



With an EE 8 assembly kit the following eight circuits can be built:

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With an EE 20 or the EE 8 together with add-on kit the following twenty-two fascinating circuits can be built.



Safe! No mains connections, no soldering! Easy to build, easy to rebuild!

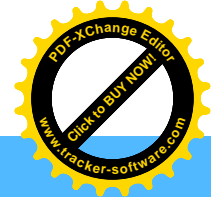


For description of the circuits turn over to pages 2 and 3.

- two transistor radio receiver
- one transistor radio receiver
- two transistor gramophone amplifier
- automatic night light
- morse code training set
- tell-tale light
- flashing beacon
- rain and moisture indicator

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- three transistor radio receiver
- two transistor radio receiver
- one transistor radio receiver
- two transistor gramophone amplifier
- electronic organ
- morse code training set
- morse code trainer with loudspeaker
- burglar alarm
- component testing equipment and:  
light meter
- audio amplifier
- push-pull audio amplifier
- bi-ampli amplifier
- intercom
- telephone amplifier
- tell-tale light
- flashing beacon
- acoustic relay
- pilfering alarm
- burglar alarm with  
power economising circuit
- automatic night light
- rain and moisture indicator
- time switch



## **ELECTRONICS SPAN THE WORLD**

Electronics is a modern technique which increases daily in scope and which makes possible what was once regarded as a fairy-tale. Radios, gramophones and television sets are to be found in every home. Radar and radio beacons, which help ships and aircraft to find their way through the densest fog, are in everyday use. We are no longer surprised to find rockets being shot into space, sending back information on the mysterious belts of radiation and on the magnetic fields to be found at thousands and even millions of miles away from our earth.

### **... AND AT HOME**

All this, communications, signalling, measuring, controlling and now even calculating is made possible by electronics. To many people these techniques are like a closed book. The EE assembly kits, in which use is made of the most modern components, will enable you to open this book and understand it. No mathematics or difficult studies are involved; just your eyes and your own common sense. And as you go along, you learn to read the drawings, to get to know the components such as transistors, and to understand how the components in the sets work.

### **ASSEMBLING AND EXPERIMENTING**

Lots of interesting circuits can be built with the EE-assembly kits. Radio receivers, gramophone amplifiers, intercom systems are things which will give you as much pleasure in using as you had in building them. And this is also true of the less well-known circuits; the monitoring set, the flashing light, the burglar alarm, the wetness indicator etc.

All this is without any risk of fire or burnt out fuses, for these transistor sets work on batteries. You do not even need a soldering iron. So, without too much trouble and with a great deal of pleasure you can amass so much knowledge and experience of electronics that your friends, your parents and even experts will be astonished about what you know in this field.

## **GENERAL ASSEMBLY INSTRUCTIONS**

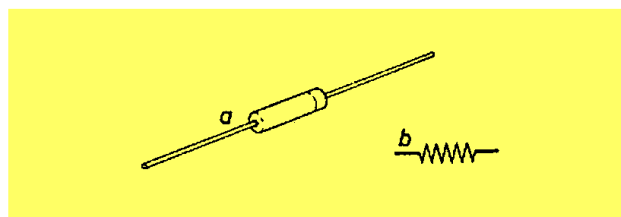
## **CIRCUIT CONSTRUCTION**

## **GENERAL THEORY**

## RESISTORS

### Carbon resistors

Carbon resistors are used in the EE assembly kits. These consist of a small ceramic tube on which there is a thin spiral shaped layer of carbon. Such a layer has a far higher resistance, for instance, than a copper wire. The thickness of the layer, the length of it and the fineness of the carbon particles determine the amount of resistance. The carbon resistors are too small for the resistance value to be expressed in figures and this value can only be indicated by means of the colour code. Four coloured rings are painted on the resistors in the kit. Of these one is silver or gold. When reading the colour code the silver or gold ring must be at the right hand side.



Then the colour of the first ring (from left to right) indicates the first number, the colour of the second ring the second number and the colour of the third the number of the noughts. A gold ring indicates that the resistor is accurate to within 5%, the silver ring indicates an accuracy to within 10%.

The significance of the colours can be read from the following table:

Colour	1st and 2nd coloured ring	3rd coloured ring
black	0	-
brown	1	0
red	2	00
orange	3	000
yellow	4	0 000
green	5	00 000
blue	6	000 000
purple	7	0 000 000
grey	8	00 000 000
white	9	000 000 000

See also the chart on the inside back cover of this manual.

(The commonest tolerance value is 10% and this explains why the resistance values are such "strange" numbers. The series is, in fact, 10, 12, 15, 18, 22, 27, 33, etc. A 10 ohm ( $\Omega$ ) resistor can thus be a maximum of  $10 \text{ ohm} + 10\% = 11 \text{ ohm}$ . A 12  $\Omega$  resistor can also be 10% less:  $12 \text{ ohm} - 10\% = 10.8 \text{ ohm}$ . When a resistor does not have its own value, but deviates by more than 10%, it automatically comes under a different value and is naturally marked accordingly.)

### Potentiometer

A potentiometer is used to regulate the volume of a radio receiver or sound amplifier. It is a resistor along which a contact can be slid and depending on the position of this contact a greater or lesser voltage is tapped off.

There is also a switch on the potentiometer in the kit for switching the battery on or off. This works off the same spindle as the sliding contact of the potentiometer. When the knob is turned as far to the left as it will go (counter-clockwise), it sets the switch at off; when turned to the right it sets it at on again.

