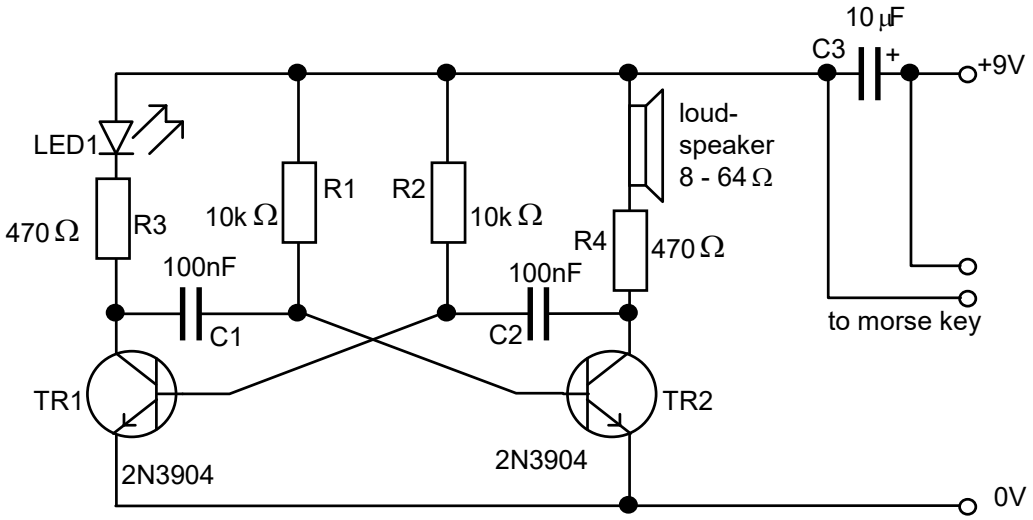
Morse Code Oscillator.

Specification

Total cost is less than £1.
Produces a frequency of ~800Hz via a sounder.
Powered by a 9V battery.

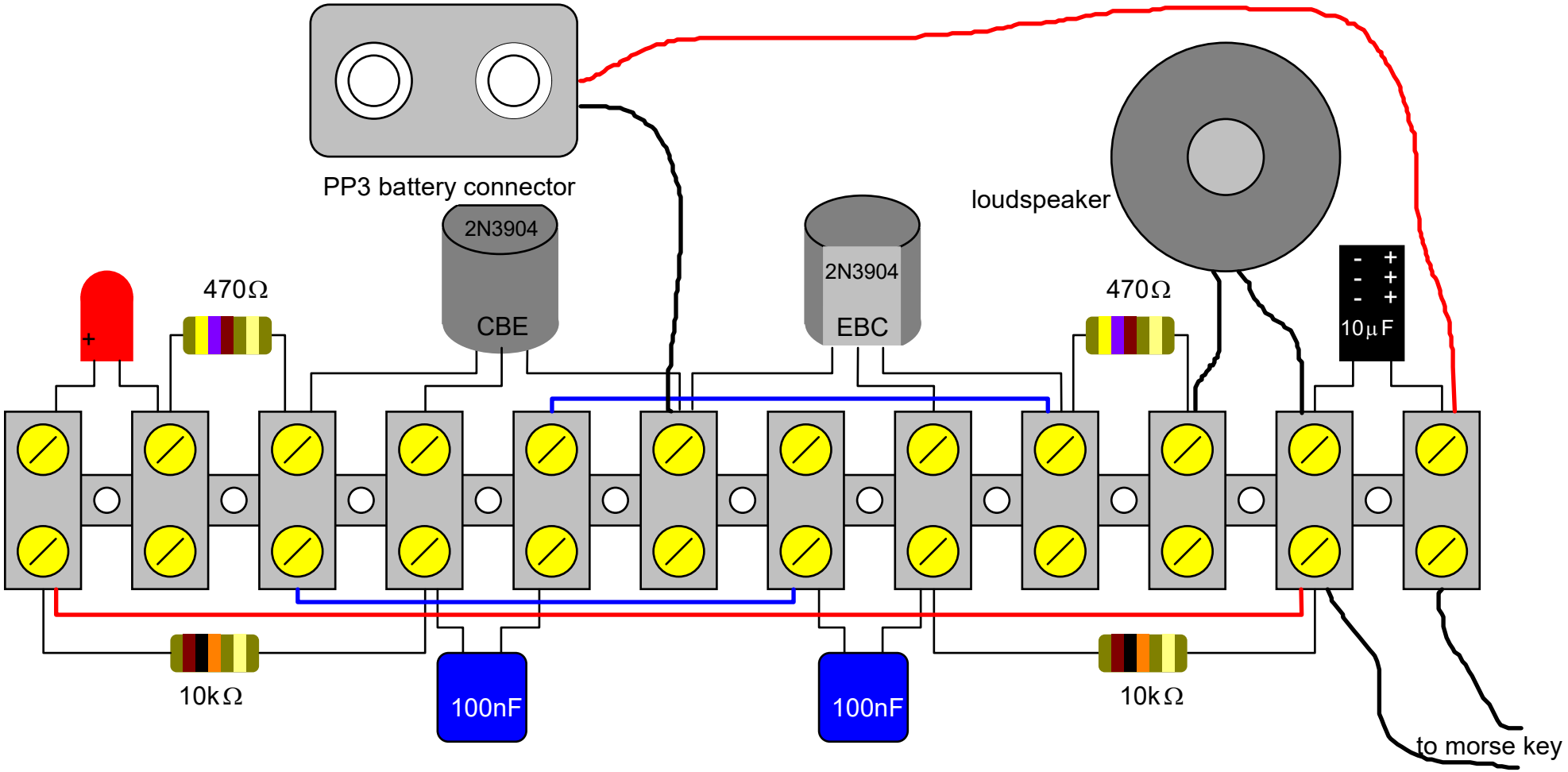
Circuit Diagram



How it works

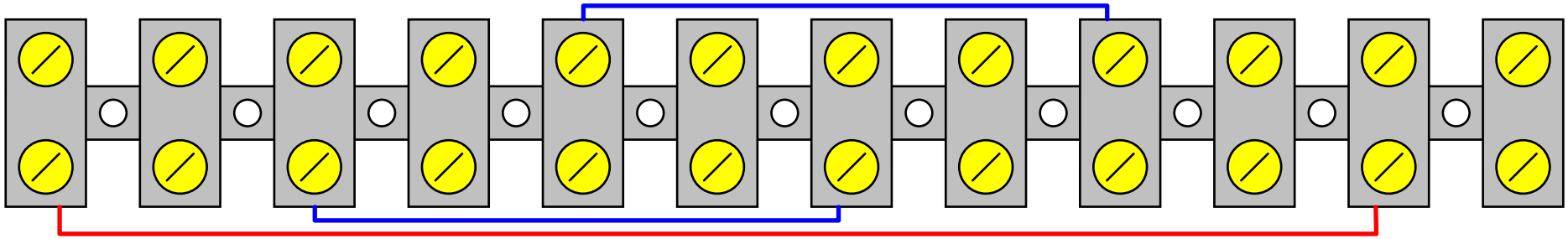
This circuit works in the same way as the LED Flasher circuit, just many times faster.
In this circuit the values of C1 and C2 have been reduced to 100nF, 1000 times smaller than the values in the LED flasher.
A loudspeaker has replaced LED2 in the flasher circuit, so that the tone can be heard.
LED1 has been kept so that so that the dots and dashes of the morse code can also be seen.
Capacitor C3 has been included to remove some of the noise that can be made when the contacts on the morse key are dirty.

Terminal Strip Layout

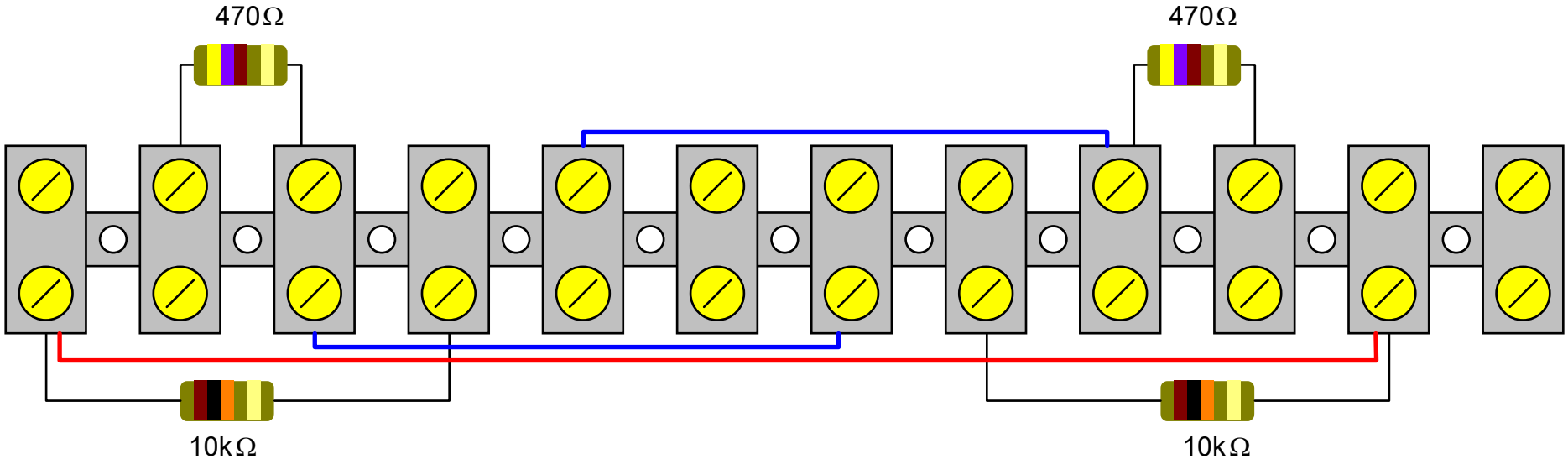


Step by step construction.

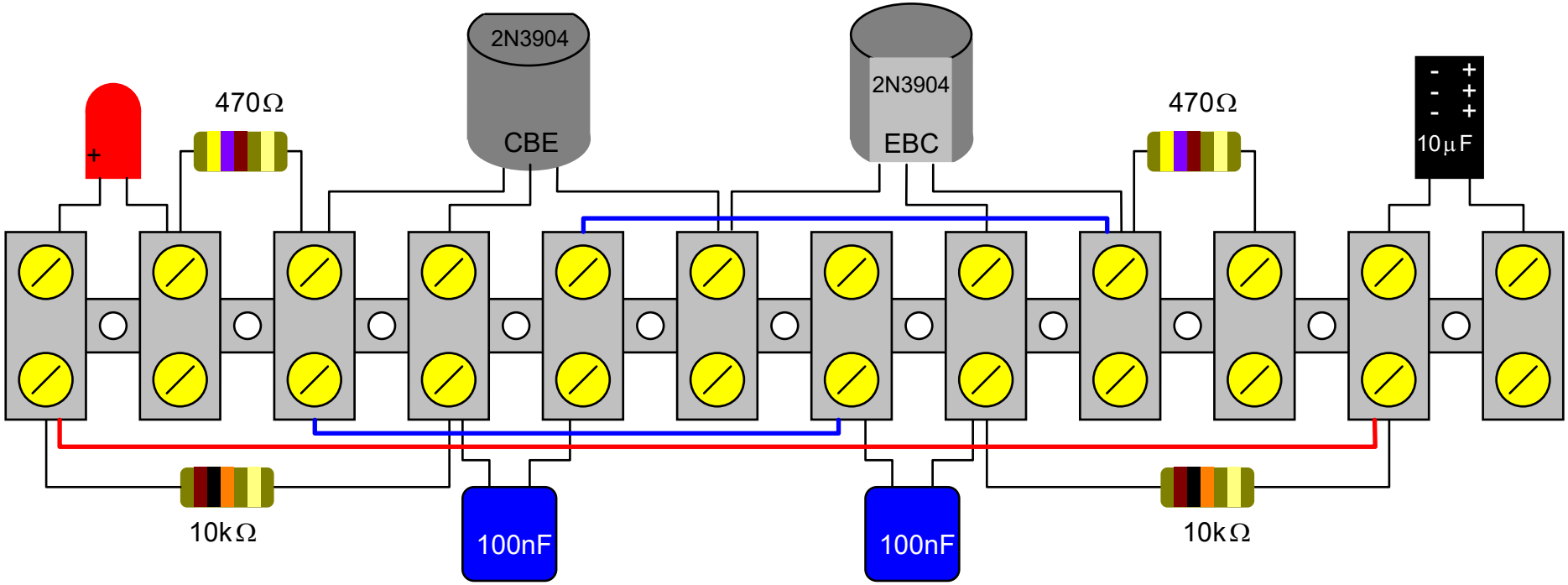
1). Cut two pieces of insulated wire approximately 5cm long and strip both ends. Bend the ends of the wires so that they will fit where the blue wires are in the diagram below. Cut a piece of insulated wire approximately 10cm long and strip both ends. Bend the ends of the wire so that it will fit where the red wire is in the diagram below.



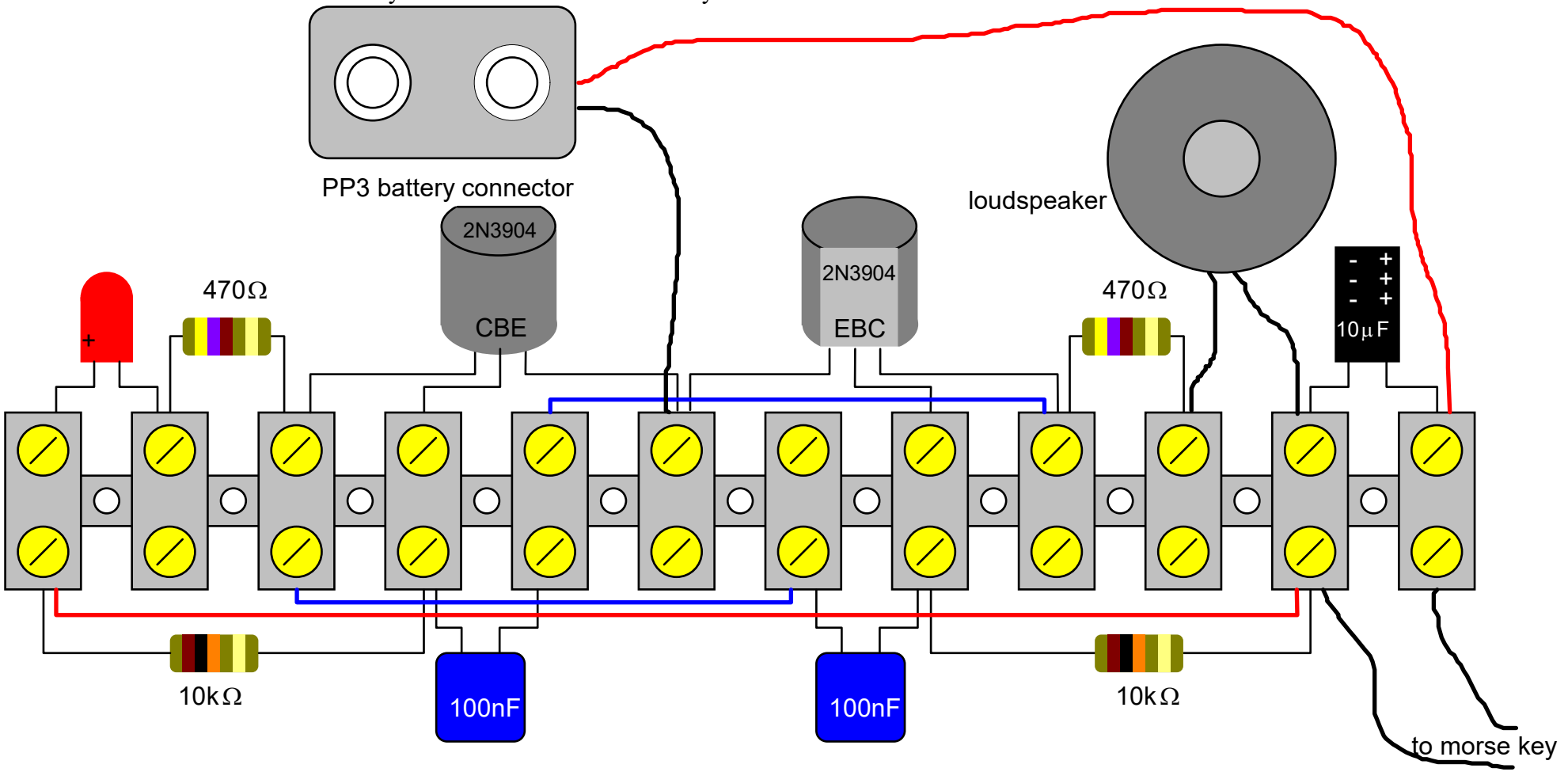
2). Take the two 470Ω resistor (yellow, violet, brown and gold) and the two 10kΩ resistor (brown, black, orange and gold). Carefully bend the leads so that they will fit as in the diagram below. Trim the leads if necessary. It does not matter which way round they are connected.



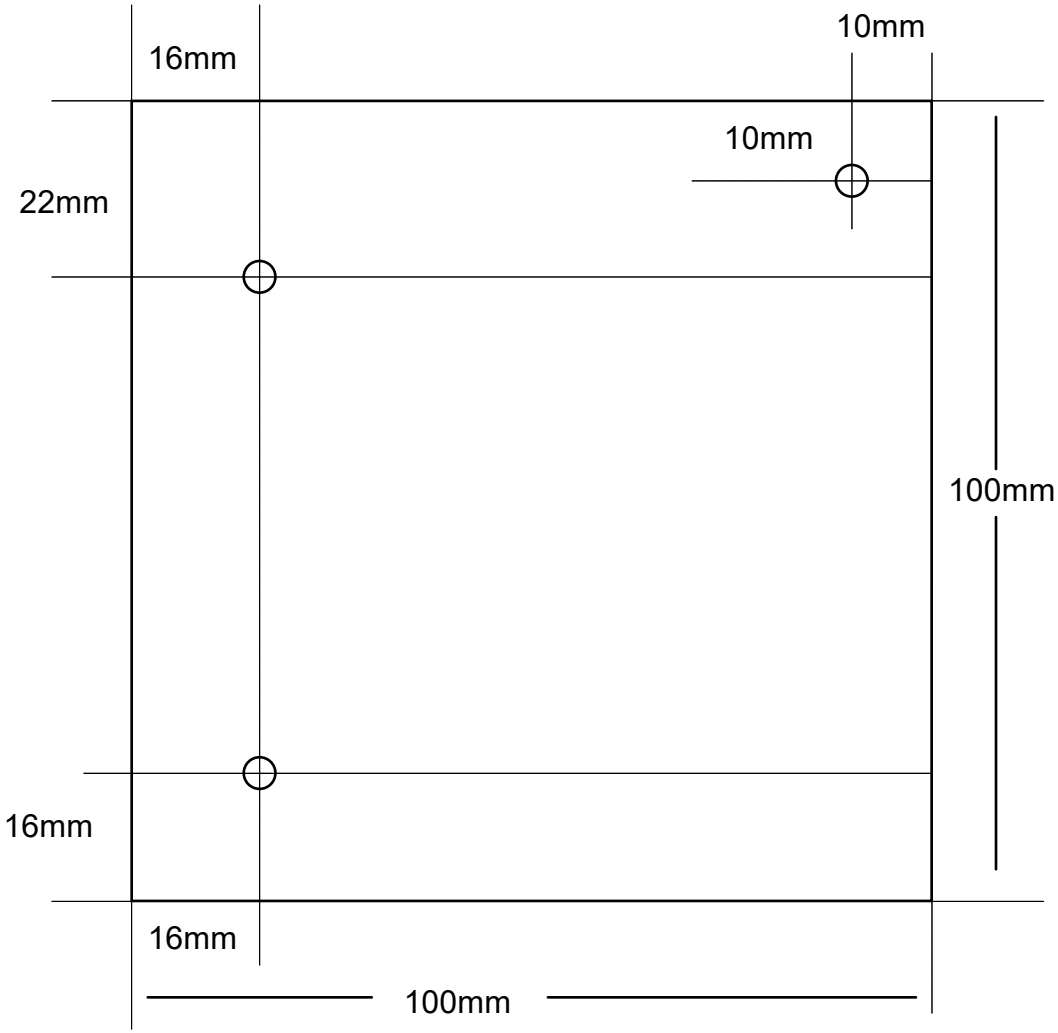
3). Take the two 2N3904 transistors - carefully spread out the leads so that it will fit as in the diagram below. Trim the leads if necessary.
Ensure that the transistors are connected the correct way round.
Take the LED - carefully spread out the leads so that it will fit as in the diagram below. Trim the leads if necessary.
Ensure that the LED is connected the correct way round - the flat on the side of the LED body is the negative side.
Take the two 100nF capacitors. Carefully bend the leads so that they will fit as in the diagram below. Trim the leads if necessary.
It does not matter which way round they are connected.
Take the 10µF capacitor. Carefully bend the leads so that they will fit as in the diagram below. Trim the leads if necessary.
Ensure that it is connected the correct way round.

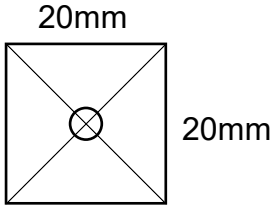


4). Finally connect the battery connector - ensure that the red and black wires are connected to the correct terminals.
Connect the loudspeaker - it does not matter which way round it is connected.
Connect wires for the morse key - it does not matter which way round it is connected.

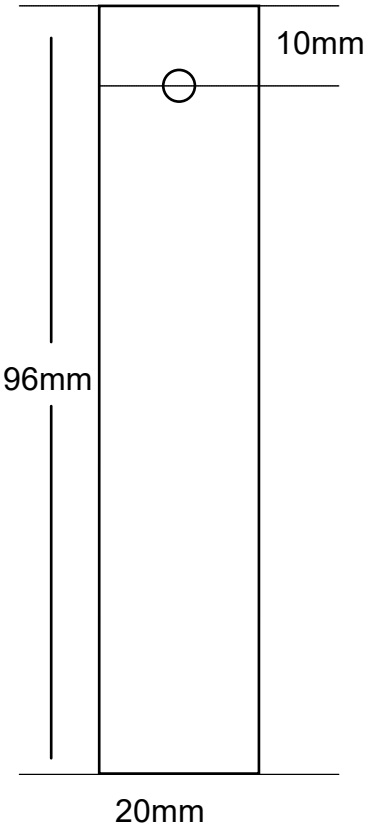


Connect the battery. If all is well, nothing will happen! Join the two wires together for the morse key and a tone should be heard from the loudspeaker and the LED should light. If it does not, then check your wiring for errors and also check that all of the wires are being held by the screws in the terminal strip.





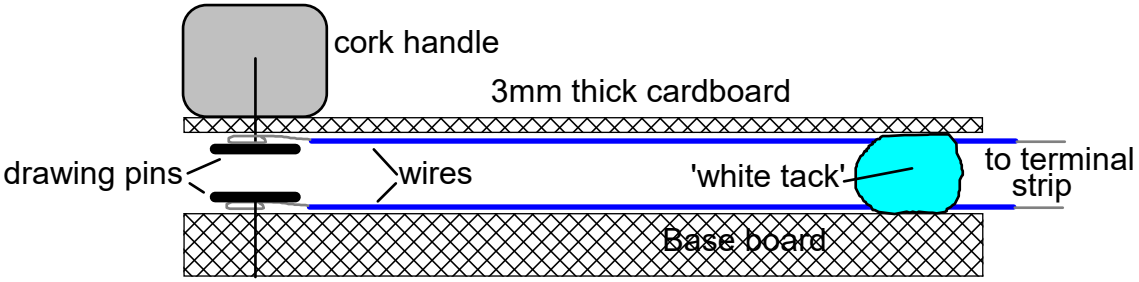
All holes 3mm

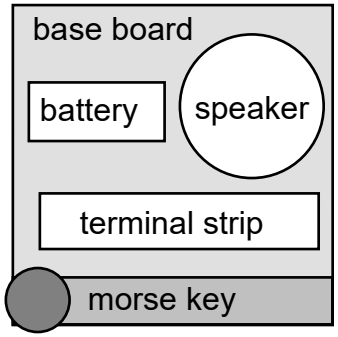


Making a simple Morse Code Key.

This needs:-

2 drawing pins,
a piece of cardboard ~3mm thick and 2cm × 10cm - this can be made by glueing together thinner pieces of card,
2 pieces of insulated wire ~15cm long, stripped at both ends,
a base board 10cm × 10cm and at least 6mm thick - this can be wood, MDF or cardboard. This can be made by glueing together thinner pieces.
a handle to fit on the morse key. The original was the top of a cork from a sparkling wine bottle.
'White tack' type adhesive.





1). Loop the stripped end of the wires around the drawing pins. Carefully push one drawing pin and wire into the front right hand corner of the baseboard 1cm from the edges.

2). Carefully push the other drawing pin and wire through the centre of the 3mm cardboard, 1cm from the end. Glue the cork handle onto the other side of the card using normal glue.

3). Take a piece of white tack and make a ball around 1.5cm diameter. Use this to attach the 3mm cardboard to the base board. Adjust the height of the white tack blob so that there is a small gap between the drawing pin heads. This can be adjusted by lifting or pressing the white tack.

4). Secure your circuit and battery to the cardboard base with Sticky Tac to prevent it being damaged by being moved.

5). It takes a lot of practice to become proficient at sending and receiving morse code. A program to help practice receiving morse can be found at
www.ikes.16mb.com/AR/Morse_practice.htm

— —• — — — — — — —•• •—•• ••— —•—• —•—

Morse Code.

A dash is equal to three dots in time.
The time between dots and dashes in a letter is equal to a dot.
The time between letters in a word is equal to 3 dots.
The time between words is equal to 5 dots.

The Alphabet.

A	• —	**N**	— •
B	— • • •	**O**	— — —
C	— • — •	**P**	• — — •
D	— • •	**Q**	— — • —
E	•	**R**	• — •
F	• • — •	**S**	• • •
G	— — •	**T**	—
H	• • • •	**U**	• • —
I	• •	**V**	• • • —
J	• — — —	**W**	• — —
K	— • —	**X**	— • • —
L	• — • •	**Y**	— • — —
M	— —	**Z**	— — • •

Numerals

1	• — — — —	**6**	— • • • •
2	• • — — —	**7**	— — • • •
3	• • • — —	**8**	— — — • •
4	• • • • —	**9**	— — — — •
5	• • • • •	**0**	— — — — —

Instructions

Error or Erase	• • • • • • • •
Start of message	— • — • —
End of message	• — • — •
Closing down	• • • — • —
Wait	• — • • •
Message received	• — •
Ready to receive	— • —
Distress Call (SOS)	• • • — — — • • •

Punctuation

Full stop (.)	• — • — • —
Comma (,)	— — • • — —
Colon (:)	— — — • • •
Hyphen or dash (-)	— • • • • —
Apostrophe (')	• — — — — •
Fraction (/)	— • • — •
Break or Equal (=)	— • • • —
Question mark (?)	• • — — • •
Bracket ()	— • — — • —
Underline	• • — — • —

These should be sent before and after each word or phrase that are to be underlined of bracketed.