

# MORSE KEY & BUZZER Mk 2

## Instructions



### The Finished Model

The model should look like this when it is finished. The important parts are shown in the picture.

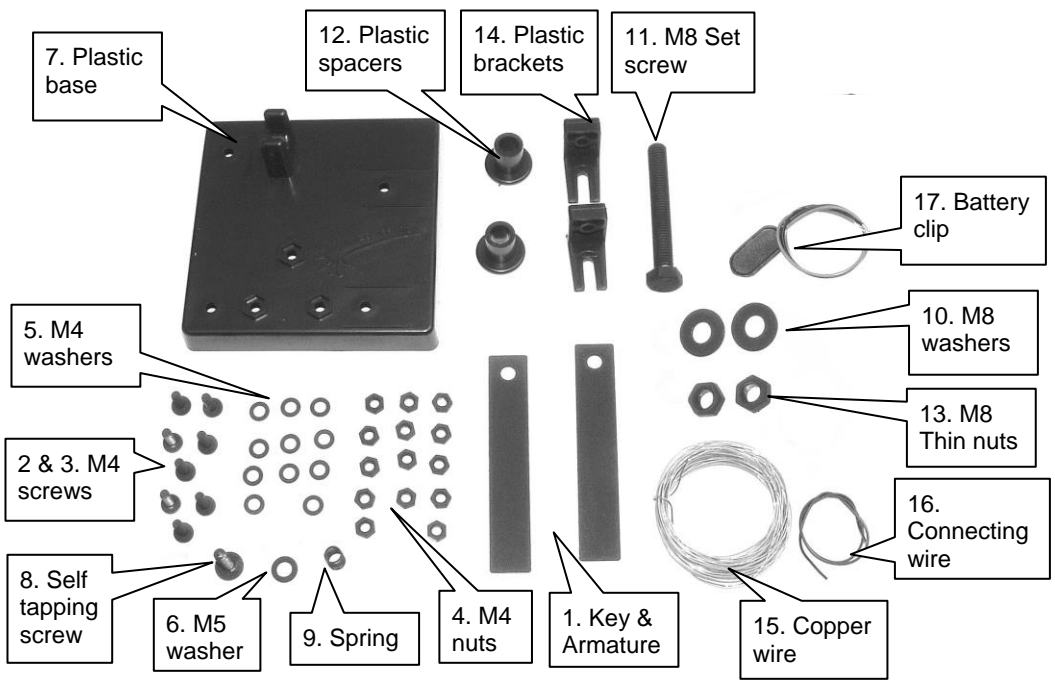
### Topics Covered

Electromagnetism, Conductors and Insulators, Electrical circuits, Fundamentals of telecommunication.

### Tools required

One 7mm and two 13mm open ended spanners. Pozidrive screwdriver, pliers, wire stripper.  
1 x PP3 battery is required.

**This is an Education Kit – not a Toy.  
It requires adult supervision during construction.  
The Kit contains small parts and is NOT suitable for children under 8yrs of age.**

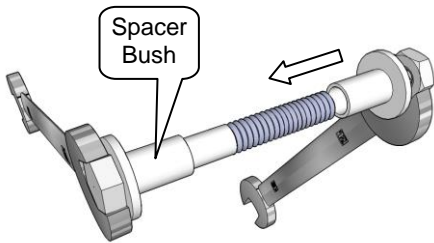


## 1. Check you have the Parts

Lay out all the parts and check that you have each part by putting a tick in the column

## 2. Winding and fitting the Coil

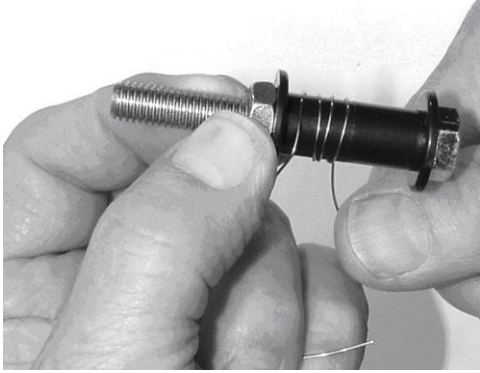
a) Assemble the 2 spacer bushes on the M8 set screw as shown with a single nut. Tighten up the nut using two 13mm spanners.



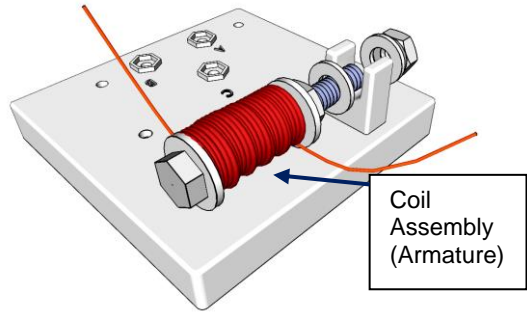
Item	Description	Number	Check
1	Key and armature strips	2	
2	M4x 10mm long screws	5	
3	M4x 15mm long screws	3	
4	M4 nuts	14	
5	M4 washers	11	
6	M5 washer	1	
7	Plastic base	1	
8	Self tapping screw	1	
9	Spring	1	
10	M8 washers	2	
11	M8 set screw	1	
12	Plastic spacer bushes	2	
13	M8 thin nuts	2	
14	Plastic brackets	2	
15	Copper wire	1	
16	Connecting wire	1	
17	PP3 battery clip	1	

**2. b)** Leaving about 8 cm of the copper wire free so that it can be connected to the terminals, wind all the wire onto the spacers as neatly as possible. When complete wrap tape round wire to stop it unwinding.

**2. d)** Fit the coil assembly (armature) to the base with a washer each side of the bracket, tightened with the second nut.



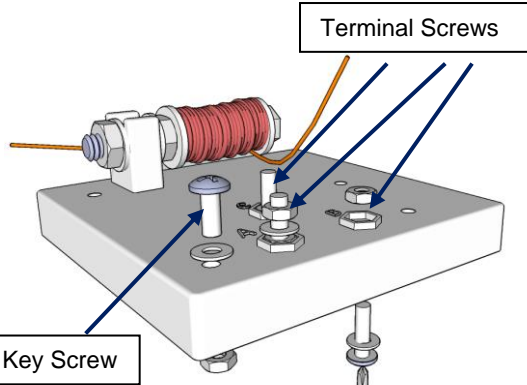
**2. c)** Remove the insulation varnish from about 1 cm at each end of the wire with a scraper or sand paper. (The armature strip makes a good scraper).



### 3. Terminal Screws and the Key Screw

a) Cut the connecting wire (16) into 2 pieces about 6cm long, and one 10cm long. Strip about 2cm of insulation from both ends of each piece and form the wire into small hooks go under the screw washers.

b) Take 3 M4 x 15mm long screws, (3) put washers on them and push them up through the holes marked A, B and C on the top of the base (7) (to be the terminal screws). Run nuts on each and tighten screws underneath to pull the nuts down into the hexagon sockets.



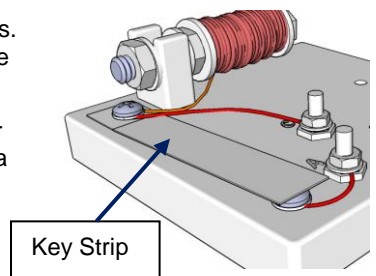
Put another washer and nut loosely on the screw terminal A.

c) Take an M4 x 10mm long screw (2) (to be the Key Screw) with a washer and insert it down through the corner hole in the base. Run a nut loosely on underneath.

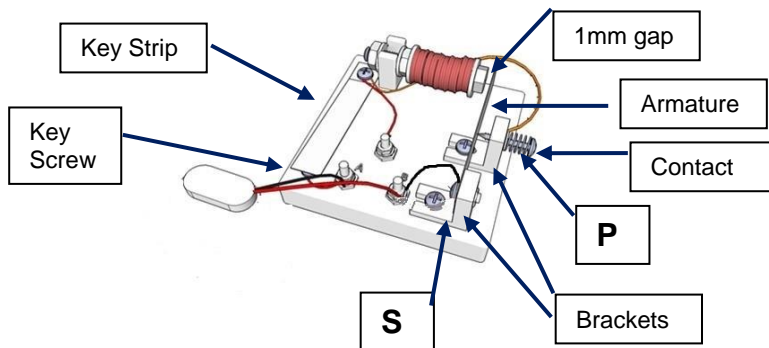
### 4. Fit the Key, Armature and Contact Screw

a) Connect the terminal A to the Key screw with a 6cm wire, trapping the bare end hooks of the wire under the washers. Tighten the Key screw and nut, and the nut on A to secure the wire.

b) Fit the Key strip (1) to the base using a screw and washer through its end hole and the corner hole in the base with a nut underneath. Connect one end of the 10cm wire under this screw/washer together with one end of the coil wire. Tighten the screw.



- c) Put another washer and nut on terminal C, connect the other end of the 10cm wire to it and tighten it down. Bend the key strip up slightly so that it is just clear of the Key screw.



- d) Take the Armature strip (1), push a screw with a washer through the end hole, and then through the hole in one of the plastic Brackets at [S]. Run a nut into the hexagon socket on the back. Trap one end of the other 6cm piece of connecting wire under the washer. Tighten the screw.
- e) Fit the spring (9) and then the 5mm washer (6) to the pointed self tapping Contact screw (8). Screw this into the other bracket at [P] as shown in the diagram.
- f) Assemble both brackets to the base with screws, and washers and nuts underneath.
- g) Put another washer and nut on terminal B. Hook under the washer the other end of the 6cm wire from the armature strip. Tighten the nut by hand.

## 5. Final Connections & Adjustments

- a) Connect the other end of the coil wire to the contact screw by slipping it between the bracket and the washer under the spring. Connect the two Battery clip (17) wires to terminals A and B
- b) Position the armature strip about 1mm from the end of the coil assembly (armature) bolt head by adjusting the position of the bracket. Screw the contact screw in towards the armature strip until it just touches it. (It may be necessary to adjust the bracket first)
- c) Connect a PP3 battery to the battery clip (17).
- d) Press the key down to make contact with the key screw. Adjust the contact breaker screw to get the best buzz. A drop of oil reduces oxidising at the spark point.

## 6. Sending a message

Write a short message and translate it into Morse Code. Send the message by operating the key with short or long presses. Do not hold the key down for a long time – the battery will quickly go flat.

## 7. Sending a message to another unit

Connect terminal A of the first unit to terminal B of the second unit and vice versa with the other A and B terminals. Connect the two terminals C together with the battery between. The key on one will sound on the buzzer of the other and vice versa. (You will need extra wire for this). The Teacher/Tutor notes give more detail on how to achieve this.