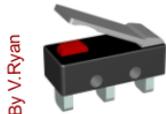
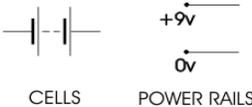
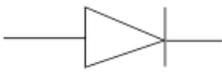


## Design and Technology

GCSE AQA

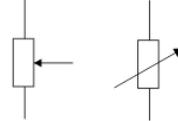
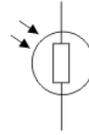
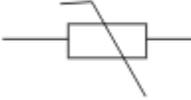
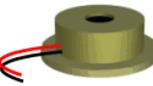
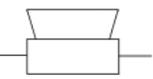
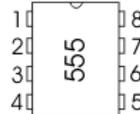
### Electronic Component and Symbols

#### Section A

Component	Image	Symbol
Slide switch		
Micro switch	 <small>By V.Ryan</small>	
Toggle switch		
Battery	 <small>By V.Ryan</small>	
Light Emitting Diode (LED)		
Diode		
Motor		
Electrolytic Capacitor		

There are a large number of symbols which represent an equally large range of electronic components. It is important that you can recognise the more common components and understand what they actually do

#### Section B

Component	Image	Symbol
Variable Resistor		
Light Dependent Resistor		
Resistor		
Thermistor		
Buzzer		
Speaker		
Integrated Circuit (IC)		

#### Section C

**Resistors** restrict or limit the flow of current in a circuit. The ability of a material or component to resist current flow is measured in ohms. There are three main types of resistor:

- fixed resistors
- variable resistors
- special resistors, such as thermistors and light-dependent resistors (LDRs)

A **capacitor** is a discrete component that can **store an electrical charge**. The larger the capacitance the more charge it can store. The unit of measurement of capacitance is the **farad**. Often you will see capacitors of much less than a farad. These will be measured in **microfarads** (one millionth of a farad or 1/1,000,000) or **picofarads** (one million-millionth of a farad or 1/1,000,000,000,000).

There are two types of capacitor:

- polarised or electrolytic capacitors
- non-polarised or non-electrolytic capacitors

#### Section D

#### Section E

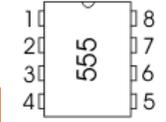
A light-emitting diode (LED) is a special kind of diode that glows when electricity passes through it. Most LEDs are made from a semi-conducting material called gallium arsenide phosphide. LEDs can be bought in a range of colours. They can also be bought in forms that will switch between two colours (bi-colour), three colours (tri-colour) or emit infra-red light.

In common with all diodes, the LED will only allow current to pass in one direction. The cathode is normally indicated by a flat side on the casing and the anode is normally indicated by a slightly longer leg. The current required to power an LED is usually around 20 mA.

Section F

**Output Devices**

- LEDs and seven-segment displays, **lamps** convert electricity into light.
- Piezo sounders, buzzers, bells, loudspeakers** and **sirens** are used to convert electricity into sound.
- Microphones** convert sound into electricity.
- Solenoids** are used to convert electricity into linear movement.
- Motors** convert electricity into rotary movement.



Section H

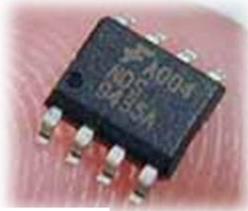
**Integrated circuits are the basic component of modern microelectronics. They are important process blocks in electronic systems. There is a wide range of integrated circuits available, including timer circuits, operational amplifiers and counter circuits.**

Section H

Integrated circuits (ICs) are self-contained circuits with many separate components such as transistors, diodes, resistors and capacitors etched into a tiny silicon chip.

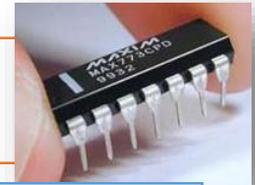
**Advantages ICs have over conventional circuits with discrete components**

- ICs take up **very little space**, allowing products to be made much smaller.
- ICs normally **cost much less** to make than the individual components needed to do the same function.



Section I

The chip inside an IC is usually packaged inside a piece of black plastic with tiny pins protruding to allow connections to the circuit. In ICs the pins are arranged in a dual-in-line (DIL) configuration.



Section J

**Forms of switch**

Switches are available in a wide range of forms, including:

- slide
- toggle
- rocker
- push
- key
- micro
- reed
- rotary
- membrane
- tilt



Section K

**Electrical conductors** are materials that allow electricity to flow through them easily.

Most metals are good conductors.

**Electrical insulators** are materials that do not allow electricity to flow through them.

Most plastic and ceramic materials are insulators.

Section K

There is also a small group of materials called semi-conductors. These have **both conducting and insulating properties** and they are used to make electronic components. The way in which a semi-conducting material is connected to a power supply determines whether it will conduct an electrical current or prevent it from flowing.

Section L

Electronic circuits can be difficult to recycle, as the cost of removing the components is often more than the cost of replacing them. Designing electronic products to be recycled may involve using modular systems or allowing the enclosure to be easily taken apart and separated from the circuitry.



Section G

**Batteries** are the most common source of power used for electrical circuits in schools. They come in a variety of sizes, which can be combined in series battery holders.

When choosing a battery, the following should be considered:

- The **power requirements** of the circuit.
- The **battery life needed**, measured in milliamp hours.
- The **size, shape and weight** of the battery.
- The **cost** of the battery.
- Sustainability**: could rechargeable batteries be used?
- Battery disposal**: how will the battery be disposed of at the end of its working life?

