Push	Push
Nominal voltage	12V DC	12V DC
Stroke	2 to 3mm	15mm
Start/end force	0.1N/0.9N	0.2N/10.22N
Nominal power	0.8W	4.5W
Dimensions L x W x H	20 x 10 x 8mm	40 x 29.5 x 24.2mm
Limit temperature	130°C	130°C

Order code	**50-6085**	**50-6086**	**50-6096**
Type	Pull	Push	Push
Nominal voltage	12V DC	12V DC	24V DC
Stroke	1.5mm	1.5mm	18mm
Start/end force	0.18N/2N	0.18N/2N	2N/56N
Nominal power	1.1W	1.1W	8W
Dimensions L x W x H	22 x 11 x 10mm	22 x 11 x 10mm	64 x 38 x 30mm
Limit temperature	130°C	130°C	130°C

Order code	50-6089	50-6092
Type	Pull	Push
Nominal voltage	12V DC	24V DC
Stroke	15mm	15mm
Start/end force	0.2N/10.22N	0.2N/10.22N
Nominal power	4.5W	4.5W
Dimensions L x W x H	40 x 29.5 x 24.2mm	40 x 29.5 x 24.2mm
Limit temperature	130°C	130°C

Order code	50-6093	50-6095	50-6094
Type	Pull	Pull	Push
Nominal voltage	12V DC	24V DC	12V DC
Stroke	18mm	18mm	18mm
Start/end force	2N/56N	2N/56N	2N/56N
Nominal power	8W	8W	8W
Dimensions L x W x H	64 x 38 x 30mm	64 x 38 x 30mm	64 x 38 x 30mm
Limit temperature	130°C	130°C	130°C

Voltage DC	Solenoid type	Order code	1+	25+	100+
20 x 10 x 8mm					
12	Push	50-6097	2.37	2.18	2.01
22 x 11 x 10mm					
12	Pull	50-6085	5.43	4.97	
12	Push	50-6086	5.98	5.50	
40 x 29.5 x 24.2mm					
12	Pull	50-6089	11.67	10.72	
12	Push	50-6090	9.95	8.46	
24	Push	50-6092	10.15	8.72	
64 x 38 x 30mm					
12	Pull	50-6093	21.40	19.62	
24	Pull	50-6095	19.80	18.42	
12	Push	50-6094	17.81	17.05	
24	Push	50-6096	21.56	19.75	

520744

Intertec Components

Cylindrical Linear Solenoids

A comprehensive range of cylindrically-bodied solenoids. There is a choice of push or pull linear actuators and the further choice of diameter and voltage means that there is a solenoid to suit any of the many applications that these devices are designed for.

- Closed design
- Higher efficiency than bar magnets
- Can be used in harsh environments
- Installation via screw caps
- Push type includes return spring
- Fixings M3

Technical specification

Order code	50-6034	50-6036	50-6035	50-6037	50-6040
Type	Pull	Pull	Push	Push	Push
Nominal voltage	6V DC	12V DC	6V DC	12V DC	24V DC
Stroke	4mm	4mm	4mm	4mm	4mm
Start/end force	0.4N/2N	0.4N/2N	0.4N/2N	0.4N/2N	0.4N/2N
Nominal power	4W	4W	4W	4W	4W
Dimensions ø x L	13 x 33mm	13 x 33mm	13 x 33mm	13 x 33mm	13 x 33mm
Limit temperature	130°C	130°C	130°C	130°C	130°C

Order code	50-6052	50-6054	50-6051
Type	Pull	Pull	Push
Nominal voltage	12V DC	24V DC	12V DC
Stroke	9 to 16mm	9 to 16mm	9 to 16mm
Start/end force	0.5N/6N	0.5N/6N	0.5N/6N
Nominal power	5.5W	5.5W	5.5W
Dimensions ø x L	16 x 42	16 x 42	16 x 42
Limit temperature	130°C	130°C	130°C

Order code	50-6039	50-6046	50-6041	50-6045	50-6047	50-6042
Type	Pull	Pull	Pull	Push	Push	Push
Nominal voltage	6V DC	12V DC	24V DC	6V DC	12V DC	24V DC
Stroke	10mm	10mm	10mm	10mm	10mm	10mm
Start/end force	0.6N/11N	0.6N/11N	0.6N/11N	0.6N/11N	0.6N/11N	0.6N/11N
Nominal power	7W	7W	7W	7W	7W	7W
Dimensions ø x L	20 x 49	20 x 49	20 x 49	20 x 49	20 x 49	20 x 49
Limit temperature	130°C	130°C	130°C	130°C	130°C	130°C

Order code	50-6048	50-6050	50-6043	50-6049	50-6033	50-6044
Type	Pull	Pull	Pull	Push	Push	Push
Nominal voltage	6V DC	12V DC	24V DC	6V DC	12V DC	24V DC
Stroke	18mm	18mm	18mm	18mm	18mm	18mm
Start/end force	0.78N/22N	0.78N/22N	0.78N/22N	0.78N/22N	0.78N/22N	0.78N/22N
Nominal power	10W	10W	10W	10W	10W	10W
Dimensions ø x L	25 x 61	25 x 61	25 x 61	25 x 61	25 x 61	25 x 61
Limit temperature	130°C	130°C	130°C	130°C	130°C	130°C

Voltage (V DC)	Solenoid type	Order code	1+	25+
ø13mm				
6	Pull 4mm	50-6034	8.19	6.41
12	Pull 4mm	50-6036	8.77	8.09
6	Push 4mm	50-6035	8.71	7.99
12	Push 4mm	50-6037	10.15	8.61
24	Push 4mm	50-6040	8.90	8.15
ø16mm				
12	Pull 9 to 16mm	50-6052	11.81	10.84
24	Pull 9 to 16mm	50-6054	8.27	7.60
12	Push 9 to 16mm	50-6051	8.75	8.03

|			1+	25+
ø20mm				
6	Pull 10mm	50-6039	18.68	17.12
12	Pull 10mm	50-6046	8.91	8.16
24	Pull 10mm	50-6041	9.97	9.35
6	Push 10mm	50-6045	11.27	9.74
12	Push 10mm	50-6047	11.27	10.79
24	Push 10mm	50-6042	12.31	11.27
ø25mm				
6	Pull 18mm	50-6048	12.82	10.77
12	Pull 18mm	50-6050	11.94	10.95
24	Pull 18mm	50-6043	14.87	11.79
6	Push 18mm	50-6049	15.28	14.10
12	Push 18mm	50-6033	14.15	12.97
24	Push 18mm	50-6044	10.15	9.33

520738

Sounders, Buzzers & Speakers

≡RVFM

Electronic Buzzers

A range of compact, low-cost electronic buzzers.

- Available with either flying leads (10cm long) or PCB mounting pins
- 3V, 6V or 12V operating versions
- Resonant frequency is 400Hz
- Black ABS case material
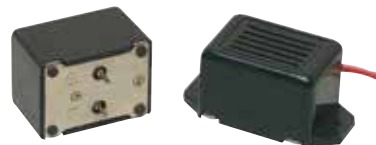
Suitable for education and hobbyist use only.

Technical specification

Operating voltage		2V to 5V DC or 4V to 8V DC or 9V to 15V
Rated voltage	2V to 5V type	3V DC
	4V to 8V type	6V DC
	9V to 15V	12V DC
Max rated current	2V to 5V type	25mA @ 3V DC
	4V to 8V type	30mA @ 6V DC
	9V to 15V	30mA @ 12V DC
Min sound pressure level	2V to 5V type	70dB @ 3V DC/20cm
	4V to 8V type	75dB @ 6V DC/20cm
	9V to 15V	80dB @ 12 DC/20cm
Resonant frequency		400Hz ± 100Hz
Operating temperature		–20°C to +60°C
Weight	PCB type	10g
	with lead	8g
Dimensions	PCB type	23 x 17 x 15mm with PCB pins on 7.6mm centres
	with lead	33.5 x 17 x 15mm with 100mm leads fixing centres 27.5mm, 2mm dia fixing hole

Type	Order code	1+	25+	100+
3V Buzzer + lead	35-3592	1.12	0.935	0.834
3V PCB Mount buzzer	35-3594	1.12	0.935	0.834
6V Buzzer + lead	35-3596	1.12	0.935	0.834
6V PCB Mount buzzer	35-3598	1.12	0.935	0.834
12V Buzzer + lead	35-3610	1.19	1.00	0.937
12V PCB Mount buzzer	35-3612	1.07	0.914	

036772

≡RVFM

Piezo Buzzer Miniature

A miniature piezo buzzer available with flying leads.

- Offers a high output with low power consumption

Technical specification

Operating voltage	3-30V DC
Sound output	90dB at 50cm
Current consumption at 12V	10mA
Frequency	2.7kHz

Type	Order code	1+	25+	100+
Piezo buzzer	35-0115	1.55	1.19	1.06

030205

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www.rapidonline.com

≡RVFM

Low Profile Buzzers

These PCB mounting buzzers have a loud but pleasant 85dB tone and operate from a either 6 or 12V DC supply. They are only 7.5mm high when mounted on the PCB. They will work with supply voltages ranging from 3 to 8V DC or 8 to 15V DC depending which version is required. Supply polarity is marked on the bottom of the top of the housing as an aid to installation. The case is finished in black.

- The base of the device is potted to maximise protection against flux contamination
- Masking label is included over the sound emission hole to permit board cleaning
- Encapsulated in a low profile housing making them particularly suitable for inclusion in miniature electronics instrumentation
- Supplied with PCB pins for direct mounting to PCBs
- Small / low profile design
- Compact rich sound
- Pitch 7.6mm
- Application: cellular phones, pagers, communication equipment, computers, household appliances, security of electronic devices
- Dimensions 11.6 x 11.6 x 7.5mm

Technical specification

Order code	35-0040	35-0041
Rated voltage	6V DC	12V DC
Operating voltage	3 to 8V DC	8 to 15V DC
Current consumption	30mA	30mA
Sound output at 10cm	>85dB	>85dB
Frequency	3100Hz ±500Hz	3100Hz ±500Hz
Housing material	PBT	PBT
Weight	2g	2g
Operating temperature	−20°C to +85°C	−20°C to +85°C
Storage temperature	−20°C to +88°C	−20°C to +88°C
Dimensions	11.6 x 11.6 x 7.5(D)mm	11.6 x 11.6 x 7.5(D)mm

Type	Order code	1+	25+	100+	500+
6V low profile buzzer	35-0040	0.966	0.747	0.644	0.528
12V low profile buzzer	35-0041	0.966	0.747	0.644	0.528

083003

≡RVFM

Electronic Buzzers with 20cm Flying Leads

A range of rectangular electronic buzzers offering a high but rich sound.

- Supplied with 20cm flying leads
- 2mm fixing holes in base
- **KPMB-2200L series**
- **Available with** 6 and 12V **operating voltages**

Technical specification

		Mftrs. code	Order code
Operating voltage	6V DC	KPMB-2206L	35-3601
	12V DC	KPMB-2212L	35-3603
Sound output	75dB		
Rated current max.	20mA		
Response time	<50ms		
Operating temperature	−20°C to +60°C		
Dimensions	34(L) x 16(W) x 15(H)mm		
Weight	10g		

Type	Order code	1+	25+	100+
6V	35-3601	1.18	0.954	0.891
12V	35-3603	1.07	0.891	0.834

071396

SoniCrest

6V and 12V Low Profile Electromagnetic Buzzers

The **SoniCrest HCM12BX** series of electromagnetic sound generators are low profile buzzer units that have a sealed structure and are washable and compatible with wave soldering.

These low profile sounders are efficient, board mounting devices that are suitable for a wide applications such as: multi-tone audio signals (e.g. GSM), mobile phones and pagers, PDAs, automotive, domestic appliances, portable equipment, medical devices and computer motherboards.

- Available in 6V or 12V variants
- Supply polarity marked on housing as an aid to installation
- Supplied with PCB pins for direct mounting to PCBs
- Sealing label for wash protection
- SoniCrest HCM12BX series

Technical specification

Order code	35-0052	35-0053
Mftrs. pt. no.	HCM1206BX	HCM1212BX
Rated voltage	6V	12V
Operating voltage range	4 to 7V	7 to 15V
Rated current	≤30mA	≤30mA
Sound output @ 10cm	≥83dB	≥83dB
Generated frequency	2.3kHz ±400Hz	2.3kHz ±400Hz
Operating temperature	−20°C to +80°C	−20°C to +80°C
Dimensions	7.5 x ⌀12mm	7.5 x ⌀12mm
Weight	1.6g	1.6g

Type	Order code	1+	100+
Low Profile Buzzer 6V	35-0052	0.858	0.569
Low Prof. Buzzer 12V	35-0053	0.858	0.569

500352

≡RVFM

Miniature Electronic Buzzer

These electronic buzzers offer a high but rich sound. They are ideal for all applications and can be applied to telephone times, calling devices, time pieces electronic toys, safety equipment.

- Base of the buzzer is potted to maximise protection against flux contamination
- Masking label is included over the sound emission hole to permit board cleaning
- Supplied with PCB pins for direct mounting to PCBs
- Encapsulated in a low profile housing
- Suitable for inclusion in miniature electronics instrumentation
- Small / low profile design
- Available in 5, 12V operating versions
- 7.6mm pitch
- Dimensions 12mm dia x 7.5(H)mm

Technical specification

Order code	35-0049	35-0048
Rated voltage	12V DC	5V DC
Operating voltage max.	3 - 15V DC	3 - 8V DC
Sound output	88dB	85dB
Frequency	2300 ±300Hz	2300 ±300Hz
Response time	50ms	50ms
Housing material	PST	PST
Operating temperature	−20°C to +85°C	−20°C to +85°C
Storage temperature	−20°C to +88°C	−20°C to +88°C
Pitch	7.6mm	
Dimensions	12mm diameter	7.5mm(H)
Weight	2g	2g

Type	Order code	1+	25+	100+	500+
5V Buzzer	35-0048	1.05	0.817	0.701	0.569
12V Buzzer	35-0049	1.11	0.817	0.701	0.569

083008

≡RVFM

Transistor Oscillator Buzzers

A 1.5V miniature transistor oscillator buzzer with flying leads.

- Frequency 400Hz
- Sound output 75dB at 30cm
- Height 15.5mm
- Length 33.5mm
- Width 16.5mm
- Lead length 150mm
- Voltage 1.5V

Technical specification

Operating voltage	1.3 to 2V
Current consumption	25mA
Sound output	75dB at 30cm

Type	Order code	1+	25+	100+
1.5V buzzer (leads)	35-0086	1.20	0.964	0.913

030204

≡RVFM

Round Electronic Buzzers with 20cm Flying Leads

A range of round electronic buzzers offering a high but rich sound.

- Supplied with 20cm flying leads
- 2mm fixing holes in base
- **KPMB-2600L** series
- Available with **3, 6** and **12V** operating voltages

Technical specification

		Mftrs. code	Order code
Operating voltage	3V DC	KPMB-2603L	35-3587
	6V DC	KPMB-2606L	35-3588
	12V DC	KPMB-2612L	35-3589
Sound output	80dB		
Rated current max.	40mA		
Response time	<50ms		
Operating temperature	−20°C to +60°C		
Dimensions	25mm diameter x 18mm (height)		
Weight	20g		

Type	Order code	1+	25+	100+	500+
3V DC	35-3587	1.15	0.958	0.868	0.79
6V DC	35-3588	1.15	0.958	0.868	
12V DC	35-3589	1.18	1.02	0.914	

071394

≡RVFM

Uncased Piezo Transducer

An uncased miniature piezo transducer offering an ultra low profile.

- Ideal for use with speech and music modules as fitted to greetings cards and toys
- Connection is by means of 95mm flying leads

Technical specification

Overall diameter	20mm
Ceramic plate diameter	15mm
Overall thickness	0.42mm excluding leads
Brass plate thickness	0.21mm
Resonant frequency	6.8 ±0.7kHz
Resonant resistance	LE 300Ω
Capacitance	15,000pF ±30%

	MOQ 5 - In Multiples of 5			
Type	Order code	5+	50+	300+
Uncased piezo transducer	35-0200	0.49	0.373	0.334

035847

Miniature Electromagnetic Buzzers – 5V and 12V

A miniature profile electromagnetic buzzer that is available in 5V or 12V versions. The **SoniCrest HCM12X** series of PCB mounting sounders feature a sealed construction making them suitable for washing and wave soldering manufacturing techniques.

These miniature buzzers have PCB pins for direct board mounting and are suitable for a wide applications such as: GSM, PDAs, cell phones and pagers, automotive, domestic appliances, portable equipment, medical devices and computer motherboards.

- Available in 5V or 12V variants
- Supply polarity marked on housing as an aid to installation
- Supplied with PCB pins for direct mounting to PCBs
- Sealing label for wash protection
- SoniCrest HCM12X series

Technical specification

Order code	35-0055	35-0056
Mftrs. pt. no.	HCM1205X	HCM1212X
Rated voltage	5V	12V
Operating voltage range	3 to 7V	8 to 15V
Rated current	≤30mA	≤30mA
Sound output @ 10cm	≥85dB	≥85dB
Generated frequency	2.3kHz ±400Hz	2.3kHz ±400Hz
Operating temperature	–40°C to +85°C	–40°C to +85°C
Dimensions	9.5 x ø12mm	9.5 x ø12mm
Weight	2g	2g

Type	Order code	1+	100+	1000+
Miniature Buzzer 5V	**35-0055**	0.939	0.634	
Miniature Buzzer 12V	**35-0056**	0.858	0.569	0.489

500354

90dB Piezo Sound Generator 5V

SoniCrest have produced a sound generator that operates using the piezoelectronic effect. Producing a loud 90dB of sound, this 5V buzzer is suitable for use in alarms, sirens, audio alerts, telephone ringers, industrial/household appliances, control modules, high end toys, medical instruments, etc.

- Unsealed structure and non-washable
- With PCB pins for direct board mounting
- **SoniCrest HPA17F** type

Technical specification

Rated voltage	5V
Operating voltage range	1 to 30V
Rated current	≤2mA
Sound output @ 10cm	≥90dB
Rated frequency	4kHz
Capacitance	15nF
Operating temperature	–40°C to +85°C
Dimensions	6.8 x ø17mm
Weight	1.5g

Type	Order code	1+	100+	1000+
Piezo Sound Gen 5V	**35-0054**	0.623	0.409	0.36

500353

8Ω Speaker Sound Generator

A low-cost, low power sound generator has been designed for use in toy and other applications. This very compact sound module is ideal for PCB fitting and produces a sound of up to 83dB.

- Good quality
- Suitable for soldering directly to a circuit board
- Dimensions: 30mm (dia) x 11mm (depth)

Technical specification

Rated power	0.15W
Input power max.	0.3W
Frequency range	700 - 5000Hz
Rated frequency	1200 ±200Hz
Rated impedance	8Ω
Sound pressure level	83dB
Housing material	ABS/black
Operating temperature	-20°C - +60°C
Weight	12g

Type	Order code	1+	25+	100+
Speaker sound generator	**35-0043**	1.18	0.951	0.865

083005

5V Electro-Magnetic Sound Generator

A 5V electro-magnetic sound generator encapsulated in a low profile housing making it particularly suitable for inclusion in miniature electronics instrumentation.

- Electro magnetic sound generator
- 5V voltage rating
- 45mA current
- 85dB at 10cm sound output
- 2400Hz frequency
- 12mm diameter
- 1.2g weight
- Noryl housing
- Sealed base
- Positive terminal marked
- PCB pins
- Requires external drive circuit

Technical specification

Rated Voltage	Operating Voltage	Rated Current	Coil Resistance	Sound Output	Rated Frequency	Diameter	Operating Temperature
5V	4-8V	≤60mA	45 ±4mA	≥85dB	2400Hz	12mm	–40°C to +85°C

MOQ 5 - In Multiples of 5

Type	Order code	5+	25+	100+
5V	**35-3611**	0.616	0.53	0.442

073358

adastra

Megaphones with Sirens

35-4642   35-4643

Compact and lightweight megaphones available in 25W or 30W power outputs. The feature sets of these compact and durable loudhailers make them ideal for a variety of outdoor uses in schools, work, construction sites, etc.

The megaphones all feature a good quality built-in microphone, comfortable pistol grip handle, rotary volume control and carrying strap. In addition, the 25W and 30W versions also include a hand-held microphone that gives the option of a different operating style.

- Comfortable strong strap included
- Built-in switchable siren function
- Pistol grip handle with push-to-talk trigger switch
- Anti-feedback hand-held microphone
- Rotary volume control
- Robust ABS construction

Technical specification

Order code	35-4641	35-4642	35-4643
Power max.	10W	25W	30W
Power supply	12V DC (8x AA batteries)	12V DC (8x C batteries)	12V DC (8x D Alkaline batteries)
Range	500 to 600m	700m - 1km	600m
Dimensions	235 x ø150mm	335 x ø230mm	340 x ø230mm
Weight	630g	1.65kg	2kg

Type	Order code	1+
25W Siren megaphone	**35-4642**	51.35
30W Siren megaphone	**35-4643**	29.60

500292

Miniature Speakers 80

These KEPO Miniature Speakers 80 are a compact round size, suitable for signal output in machines and other equipment where space is at a premium. Typical applications include voice and signal output in machines and other equipment both indoors and outdoors.

- Available from 330-1280Hz

Technical specification

Order code	51-7383	51-7384	51-7386	51-7387
Basket diameter	36mm	50mm	50mm	32mm
Height	4.9mm	17mm	8.3mm	7mm
Nominal load	0.5W	0.25W	0.5W	1W
Resonant frequency	500Hz	450Hz	330Hz	400Hz

Order code	51-7389	51-7390	51-7391	51-7395
Basket diameter	15mm	16mm	20 x 14mm	28mm
Height	3.4mm	3.5mm	3.6mm	5mm
Nominal load	0.5W	0.5W	0.5W	0.7W
Resonant frequency	850Hz	900Hz	950Hz	650Hz

Input power	Height	Order code	1+	25+	100+
330Hz					
0.5W/ Max.1W	8.3mm	**51-7386**	2.79	2.21	
400Hz					
1.5W/Max. 1.8W	7mm	**51-7387**	3.26	2.95	
450Hz					
0.8W/Max.1.5W	17mm	**51-7384**	1.75	1.60	1.47
500Hz					
0.5W/Max. 1W	4.9mm	**51-7383**	3.10	2.82	
650Hz					
0.5W/Max. 1.W	5mm	**51-7395**	2.38	2.16	
850Hz					
0.5W/Max. 0.7W	3.4mm	**51-7389**	1.65	1.50	
900Hz					
0.5W/Max. 0.8W	3.5mm	**51-7390**	2.63	2.24	
950Hz					
0.5W/Max. 1W	3.6mm	**51-7391**	1.50	1.36	

526112

Primetone
Miniature Loudspeakers

An economical miniature speaker for use in small portable equipment.

- Fitted with paper cone and ferrite magnets
- Solder connection tags
- Both types 66mm diameter 21mm deep
- Handling capacity 300mW
- **Primetone types 6608F (35-0130)** and **6664F (35-0135)**

Type	Order code	1+	25+	100+
8Ω Mini speaker	**35-0130**	1.11	1.01	0.841
64Ω Mini speaker	**35-0135**	1.11	1.02	0.841

030207

Don't Forget Curriculum Electronic Kits

≡**RVFM**

75mm 10W Full Range Speaker

A quality and good sounding full range loudspeaker.

- Suitable for all applications
- Foam edged paper cone with chrome HF dome

Technical specification

Impedance	8Ω
Power rating	10W
Frequency response	120Hz - 16kHz
Resonant frequency	120Hz
Sensitivity 1W, 1m	88dB
Magnet weight	150g
Overall weight	415g
Dimensions	78 (dia.) x 45mm

Type	Order code	1+	6+	12+
75mm Full range speaker	**35-1400**	5.54	4.97	4.22

028631

≡**RVFM**

50mm Ultra Slim Paper-coned Speakers

These miniature ultra slim loudspeakers are just 17mm thick.

- Paper cones
- Suitable for a wide range of applications
- 50mm diameter
- Wide frequency response enables the speakers to be used for speech, music or high frequency alarm output
- Solder tag termination
- Fitted with flange to assist mounting
- Available in **8Ω** and **64Ω options**

Type	Order code	1+	25+	100+	500+
8Ω speakers	**35-0128**	0.924	0.769	0.656	0.597
64Ω speakers	**35-0129**	1.13	0.937	0.80	0.728

083193

VISAT**O**N®

5cm Mini Speaker with Plastic Diaphragm

A high quality 5cm round speaker particularly well suited to outdoor applications and where ambient conditions are generally unfavourable.

- Magnetically shielded
- Plastic diaphragm and metal basket
- Full-range driver with good efficiency
- Broad frequency response and good voice reproduction
- Extremely small size due to a neodymium magnet system
- Typical applications include electronic devices and outdoor systems
- **CE** approved

Technical specification

Rated power	2W
Maximum power	3W
Nominal impedance	8Ω
Frequency response	–10dB 180-17000Hz
Mean sound pressure level	86dB
Resonance frequency fs	300Hz
Voice coil diameter	10mm
Cutout diameter	46mm
Net weight	48g
Protective system	IP65

Type	Order code	1+	10+	25+	50+
8Ω	**35-2902**	2.21	1.91	1.86	1.80

073504

VISAT**O**N® GERMANY

2015 FR 7 Round Full Range Speaker 4Ω

A compact size **round miniature speaker** from **Visaton**. Includes a balanced frequency response from 130Hz, high efficiency and very good high range response, making it suitable for machines and other equipment where space is at a premium. Typical applications include control speakers for electronic devices, narrow network column speakers, model construction and electronic musical instruments.

- Moisturised cone
- Metal basket
- Cutout: ø 61mm
- Manufacturer's part **2015**

Technical specification

Rated/max. power	Impedance		Mean sound press.	Resonance	Voice coil	Winding height
5W/10W	4Ω	130–20000Hz	86dB (1W/1m)	220Hz	ø 14mm	2.5mm

Type	Order code	1+	10+	25+
Round Speaker	**35-0567**	4.73	4.30	4.06

554242

Primetone

Ultraslim Subminiature Speakers

A subminiature speaker measuring 40mm in diameter.

- Overall depth of just 9.5mm
- Paper cone and alnico magnet
- Solder connection tags
- 0.1W and 0.25W versions available

Technical specification

Dimensions	40(W) x 9.5(D)mm
Impedance	8Ω
Frequency range	450Hz - 5kHz
Magnet weight	1.5g
Primetone series	LP400

Type	Order code	1+	25+	100+
0.1W 40mm Speaker	**35-0120**	1.58	1.27	
0.25W 40mm Speaker	**35-0122**	1.58	1.27	1.07

075779

VISAT**O**N® GERMANY

10cm Full Range Speakers

A high quality 10cm full range speaker with good bass reproduction.

- Galvanised lacquered basket
- Balanced frequency response
- High efficiency
- Suitable as a built-in speaker for music reproduction
- Typical applications include 100V network column speakers, ceiling mounted speakers in transport, built-in car Hi-Fi and electronic music instruments
- Available in **4** and **8Ω versions**
- **CE** approved

Technical specification

Rated power	20W
Maximum power	30W
Nominal impedance	4 and 8Ω
Frequency response	–10 dB 80-20000Hz
Mean sound pressure level	86dB
Resonance frequency fs	95Hz
Voice coil diameter	20mm
Cutout diameter	46mm
Net weight	410g
Protective system	IP65

Type	Order code	1+	10+
4Ω	**35-2908**	14.06	
8Ω	**35-2909**	12.59	12.16

073508

VISAT**O**N® GERMANY

FRs 8 High Power Fullrange Speakers

These Visaton 8cm (3.3 inch) Hi-Fi fullrange speakers are suitable for surround, as effect channel speakers and mini subwoofer/satellite systems. Due to the small size they are very suitable for control speakers for electronic devices.

Ideal for use as ceiling-mounted speakers in railway carriages and busses, mini Hi-Fi systems and model construction.

- Small size
- Protective grille 1138 available (order code **35-2959**)

Technical specification

	FRS 8; 8Ω	FRS 8; 4Ω
Mftrs. Part No.		
Order code	**35-2936**	**35-2937**
Rated/maximum power	50W	30W
Impedance	8Ω	4Ω
Frequency response (-0dB)	100 to 20000Hz	100 to 20000Hz
Mean sound pressure level	82dB (1W/1m)	82dB (1W/1m)
Excursion limit xmech	±2.5mm	±2.5mm
Resonance frequency	115Hz/120Hz	115Hz/120Hz
Height of front pole-plate	4mm	4mm
Voice coil diameter	20mm	20mm
Height of winding	4,5mm	4,5mm
Depth	44mm	40mm
Cutout diameter	73mm	73mm
Net weight	280g	280g

Type	Order code	1+	10+
FRS 8; 8 Ohm	**35-2936**	10.69	9.56
FRS 8: 4 Ohm	**35-2937**	8.49	7.89

500253

≡**RVFM**

50mm Ultra Slim Mylar Cone Speakers

These miniature ultra slim loudspeakers are just 11mm in thickness.

- Mylar cones
- Suitable for a wide range of applications
- 50mm diameter
- Wide frequency response enables the speakers to be used for speech, music or high frequency alarm output
- Solder tag termination
- Fitted with flange to assist mounting
- Available in **8Ω** and **64Ω options**

Type	Order code	1+	25+	100+	500+
8Ω Speakers	**35-0126**	1.23	1.09	0.952	
64Ω Speakers	**35-0127**	1.23	1.09	0.952	0.896

079443

VISAT**O**N® GERMANY

1138 Speaker Grille

A protective grille that has been manufactured from metal and given a matt black finish. The grille has a decoration ring made of black plastic.

Suitable for Visaton speakers:
FR 8 4Ω; FRS 8 8Ω; FRS 8 4Ω; FRS 8 8Ω; F 8 SC 4Ω; F 8 SC 8

- Grille for FRS 8, FR 8 F 8 SC
- Colour: Matt black
- External diameter: 95mm
- External length / Height: 6mm
- External width: 82mm
- Material: Metal
- Surface finish: Matt

Type	Order code	1+	10+
Grille for FRS8, FR 8	**35-2959**	4.38	3.87

500254

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≡RVFM

Miniature PCB Piezo Transducer

This piezo transducer is able to generate a range of audible tones and frequencies when energised by a 12V peak square wave. Provided it is mounted rigidly in the prescribed manner, outputs of up to 80dB can be achieved.

- Requires drive circuit
- PCB mounting
- Ideal for toys, clocks and watches, calculators and electronic games, using the transducer in place of a speaker
- Suitable for use in professional, commercial and industrial applications.
- Durable in domestic appliances
- Dimensions: 17(dia) x 8mm (depth)

Note: Not suitable for speech and music.

Technical specification

Rated voltage	12V peak to peak
Allowable voltage max.	30V peak to peak
Current consumption	4mA at 4.0KHz
Sound output	80dB
Frequency	4.0 4± 0.5KHz
Housing material	ABS / black
Weight	1g
Operating temperature	-20°C to +60°C
Storage temperature	-30°C to +70°C

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	500+
PCB Piezo transducer	**35-0044**	0.644	0.424	0.35	0.289

083006

≡RVFM

Piezo Transducer 1mA, 80dB

A piezo audio transducer that is epoxy sealed at base and suitable for PCB mounting.

- Wave solderable and washable
- Low power consumption
- Available in **black**

Technical specification

Rated voltage	5V AC
Operating voltage	1 - 20V AC pk-pk
Rated current at rated voltage	1mA
Capacitance	13000 ±30%pF
Sound output at rated voltage	>80dB
Resonant frequency at rated voltage	4000 ±500Hz
Operating temperature	–20°C to +70°C
Storage temperature	–30°C to +80°C
Housing material	Noryl
Weight	1g

Type	Order code	1+	25+	100+
Piezo transducer	**35-0282**	1.01	0.90	0.794

073100

≡RVFM

Piezo Element 27mm 4.2kHz with Leads

A 27mm diameter piezo element that comes with 200mm flying leads.

- Low power consumption
- Reliable and lightweight
- Just 0.52mm thick

Technical specification

Rated voltage (max.)	30V pk-pk
Capacitance	20000pF ±30%
Resonant frequency	4.2kHz ±500Hz
Operating temperature	–20°C to +60°C
Storage temperature	–20°C to +70°C
Overall diameter	27mm
Overall thickness	0.52mm
Wire type	AWG28 UL1095
Lead length	200mm

Type	Order code	5+	100+
Piezo element	**35-0288**	0.473	0.412

200129

≡RVFM

Miniature Piezo Transducer with Flying Leads

This piezo transducer is able to generate a range of audible tones and frequencies when energised by a 12V peak square wave. Provided it is mounted rigidly in the prescribed manner, outputs of up to 80dB can be achieved.

- Flying leads
- Requires drive circuit
- PCB mounting
- Ideal for toys, clocks and watches, calculators and electronic games, using the transducer in place of a speaker
- Suitable for use in professional, commercial and industrial applications.
- Durable in domestic appliances
- Available in 12.5, 23 and 30mm diameter options

Note: Not suitable for speech and music.

Technical specification

Order code	35-0045	35-0046
Rated voltage	12V peak to peak	12Vpeak to peak
Allowable voltage max.	25V peak to peak	30V peak to peak
Current consumption	2mA at 4.0KHz	3mA at 4.0KHz
Sound output	75dB	80dB
Frequency	4.0 4± 0.5KHz	4.0 4± 0.5KHz
Housing material	ABS / black	ABS / black
Weight	1.3g	1g
Operating temperature	-20°C to +60°C	-20°C to +60°C
Storage temperature	-30°C to +70°C	-30°C to +70°C

Order code	35-0047
Rated voltage	12V peak to peak
Allowable voltage max.	30V peak to peak
Current consumption	8mA at 4.0KHz
Sound output	80dB
Frequency	3.6 4± 0.5KHz
Housing material	ABS / black
Weight	3g
Operating temperature	-20°C to +60°C
Storage temperature	-30°C to +70°C

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	500+
15mm transducer	**35-0045**	0.79	0.556	0.454	
20mm transducer	**35-0046**	0.79	0.556	0.454	0.382
29.5mm transducer	**35-0047**	0.79	0.556	0.454	0.382

083007

≡RVFM

Piezo Transducer

A piezo audio transducer that is epoxy sealed at base and suitable for PCB mounting.

- Wave solderable and washable.
- Available in two voltage ratings 6 and 12V.
- Low power consumption.
- Available in black
- Please note: This transducer requires a drive circuit.

Technical specification

Rated voltage	9V DC
Operating voltage	1 - 30V DC
Rated current at rated voltage	3mA
Capacitance	17000 ±30%pF
Sound output at rated voltage	>85dB
Resonant frequency at rated voltage	4000 ±500Hz
Operating temperature	-20°C to +60°C
Storage temperature	-30°C to +70°C
Housing material	Noryl
Weight	3g

Type	Order code	1+	25+	100+
Piezo transducer	**35-0286**	1.50	1.34	1.17

073102

SCI PARTS

R13-510A Low Profile Push Button Switches

A range of low profile push switches that snap-fit into a 12.7mm panel cut-out.

- Large 9mm actuator button available in red or black in momentary action push to make

Technical specification

Contact rating	1.5A 250V AC
	3A 125V AC
Contact resistance	50mΩ max
Insulation resistance	>100MΩ

			MOQ 5 - In Multiples of 5		
Type	Colour	Order code	5+	25+	100+	500+
Push to make	Red	**78-1520**	0.451	0.41	0.379	0.349
Push to make	Black	**78-1522**	0.451	0.42	0.379	0.349

030972

SCI PARTS

Low Profile Push-Button Switches with Chrome Bezels

A range of low profile push switches supplied with large 9mm actuator buttons.

- Available in momentary action push to make, push to break or changeover options
- Smart chrome bezel
- Supplied with button in red or black
- SCI R13–502 series

Technical specification

Contact rating		3A 125V AC
		1.5A 250V AC
Contact resistance		50m max.
Insulation resistance		10 x 10⁷ min.
Body dimensions	push to make	20mm x 14.0mm dia,
	push to break	22.3mm x 14.0mm dia.
	SPCO	21mm x 14.0mm dia.
Panel cut-out		12.7mm

Type	Colour	Order code	1+	25+	100+	500+
Push to make	Red	**78-1550**	0.923	0.81	0.759	0.687
Push to break	Black	**78-1570**	0.95	0.803	0.721	
SP Changeover	Red	**78-1590**	1.00	0.89	0.82	
SP Changeover	Black	**78-1591**	1.02	0.913	0.81	

030295

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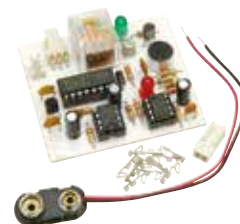
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Education

5

Electronic Kits & Components

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Miniature Push-button Switches

A range of low-cost, miniature push to make and push to break switches that are available in various button colours.

- Ideal for school projects and prototyping
- Non-locking
- Rated 125V AC 250mA
- Panel cut-out 7mm
- Dimensions 28mm long, ø10.5mm

Note: *These switches are not recommended for industrial applications.*

		MOQ 10 - In Multiples of 10		
Colour	Order code	10+	100+	500+
Push to make				
Black	**78-0118**	0.21	0.185	0.17
Red	**78-0100**	0.21	0.185	0.17
Blue	**78-0119**	0.21	0.185	0.17
Green	**78-0120**	0.21	0.185	0.17
White	**78-0121**	0.21	0.185	0.17
Yellow	**78-0122**	0.21	0.185	0.17
Push to break				
Black	**78-0105**	0.21	0.185	0.17
Red	**78-0123**	0.21	0.185	0.17

077607

≡RVFM

Miniature Push Switches

Miniature low cost push-to-make switches with an all-plastic body and chrome locking nut, offered in a variety of button colours.

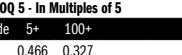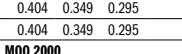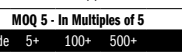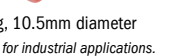- Non-locking action
- Rated 250mA 60V AC
- Panel cut-out 7mm
- Overall dimensions 28mm long, 10.5mm diameter

These switches are not recommended for industrial applications.

	MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	500+
Red push switch	**78-0030**	0.404	0.349	0.295
Black push switch	**78-0035**	0.404	0.349	0.295

	MOQ 2000	
Type	Order code	2000+
Yellow push switch	**78-0045**	0.285

	MOQ 5 - In Multiples of 5	
Type	Order code	5+	100+
White push switch	**78-0055**	0.466	0.327

064324

SCI PARTS

Miniature Latching Push Switch Small Button

Low-cost, panel mounting, latching 2P SPST push switches that have small buttons.

- Available with red or black button
- Fits into 7mm panel cut-out, max. thickness 4mm
- Silver plated brass solder terminals
- Nylon frame to **UL 94V-2**

Technical specification
Rating	250V AC 1.5A/125V AC 3A
Contact resistance	50mΩ max.
Insulation resistance	100MΩ min.
Dielectric strength	1500V AC 1 minute

Type	Colour	Order code	1+	25+	100+	500+
Latching switch	Red	**78-0233**	0.792	0.725	0.62	
Latching switch	Black	**78-0234**	0.792	0.663	0.62	0.567

075718

SCI PARTS

Miniature Latching Push Switch Large Button

Low-cost, panel mounting, latching 2P SPST push switch that has a large button.

- Available with red button
- Fits into 7mm panel cut-out, max. thickness 4mm
- Silver plated brass solder terminals
- Nylon frame to **UL 94V-2**

Technical specification
Rating	250V AC 1.5A/125V AC 3A
Contact resistance	50mΩ max.
Insulation resistance	100MΩ min.
Dielectric strength	1500V AC 1 minute

Type	Colour	Order code	1+	25+	100+	500+
Latching switch	Red	**78-0235**	0.761	0.673	0.62	0.567

075719

SCI PARTS

Miniature SPST Momentary Push-Button Switches

These low cost push to make switches come with an all-plastic body and chrome locking nut.

- Non-locking momentary action
- Available with red or black button
- 5.2mm (M5) dia. panel cut-out
- Dimensions 19(L) x 8mm diameter
- Silver plated brass terminals
- **UL 94V-2** approved

Technical specification
Voltage rating	0.5A 125V AC
Contact resistance	50mΩ max.
Insulation resistance	500V DC, 100MΩ min.
Dielectric strength	1000V AC, 1 minute
Circuit	SPST momentary push to make
Mount hole	5.2mm
Panel thickness	4mm max.

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	25+	100+	500+
Red push switch	**78-0186**	0.357	0.31	0.287	
Black push switch	**78-0187**	0.45	0.376	0.344	0.287

071431

SCI PARTS

Latching Push Button Switches

Low-cost, panel mounting, latching 2P SPST push switches which have domed buttons.

- Available with red or black button
- Fits into 12.2mm panel cut-out, max. thickness 4mm
- ABS actuators with phenolic base
- **UL 94HB** approval

Technical specification
Rating	250V AC 1.5A/125V AC 3A
Contact resistance	50mΩ max.
Insulation resistance	100MΩ min.
Dielectric strength	1000V AC 1 minute

		MOQ 5 - In Multiples of 5		
Type	Colour	Order code	5+	25+	100+	500+
Latching switch	Red	**78-0237**	0.651	0.532	0.445	
Latching switch	Black	**78-0238**	0.605	0.547	0.483	0.431

075720

SCI PARTS

SPST Momentary Push Switches

Low-cost push to make switches.

- Non-locking momentary action
- Available with red or black button
- Snap-fit into a 14.8mm dia. panel cut-out
- Dimensions 19.5(L) x 18mm diameter
- Easy to install into panel
- Silver plated brass terminals
- **UL flame 94V-2** approved

Technical specification
Voltage rating	3A 125V AC/1.5A 250V AC
Contact resistance	50mΩ max.
Insulation resistance	500V DC, 100MΩ min.
Dielectric strength	1500V AC, 1 minute
Mount hole	15mm
Panel thickness	0.5 to 2mm

Type	Colour	Order code	1+	25+	100+
Momentary	Red	**78-0184**	0.967	0.85	0.765
Momentary	Black	**78-0185**	0.967	0.85	0.765

071430

SCI PARTS

SPST Locking Panel Mounting Push Switch

A low cost push to make switch with all-plastic body and locking nut.

- Panel mounting
- Latching action
- Available with black actuating button
- 15mm dia. panel cut-out
- Easy to install into panel
- Silver plated brass terminals
- Dimensions 23.5(L) x 18(W)mm
- **UL flame 94HB** approved

Technical specification
Voltage rating	3A 125V AC/1.5A 250V AC
Contact resistance	50mΩ max.
Insulation resistance	500V DC, 100MΩ min.
Dielectric strength	1500V AC, 1 minute
Circuit	2P SPST latching push to make
Mount hole	15mm
Panel thickness	7mm max.

Type	Order code	1+	25+	100+
Black push switch	**78-0189**	1.62	1.36	1.15

071434

SCI PARTS

R13-23 Series 1A Square Push Switches

A range of attractive large push switches with actuator button in red or black.

- SPST contacts
- Available with momentary push-to-make or latching action
- Body dimensions 34 x 15 x 15mm
- Panel cut-out 12mm
- Contacts rated 1A, 250V AC

Technical specification
Order code	Mftrs Part No.	Contact configuration	Button colour	Action
78-0110	R13-23A RED	SPST	Red	Momentary
78-0112	R13-23A BLACK	SPST	Black	Momentary
78-0115	R13-23B RED	SPST	Red	Latching
78-0117	R13-23B BLACK	SPST	Black	Latching

		MOQ 5		
Type	Order code	5+	25+	100+	500+
SPST red momentary	**78-0110**	0.513	0.451	0.41	
SPST black momentary	**78-0112**	0.489	0.436	0.383	
SPST red latching	**78-0115**	0.544	0.503	0.451	0.40
SPST black latching	**78-0117**	0.554	0.513	0.441	

030275

≡RVFM

Miniature Vertical Slide Switch

A low-cost SPDT miniature slide switch for PCB mounting.

- Rating 0.5A 50V DC
- Silver plated solder terminals
- Pitch 4mm
- 19mm Long, 5.6mm Wide, 5mm High
- Long lifespan

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	100+	500+	1000+
Slide switch	**76-0310**	0.107	0.089	0.077	0.07

075724

ⓐ ALPHA

Miniature PCB Slide Switches

Miniature SPDT PCB mounting slide switches available in vertical or right angle options.

- Suited to many signal switching applications
- Both switches incorporate PCB supports to improve rigidity
- Non shorting contacts rated at 0.3A 125V AC
- Pitch 3mm

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	100+	250+
Vertical SPDT slide	**76-0265**	0.382	0.282	0.215

030269

≡RVFM

Miniature Slide Switches 6V

Miniature slide switches available with different size actuators.

- Choice of actuator size 2mm or 4.4mm
- Rating 0.3A 6V DC
- SPDT circuit
- Pitch 2.5mm

		MOQ 10			
Type	Order code	10+	25+	100+	500+
Slide switch 6V	**78-3760**	0.29	0.271	0.234	0.182

		MOQ 5			
Type	Order code	5+	25+	100+	500+
Slide switch 6V 4.4mm act.	**78-3762**	0.29	0.271	0.234	0.182

123404

≡RVFM

Standard Slide Switches

Standard slide switches with solder tag connections and break before make DPDT contacts.

- Also available in centre off
- Suited to a wide range of miniature electronic equipment
- Contacts rated at 0.3A, 125V AC
- Fixing centres 28mm

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	100+	500+	1000+
DPDT Std. slide	**76-0105**	0.304	0.254	0.211	
DPDT Centre off slide	**76-0110**	0.284	0.222	0.184	0.174

030267

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TAIWAY Switches Since 1976

1260 Ultraminiature Slide Switch

A miniature slide switch with SPDT contacts.

- Body measures just 9.0 x 3.5 x 3.5mm
- Ideally suited to a wide range of low voltage applications
- Right angle actuator button making it ideal for edge of board applications
- Pins are on a 2.50mm pitch making the switch suitable as an alternative to jumpers etc.
- Contacts rated 0.3A at 6V

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	500+
Ultramin slide switch	**76-0303**	0.287	0.246	0.215	0.195

060329

SH

Ultraminiature PCB Mounting Slide Switches 2A

A range of vertical and right angle mounting slide switches with PCB pins on a 2.54mm pitch.

- Silver plated contacts close with a positive action
- Sealed terminals are flux immune

Technical specification
Dimensions	SPDT	14 x 7.8 x 7.7mm
	DPDT	14 x 12.8 x 7.7mm
Contact rating		2A 250V AC
Minimum load		100mA 10V
Initial contact resistance		10mΩ max.
Electrical life		2×10^4 operations
Temperature range		–40°C to +85°C

Type	Order code	1+	25+	100+	500+
SPDT Vertical	**76-0200**	0.75	0.657	0.583	0.503
DPDT Vertical	**76-0220**	1.00	0.876	0.778	0.699
SPDT Right angle	**76-0205**	1.21	1.00	0.86	
DPDT Right angle	**76-0215**	1.22	1.05	0.913	0.803

030268

SCI PARTS

Miniature Toggle Switches

A range of low cost panel mounting miniature toggle switches.

- Provides exceptional value
- Available in single pole and double pole options including momentary biased options
- All switches are fully approved to **UL** and **CSA**
- SCI TA102/TA202 series

For biased switches (On) indicates momentary action.

Technical specification
Contact rating	6A, 125V, 3A 250V AC
Initial contact resistance	<20mΩ
Insulation resistance	>100MΩ at 500V DC
Contact material	Copper alloy with silver inlay silver plated
Body material	Flame retardant alkyd
Electrical life	>1 x 10^4 cycles at full load (min.)
Operating temperature	–20°C to +65°C

		MOQ 5 - In Multiples of 5		
Type		Order code	5+	25+	100+
SPST		**75-0125**	0.804	0.709	0.662
SPDT	On-Off	**75-0130**	0.758	0.693	0.628
SPDT	Centre-Off	**75-0135**	0.785	0.676	0.606
SPDT	On-Off-(On)	**75-0152**	0.886	0.82	0.733

		Price each		
Type		Order code	1+	25+	100+
SPDT	(On)-Off-(On)	**75-0157**	1.01	0.904	0.805
DPDT	On-On	**75-0140**	0.966	0.886	0.818
DPDT	Centre-Off	**75-0145**	1.02	0.918	0.847

030254

SH

Miniature Toggle Switches

A range of panel mounting latching and momentary toggle switches.

- Choose from a variety of contact configurations
- Solder lug terminations
- Silver plated copper alloy contacts
- Stainless steel housing
- **Salecom T80-T** series

For biased switches (On) indicates momentary action.

Technical specification
Contact rating	5A 125V AC/28V DC
Electrical life	50,000 make-and-break cycles at full load
Contact resistance	10mΩ max.
Insulation resistance	1000MΩ min.
Dielectric strength	1500V rms
Operating temperature	–30° to +85°C

		MOQ 5 - In Multiples of 5			
Contacts	Function	Order code	5+	25+	100+	500+
SPST	On-Off	**75-0082**	0.81	0.749	0.708	0.687
SPDT	On-None-On	**75-0083**	0.779	0.697	0.626	0.605
SPDT	On-Off-On	**75-0084**	0.77	0.711	0.659	

		Price each			
Contacts	Function	Order code	1+	25+	100+	500+
SPDT	On-Off-(On)	**75-0085**	1.12	0.974	0.81	
SPDT	(On)-Off-(On)	**75-0086**	1.25	1.23	0.931	0.869

		MOQ 5 - In Multiples of 5		
Contacts	Function	Order code	5+	25+	100+
DPDT	On-None-On	**75-0087**	0.91	0.849	0.797

		Price each		
Contacts	Function	Order code	1+	25+	100+
DPDT	On-Off-(On)	**75-0088**	1.08	0.946	0.852
DPDT	On-Off-(On)	**75-0089**	1.12	1.02	0.913
DPDT	(On)-Off-(On)	**75-0090**	1.29	1.18	1.08

075284

TAIWAY Switches Since 1976

Miniature Toggle Switches

These miniature **toggle switches** from **Taiway** are available in single pole.

- Contact rating - 5A 125VAC, 2A 250VAC
- 50,000 make and break cycles at full load
- Solder lug terminations
- Epoxy terminal seal
- Silver plated contacts

Technical specification
Contact resistance	10mΩ max @ 2-4VDC
Insulation resistance	1,000 MΩ min
Dielectric strength	1,500V RMS @ sea level
Operating temperature	–30°C to +85°C
Materials	
Case	Diallylphthalate UL94V-0
Toggle handle	Brass, chrome plated
Bushing	Brass, nickel plated
Housing	Stainless steel

Contacts	Function	Order code	1+	25+	100+
SPDT		**75-0211**	1.60	1.32	1.14
SPDT	Centre-Off	**75-0212**	1.64	1.53	1.33

072615

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SCI PARTS

Standard Toggle Switches

Low-cost standard size toggle switches.

- Complete with On/Off plate
- Rated at 250V 1.5A
- Panel cut-out 12mm
- These switches are not recommended for industrial applications

		MOQ 5 - In Multiples of 5		
Type	Body dim.	Order code	5+	10+	100+
SPST	25 x 14 x 14	75-0180	0.783	0.726	0.653

			Price each		
Type	Body dim	Order code	1+	10+	100+
DPDT	28 x 18 x 14	75-0185	0.863	0.799	0.756

030255

ZIP switch

Toggle Switches, On-On 250V AC 3A

The chrome-plated toggle has a red removable insulating sleeve. Toggle length 13mm.

- Nickel-plated lever
- 3A; 250V AC

Technical specification

50-0957
Dimensions	(L x W x H) 12.5 x 7 x 9.5mm
Functions	Maintained-Maintained
Number of pins	1
Toggle length	13mm
Specification	1-pole On/On
Switch position	SPDT, On-On
Switching current	3A
Switching power	3A/250V
Switching voltage	250V AC
Type	KNX 1

50-0958
Dimensions	(L x W x H) 12 x 11 x 9.5mm
Functions	Maintained-Maintained
Number of pins	2
Toggle length	13mm
Specification	2-pole On/On
Switch position	DPDT, On-On
Switching current	3A
Switching power	3A/250V
Switching voltage	250V AC
Type	KNX 2

		MOQ 5 - In Multiples of 5			
Switch type	Order code	5+	10+	15+	50+
SPDT, 1 pole	50-0957	0.527	0.514	0.486	0.432
DPST, 2 pole	50-0958	0.616	0.60	0.559	0.514

519922

SCI PARTS

Sub-miniature Toggle Switches

A range of low-cost panel mounting sub-miniature toggle switches.

- Excellent value
- Ideal for use where space is at a premium
- **SCI MTE** series

Technical specification
Contact rating	3A, 125V, 1.5A 250V AC
Contact resistance max.	20mΩ
Insulation resistance min.	100MΩ @ 500V DC
Dielectric strength	1000V AC 1 min
Operating temperature	–20°C to +85°C

Type	Order code	1+	25+	100+	500+
2P SPST On-Off	75-0095	0.874	0.718	0.588	0.539
3P SPDT On-On	75-0096	0.874	0.718	0.588	0.539
6P DPDT On-On	75-0097	0.989	0.845	0.691	0.634

079431

≡RVFM

Microminiature Microswitches

A range of micro-miniature microswitches, measuring only 12.7mm in length.

- 1A, 250V AC switching ability in a truly miniature package
- PCB solder terminals
- Single pole changeover contacts
- Available in button and lever operation styles

Technical specification
Dimensions	12.7 x 5.8 x 6.5mm
Pitch	6.5mm
Contact material	Silver alloy
Contact rating	2A 30V DC, 1A 250V AC
Mechanical life	>30 x 10^4
Electrical life	>30 x 14^4

	Button	Lever
Operating force	150g	80g
Release force min.	20g	5g
Pretravel max.	0.5mm	–
Overtravel min.	0.25mm	0.55mm
Movement diff.max.	0.12mm	0.5mm
Actuator length	–	13mm

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	500+
Microminiature button	78-0730	0.629	0.554	0.523	
Microminiature lever	78-0735	0.535	0.482	0.469	0.439

030288

≡RVFM

Lever Operated Microswitches
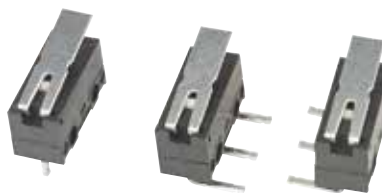
A range of value for money superminiature microswitches that are suitable for a wide variety of applications.

- Straight, right angle left or right angle right mounting
- Choice of 0.1A 30V DC or 3A 125V AC rating
- Solder terminals
- Minimum 1,000,000 operations for extended life

Technical specification
Contact rating	78-0870 0.1A 30V DC
	78-0877 3A 125V AC
	78-0878 3A 125V AC
Contact resistance (max)	100mΩ
Insulation resistance (min)	100MΩ

			MOQ 5 - In Multiples of 5			
Rating	Actuator	Order code	5+	25+	100+	500+
0.1A 30V DC	Lever	78-0870	0.363	0.312	0.265	0.246

			Price each	
Rating	Actuator	Order code	1+	
3A 125V AC	Lever RA left	78-0877	0.22	

			MOQ 5 - In Multiples of 5		
Rating	Actuator	Order code	5+	25+	100+
3A 125V AC	Lever RA right	78-0878	0.479	0.425	0.38

074549

≡RVFM
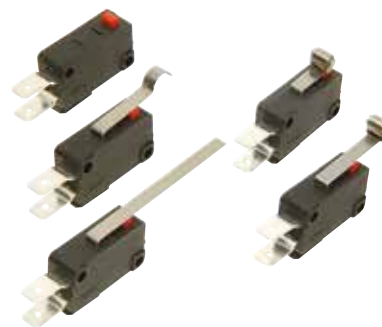
V3 Microswitches

A range of high quality standard size microswitches.

- Switching capacity 15A at 250V AC
- Connection may be made by a 6.35mm (¼in.) connector or by soldering
- Can be connected as normally open or normally closed
- Compact and precise operation
- Variety of actuator types
- Phenolic resin push buttons
- Stainless steel levers

Technical specification
Contacts rating	250V 15A AC resistive load
Service life	Mechanical >1,000,000 operations
	Electrical >100,000 operations @ rated load
Dimensions (H x W x D)	15.9 x 27.8 x 10.34mm ±0.4mm
Weight approx.	7g

Actuator	Button	Long lever	Short roller	Medium roller	Simulated roller
Pretravel (mm)	1.2	7.6	1.5	3.3	2.5
Differential (mm)	0.15-0.4	2.2	0.5	1.2	1.2
Operating force (g)	300	100	300	150	150
Release force (g)	80	14	85	28	28
Order code	78-0700	78-0702	78-0715	78-0710	78-0703

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	500+
Button	78-0700	0.739	0.667	0.606	

			Price each		
Type	Order code	1+	25+	100+	500+
Long lever	78-0702	1.10	1.04	0.878	0.822
Short roller	78-0715	1.20	0.965	0.87	0.798
Medium roller	78-0710	0.973	0.875	0.796	
Simulated roller	78-0703	0.829	0.745	0.726	

073516

CAMDENBOSS
CONNECT. ENCLOSE. INNOVATE.

Paddle Lever Microswitch

A high quality V3 type **microswitch** from **CamdenBoss** with a wide, long paddle lever.

- Ideal for quick alignment in security and safety applications such as tamper switches in alarm panels and bell boxes
- Dimensions of lever: 9 x 54mm (62mm from tip of lever to adjacent fixing hole)
- Camden part no. **CSM30531D**
- **CUL** approved

Rapid is an official distributor of CamdenBoss products. The products listed here are those that Rapid hold in stock – but we have access to many more, including the company's complete range of terminal blocks.

Technical specification
Contacts	Silver plated
Rating	3A 250V AC
Mechanical life	>10^6 operations
Temperature range	–20°C to +70°C

Type	Order code	1+	25+	100+	500+
Paddle level microswitch	78-0720	0.913	0.778	0.722	0.654

028681

RVFM

Subminiature V4 Microswitches
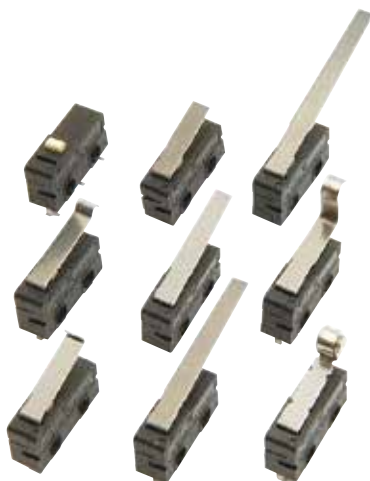
A range of subminiature microswitches.

- Switching capacity of 3A at 250V AC
- Available with solder terminal or PCB terminal connections
- Can be connected as normally open or normally closed
- All switch types are free from overtravel restrictions and permit easy setting
- Wide variety of actuator types
- Phenolic resin push buttons
- Stainless steel levers
- **UL** approved

Technical specification

Contact rating	250V 3A AC resistive load	
Service life	Mechanical	>10,000,000 operations
	Electrical	>100,000 operations rated load
Dimensions	10.2(H) x 19.8(W) x 6.4(D)mm ±0.4mm	
Weight approx.	2.2g	

Actuator	Pretravel (mm)	Differential (mm)	Operating force (g)	Release force (g)
Button	0.5	0.1	150	25
14.5mm Lever	–	0.8	50	6
30.5mm Lever	–	1	30	5
37.5mm Lever	–	1	30	5
Simulated roller	–	0.8	50	6
Edge lever	–	0.8	50	6
Formed lever	–	0.8	50	6
Roller	–	0.8	50	6

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	25+	100+
14.5mm Lever	**78-2467**	0.57	0.512	0.466

		Price each		
Type	Order code	1+	25+	100+
22.6mm Lever	**78-2468**	0.841	0.721	0.63
30.5mm Lever	**78-2469**	0.822	0.703	0.616

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	25+	100+
37.5mm Lever	**78-2470**	0.63	0.561	0.505
Simulated roller	**78-2471**	0.616	0.547	0.493

		Price each		
Type	Order code	1+	25+	100+	500+
Roller	**78-2474**	0.853	0.745	0.663	0.597
PCB terminal					

Type	Order code	1+	100+	500+
14.5mm Lever	**78-2476**	0.43	0.321	0.285

		MOQ 5 - In Multiples of 5		
Type	Order code	5+	25+	100+
Roller	**78-2483**	0.589	0.535	0.484

073543

CAMDENBOSS
CONNECT. ENCLOSE. INNOVATE.

Subminiature V4 Microswitches

Type V4 miniature microswitches with SPDT switching and a long life coil spring mechanism.

- Available in five standard actuator forms
- PCB pins or solder terminals
- **Camden CSM series**
- **CUL** approved

Rapid is an official distributor of CamdenBoss products. The products listed here are those that Rapid hold in stock – but we have access to many more, including the company's complete range of terminal blocks. Click here to make an enquiry about ordering CamdenBoss terminal blocks, connectors and enclosures.

Technical specification

Contact rating	5A 250V AC				
Mechanical life	3 x 10⁶ operations				
Temperature range	-20°C to +70°C				
	Type 00	Type 01	Type 02	Type 05	Type 08
Operating force	150	42	27	42	15
Release force	75	12	5	10	10
Pre-travel max.(mm)	0.6	2.6	5.4	2.6	7.5
Movement differential (mm)	0.1	0.6	0.9	0.6	1.7
Over-travel min.(mm)	0.5	1	1.6	1	5

		MOQ 2			
Type	Order code	2+	25+	100+	250+
Solder terminal					
00A Button	**78-2400**	0.631	0.495	0.441	0.403
01A 14.5mm Lever	**78-2402**	0.713	0.643	0.536	0.467
02A 22.6mm Lever	**78-2404**	0.563	0.436	0.396	
05A 14.5mm	**78-2407**	0.67	0.552	0.483	
08A 43mm Lever	**78-2408**	0.657	0.603	0.562	0.509

		MOQ 100 - In Multiples of 5	
Type	Order code	100+	250+
PCB termination			
00C Button	**78-2410**	0.397	0.39

		MOQ 2			
Type	Order code	2+	25+	100+	250+
01C 14.5mm lever	**78-2412**	0.683	0.523	0.47	0.441
02C 22.6mm Lever	**78-2414**	0.715	0.559	0.501	
05C 14.5mm Roller lever	**78-2416**	0.595	0.548	0.512	
08C 43mm Lever	**78-2418**	0.631	0.551	0.507	

030301

SCI PARTS

SPST Miniature "Visible On" Rocker Switches

A range of single pole rocker switches with red, green or blue marking on the rocker which is clearly visible when the switch is in the 'on' position.

- 4.8 x 0.8mm connections
- Panel cut-out 19.2 x 13mm
- A waterproof cover for the switch is also available see this section
- Fully approved to **UL, CSA, VDE, NDE, SEMKO, DEMKO, NEMKO** and **FIMKO**

Technical specification

Contact rating	6A 250V
	10A 125V
Initial contact resistance	<50mΩ
Insulation resistance	>100MΩ @ 500V DC
Termination	4.8 x 0.8mm fast-on
Operating temperature	–20°C to +65°C

		MOQ 5 - In Multiples of 5			
Type	Order code	5+	25+	100+	500+
SPST Red rocker	**75-0730**	0.554	0.513	0.451	0.41
SPST Green rocker	**75-0732**	0.627	0.537	0.448	
SPST Blue rocker	**75-0734**	0.627	0.537	0.448	0.398

034224

SCI PARTS

DPST Miniature Rocker Switch with Legend

A miniature double pole rocker switch offering a high switch capacity within a small case.

- On position is clearly marked by legend printed on rocker face
- Black bezel with matt black concave rocker
- 4.8 x 0.8mm crimp connections
- **ENEC** and **FIMKO** approved

Technical specification

Dimensions	21.2 x 15 x 14.5mm
Panel cut-out	19.2 x 13.2mm
Contact rating	4A 250V AC
	8A 125V AC
Initial contact resistance	<50mΩ
Insulation resistance	>100M at 500V DC
Mechanical life	>10⁵ cycles
Electrical life	>10⁴ cycles
Operating temperature	–20°C to +65°C

Type	Order code	1+	25+	100+	500+
DPST Miniature rocker	**75-0270**	1.07	0.887	0.791	0.655

030259

ZIP switch

Rocker Switches, SPST 250V AC

These compact 'snap-in' panel mount rocker switches comply with EN61058.1 (VDE 630 part 1).

- Nickel-plated lever
- 3A; 250V AC

Technical specification

Order code	Switch position	Legend	Housing colour	Rocker colour
50-1028	SPST on-off	None	Black	Black
50-1031	SPDT on-on	None	Black	Black
50-1032	SPDT on-off-on	None	Black	Black
50-1033	SPST on-off	O/I	Black	Black

		MOQ 5 - In Multiples of 5			
Switch type	Rocker colour	Order code	5+	10+	50+	100+
SPST On-Off	Black	**50-1028**	0.687	0.664	0.625	0.60

			Price each		
Switch type	Rocker colour	Order code	1+	10+	50+
SPST On-On	Black	**50-1031**	0.877	0.841	0.791
SPDT On-Off-On	Black	**50-1032**	1.30	1.24	1.18

		MOQ 5 - In Multiples of 5			
Switch type	Rocker colour	Order code	5+	10+	50+	100+
SPST On-Off	Black	**50-1033**	0.704	0.666	0.63	0.617

519933

SCI PARTS

DPDT Rocker Switch

A low cost nylon rocker switch.

- Non-latching concave sprung rocker
- Snap-in mounting
- 28mm x 25mm panel cut-out
- Silver plated brass terminals
- Dimensions 31.5(L) x 29(W) x 35(H)mm
- **UL flame 94V-2** approved

Technical specification

Voltage rating	16A 125V AC/10A 250V AC
Contact resistance	50mΩ max.
Insulation resistance	500V DC, 100MΩ min.
Dielectric strength	1500V AC, 1 minute
Circuit	6PDT On/Off /On
Operating temperature	–20°C to +85°C
Mount hole	28mm x 25mm
Panel thickness	5mm

Type	Order code	1+	25+	100+
Rocker switch	**75-0061**	1.58	1.32	1.12

071452

Education

5

Electronic Kits & Components

SPST Panel Mounting Rocker Switch R13-136A

A single pole rocker switch with locking nut.

- On position is clearly marked by a legend printed onto the concave rocker face
- Silver plated brass terminals
- Phenolic base
- Panel mounting
- Dimension 23(L) x 23(W) x 24(D)mm
- Available in black
- **UL flame 94V-2** approved

Technical specification
Voltage rating	10A 125V AC/6A 250V AC
Contact resistance	50mΩ max.
Insulation resistance	500V DC, 100MΩ min.
Dielectric strength	1500V AC, 1 minute
Circuit	SPST
Mount hole	18.2mm
Panel thickness	6mm

MOQ 5 - In Multiples of 5
Type	Order code	5+	25+	100+
Rocker switch	**75-0060**	0.719	0.624	0.528

071456

SPST Snap-in Rocker Switch

A low cost nylon rocker switch.

- 15.2mm dia. panel cut-out
- Silver plated brass terminals
- Snap-in mounting
- Available in black
- Dimensions 25mm(L) x 19mm diameter
- **UL flame 94V-2** approved

Technical specification
Voltage rating	10A 125V AC / 6A 250V AC
Contact resistance	50mΩ max.
Insulation resistance	500V DC, 100MΩ min.
Dielectric strength	1500V AC, 1 minute
Circuit	SPST
Mount hole	15.2mm
Panel thickness	3mm

MOQ 5 - In Multiples of 5
Type	Order code	5+	25+	100+	500+
Black rocker switch	**75-0057**	0.571	0.497	0.463	0.425

071446

SPST Miniature Rocker Switch

A miniature single pole rocker switch with black concave rocker.

- Has a red marking which is clearly visible when switch is in the 'on' position
- Switch snap fits into a 20mm panel cut-out
- 4.8 x 0.8mm fast-on connections
- **UL, CSA** and **VDE** approved
- **SCI type R13-112A2**

Technical specification
Contact rating	6A 250V AC 10A 125V AC
Initial contact resistance	<50mΩ
Insulation resistance	100MΩ at 500V DC
Termination	4.8 x 0.8mm fast-on
Operating temperature	–20°C to +65°C

Type	Order code	1+	25+	100+	500+
SPST Miniature rocker	**75-0480**	0.81	0.656	0.554	0.513

031451

≡Rapid education   We bring STEM to life

SPST On Off Switch Circular Rocker

A miniature single pole rocker switch in a white gloss finish.

- Snap-in mounting, easy to install switch into panel
- Panel cut-out - 20.2mm
- Maximum panel thickness 3mm
- 4.8 x 4.8mm terminals
- A waterproof cover for the switch is also available - see this section
- Nylon frame to **UL 94V-2**

Technical specification
Contact rating	16A 125V AC 10A 250V AC
Initial contact resistance	50mΩ max.
Insulation resistance	100MΩ min. 500V DC
Dielectric strength	1500V AC 1 minute

MOQ 5 - In Multiples of 5
Type	Order code	5+	25+	100+	500+
White rocker switch	**75-0063**	0.544	0.503	0.451	0.41

079719

Miniature 6 x 6 Tactile Switches

A range of high quality SPST miniature 6 x 6mm tactile switches.

- PCB horizontal mount
- Flat, extended and projected plunger lengths
- Positive click action
- **Diptronics DTS-6** series

Technical specification
Diptronics part No.	Dimensions Length x width x height	Order code
61N	6 x 6 x 4.3mm	**78-0620**
62N	6 x 6 x 5mm	**78-0621**
63	6 x 6 x 7mm	**78-0622**
644N	6 x 6 x 7.3mm sq 2.4	**78-0623**
65N	6 x 6 x 9.5mm	**78-0625**
66N	6 x 6 x 13mm	**78-0626**

Pitch	6.5 x 4.5mm
Contact rating	50mA 12V DC
Initial contact resistance	100mΩ

MOQ 10
| Type	Order code	10+	100+	500+	1000+
61N 4.3 high	**78-0620**	0.134	0.115	0.094	0.072
62N 5mm high	**78-0621**	0.134	0.115	0.094	0.072
63 7mm high	**78-0622**	0.134	0.115	0.094	0.072
644N 7.3mm high sq 2.4	**78-0623**	0.134	0.112	0.087	0.075
65N 9.5mm high	**78-0625**	0.21	0.133	0.108	0.083
66N 13mm high	**78-0626**	0.166	0.114	0.081	0.072

071703

Miniature 12 x 12 Tactile Switches

12 x 12mm PCB mounted tactile switches.

- Positive switch action
- Round button
- Single pole normally open contacts
- **Diptronic DTS** series
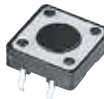
Technical specification
Dimensions	12 x 12 x 4mm
Pitch	12.5 x 5mm
Contact rating	50mA 12V DC
Initial contact resistance	<250mΩ max.
Insulation resistance	>100MΩ min. at 100V DC
Dielectric strength	250V AC for 1 minute
Travel	0.3mm
Operating life	>100,000 ops
Operating temperature range	–20°C to +70°C
PCB footprint	12.5 x 5.0mm

MOQ 10
Type	L	Order code	10+	100+	500+	1000+
Round	4.3	**78-0630**	0.261	0.199	0.166	0.124

030286

Tactile Switches 6 x 6mm

A range of miniature through hole tactile switches.

- 6 x 6mm
- Positive switch action
- Normally open single pole contacts
- Available in various heights
- Four terminal mounting for additional stability

Technical specification
Dimensions	6 x 6 x 3.5mm
Pitch	6.5 x 4.5mm
Contact rating	500mA 12V DC
Contact resistance	≤30mΩ max
Travel	0.25mm
Insulation resistance	≥100MΩ min at 500V dc
Dielectric strength	250V AC for 1 minute
Operating temperature	–30°C to + 70°C

MOQ 10 - In Multiples of 5
Type	Height	Order code	10+	100+	500+	1000+
Switch 6x6mm	4.3mm	**78-3800**	0.116	0.089	0.057	0.045
Switch 6x6mm	3.5mm	**78-3802**	0.116	0.089	0.057	0.045
Switch 6x6mm	7.0mm	**78-3804**	0.116	0.089	0.057	0.045
Switch 6x6mm	9.5mm	**78-3808**	0.116	0.089	0.057	0.045
Switch 6x6mm	13.0mm	**78-3810**	0.146	0.089	0.057	

200042

≡RVFM

Key Operated Switches

Random operated SPST 2-position key switch.

- Key removal in two positions
- Random keys
- Spare keys available for common key switches (see below)
- Zinc alloy die cast housing and cylinder
- Bright chrome plated
- 4-pin tumbler mechanism
- Chrome plated zinc alloy tubular keys
- Silver plated contacts and terminals
- Hex nut mounted
- M12 panel cut-out

Key removal	Key type	Order code	1+	25+	100+
SPST					
2 Position	Random	**79-0310**	4.72	3.89	2.33

075716

≡RVFM

Common Key Operated Switch

A mini electric lock switch with two tubular keys and fixing nut.

- SPST operation
- Panel mounting
- Key may be removed in the off position only
- Zinc body and core
- Chrome plated
- Supplied with two common keys

Technical specification
Contact rating	1A 250V AC; 2A 125V AC
Contact resistance	10mΩ max.
Insulation resistance	500MΩ min.
Dielectric strength	1000V AC

MOQ 1000
Type	Order code	1000+
Electric switch lock	**79-0306**	3.37

|		**Price each**		
Type	Order code	1+	25+	100+
Spare key set	**79-0307**	1.08	0.881	0.765

071485

≡RVFM

Matrixed 3 x 4 Data Entry Keypad

A low-profile numeric data entry keypad, with black bezel and white keys. The keypad has conductive rubber contacts and positive action keys requiring only a low operating force.

It is connected via solder pads on the lower edge of the keypad PCB and can be secured via four mounting holes. Suitable for use on a wide range of hand-held and other small equipment.

- Data entry keypad
- 24V DC contact voltage
- 20mA contact current
- 200Ω contact resistance
- 3 x 4 layout
- -20 to +60°C operating temperature
- 1,000,000 ops operating life
- 100gf operating force
- 51mm long, 64mm wide, 7.8mm high
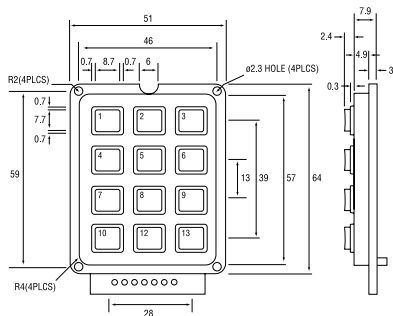
AK-304

Technical specification

Contact rating	20mA @ 24V DC
Contact resistance	200Ω max.
Mechanical life	1,000,000 cycles per key
Actuating force	100gf ±30gf
Key stroke	3 x 4 1.4 mm ±0.4mm
	4 x 4 1.5mm ±0.5mm
Operating temperature	-20°C to +60°C
Storage temperature	-40°C to +65°C

Order code	Key layout	Bezel colour	Key colour	Legend colour
78-0305	3 x 4	Black	White	Black

Type	Order code	1+	25+	100+
3 x 4 Black/white keys	**78-0305**	3.70	2.82	2.27

073486

COMUS

M1219 Neodymium Disc Magnets

A range of disc magnets manufactured from Neodymium Iron Boron which is up to 5 times more powerful than Alnico.

- All magnets are nickel plated to reduce the onset of corrosion when used under normal circumstances
- Ideally suited to proximity switch triggering or biasing where space is at a premium

Technical specification

Part no.	Distance at which magnets measure 1000 Gauss	Dimensions	Surface flux (Gauss)
M1219-1	0.5mm	3 x 1mm	1500
M1219-2	0.95mm	3 x 2mm	2500
M1219-3	1.6mm	4 x 3mm	3200
M1219-4	2.0mm	6 x 2mm	2500
M1219-5	3.8mm	10 x 5mm	3500
M1219-6	3.0mm	6 x 5mm	3500
M1219-8	3.0mm	6 x 4mm	3900
M1219-10		22 x 2mm	800
Operating temperature	120°C max.		

NB: M1219-4 has north seeking identified with a dimple

Type	Order code	1+	25+	100+	250+
M1219-1	**78-1064**	0.913	0.807	0.74	0.669
M1219-2	**78-1066**	1.03	0.696	0.618	
M1219-3	**78-1068**	1.62	1.38	1.07	
M1219-4	**78-1070**	1.22	0.932	0.813	0.698
M1219-5	**78-1072**	1.40	1.18	1.01	0.91
M1219-6	**78-3783**	0.851	0.666	0.596	
M1219-8	**78-3784**	1.01	0.724	0.632	
M1219-10	**78-3786**	1.12	0.897	0.815	

033897

TruSens

Non-Mercury Tilt Switches

A range of economical, non-mercury tilt switches, which operate when tilted approximately 10° from the horizontal.

- Contact is made by gold-plated ball-bearings which roll onto the contact
- Two styles are available:
- **78-0752** has a single gold-plated pin, with a lead attached to the case
- **78-0754** has two nickel-plated leads

Technical specification

Switch rating	24V DC 6mA
Life	100,000 cycles min.
Contact resistance	0.5Ω max @ 45° tilt
Differential angle	10° max.
Operating temperature	-25°C to +85°C

Type	Order code	1+	25+	100+	500+
2 Nickel leads	**78-0752**	0.817	0.661	0.595	0.499
Gold pin + lead	**78-0754**	0.817	0.661	0.595	0.499

034909

COMUS

Non-mercury Tilt Switch

A gas filled hermetically sealed tilt switch employing non toxic materials in a miniature completely mercury free sealed metal package.

- Normally open contacts which will close when tilted more than 10° from the horizontal

COMUS

Reed Switches

A comprehensive range of rhodium contact miniature reed switches.

- Available in a variety of styles and contact ratings
- See **60-0560** for suitable magnets

Technical specification

Case code	A	B	C	D	Case code	A	B	C	D
1	36	10	2	0.4	4	54	14.2	2.3	0.6
1A	46	15	2.54	0.6	6	55	18.5	2.6	0.7
2	55	14	2.3	0.5	8	79	52	5.4	2.5
3	52	14	2.6	0.5	9	29	52	5.4	2.5

A = Overall length
B = Glass length
C = Diameter
D = Lead diameter

Type	Contacts	Case code	Contact rating (VA) max.	Switching current (A) max.	Switching voltage (V) AC max.	Pull in range (AT)	Order code
Micro.	SPST	1	1	0.1	24	15-20	60-0520
Submin.	SPST	2	10	0.5	100	20-25	**60-0522**
Submin.	SPDT	3	3	0.2	30	20-25	60-0524
Miniature	SPST	1A	10	0.5	140	14-23	60-0515
Miniature	SPST	6	40	2	440	20-25	60-0528
Compact	SPST	9	120	3	1500	75-95	60-0532

Type	Order code	1+	25+	100+	500+
Micro SPST	**60-0520**	0.816	0.76	0.729	0.677
Submin. SPST	**60-0522**	0.881	0.718	0.653	0.578
Submin. SPDT	**60-0524**	2.19	2.15	1.87	
Minature SPST	**60-0515**	0.623	0.568	0.52	
Minature SPST	**60-0528**	1.19	1.07	0.897	
Compact SPST	**60-0532**	2.61	2.22	1.91	

030247

- Suited to a wide range of applications including toys, games, automotive and water treatment equipment
- Formerly Assemtech type CW1300-1

Technical specification

Contact arrangement	Single pole normally open
Contact rating	3VA max.
Switching current	0.25A max.
Switching voltage	60V AC or DC max.
Contact resistance	30Ω max.at 15° tilt
Temperature range	-40°C to +150°C

Type	Order code	1+	25+	100+
Non-mercury tilt switch	**78-0760**	1.30	1.27	1.25

030169

COMUS

Low Cost Non-mercury Tilt Switches

Low cost PCB mounting non-mercury tilt switches fitted with gold contacts.
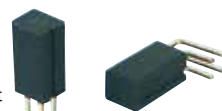
- Available with straight or right angle pins for direct mounting to a PCB
- Ideal low cost solution in alarm systems and general angle sensing
- Supplied in Polyamide 6,6 case with **UL 94V-0** rating
- Formerly Assemtech types M1230-1 (vertical) and M1230-2 (horizontal)
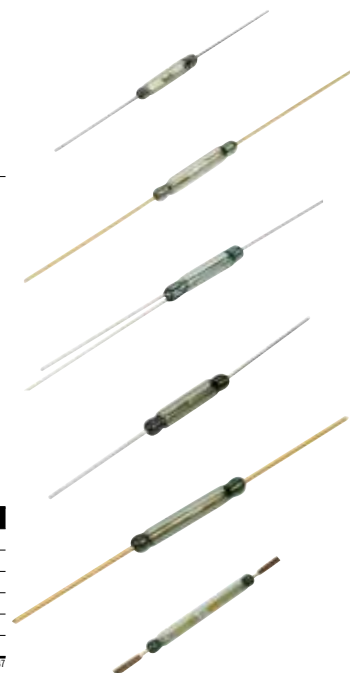
Technical specification

Contact rating	25mA at 24V DC
Contact resistance	10 Ω
Differential angle	10°
Operating temperature	-25°C to +70°C

Type	Order code	1+	25+	100+	500+
Vertical tilt switch	**78-1058**	0.769	0.637	0.57	
Horizontal tilt switch	**78-1056**	1.06	0.893	0.802	0.717

033901

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