

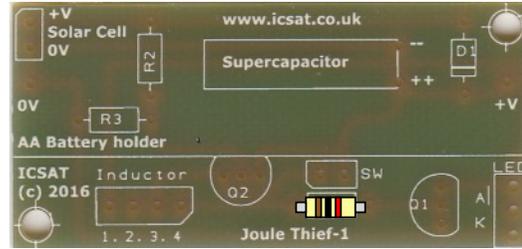
Joule Thief V1

Introduction

The **Joule Thief** is the basis of a number of lighting solutions, based upon Faraday's principle of electromagnetic induction. The circuit uses an inductor coil to create an oscillating circuit which induces a high voltage across the LED, which is sufficient to light it, even from a 1.5V battery, which normally cannot light this type of white high intensity LED.

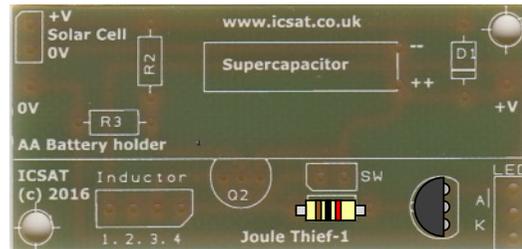
- Simple self oscillating circuit
- Example of electromagnetic induction
- 10mm Ultra bright LED 6500K [colour temperature]
- PTM on/off switch
- AA 1.5V battery holder
- 55mm x 26mm
- With additional components alternate versions can be built.

Solder on to the pcb 1K resistor R1.



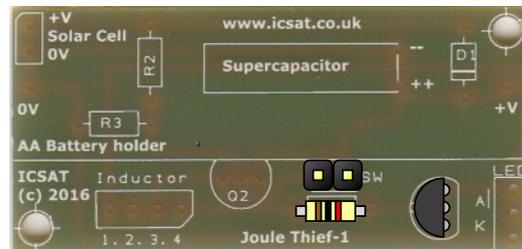
1

Solder in place the Transistor Q1, 2N4401, ensure you it correctly placed the right way around.



2

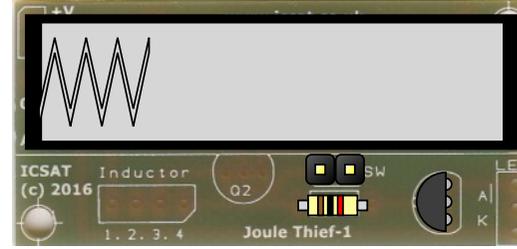
Now solder in place the 2 pin header, which is used to connect your on/off switch to.



3

Assembling your Joule Thief V1

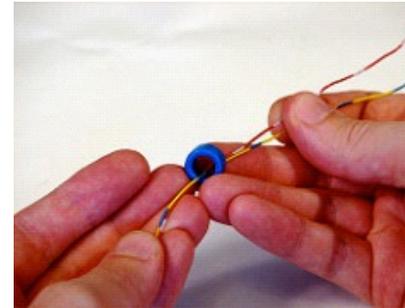
Now solder in place the AA battery holder, check way way around it is fitted.



4

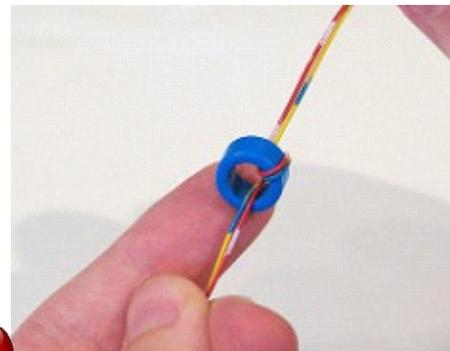
Now it is time to wind our **INDUCTOR** coil, the process is easy **BUT** you need to follow these instructions carefully.

Take the two strands of wire through the centre of the core



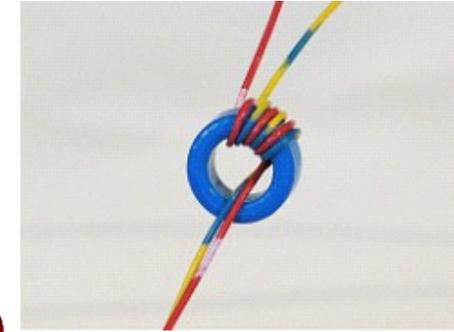
5

Keeping the two strands together, wrap them around and through the core again, **without** crossing them over each other.



6

Keeping the two wires together, make a few more turns through the centre



7

Keep winding until you fit as many turns as will fit in a single layer around the core, typically 8-10 turns with thin insulated wire



8

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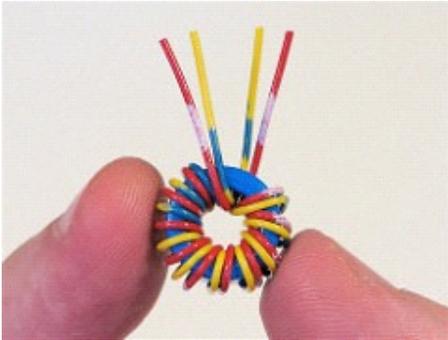
www.icsat.co.uk

SKU EK0140

Joule Thief V1 Manual

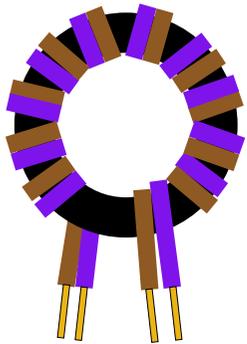
Ver. 1.00

Clip the wire leads down. Note that we have two pairs of wires: one coming out the front, and one coming out the back, and strip off the insulation



9

Your coil's connections are labelled 1, 2, 3 & 4 as shown, these will help you insert the coil correctly into the PCB.



1 2

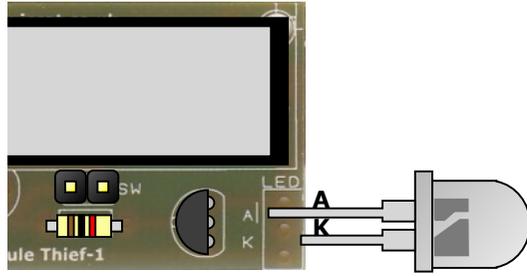
1 2 3 4

Solder in place your inductor coil, ensure the correct ends go into the holes marked 1 2 3 4



1 1

The ultra bright LED can now be soldered in place, the short lead goes into the hole mark 'K' for cathode (0V).

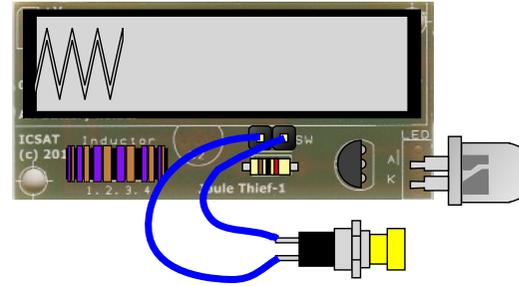


1

2

Note the top 2 holes are both 'A' anodes (+V).

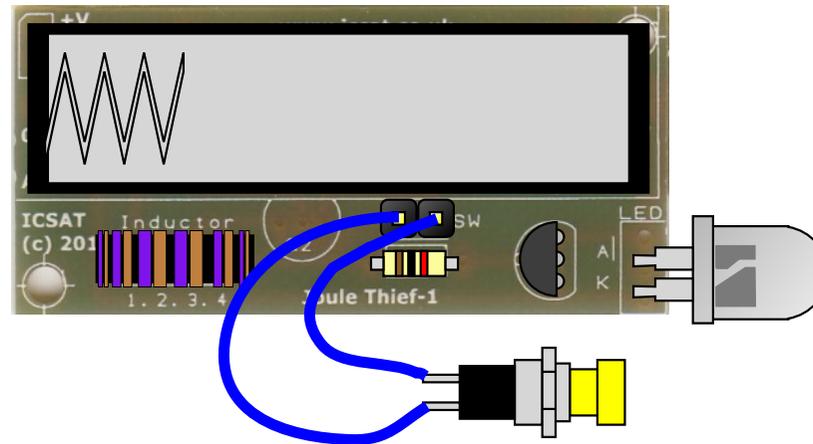
Add a switch to your circuit using two lengths of wire soldered to the 2 pin header SW



1

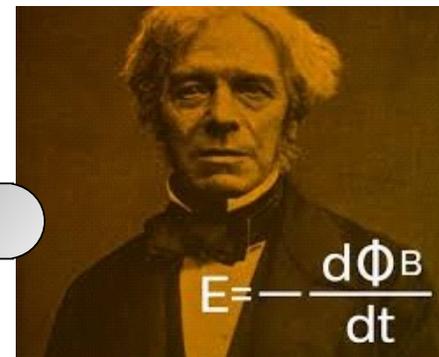
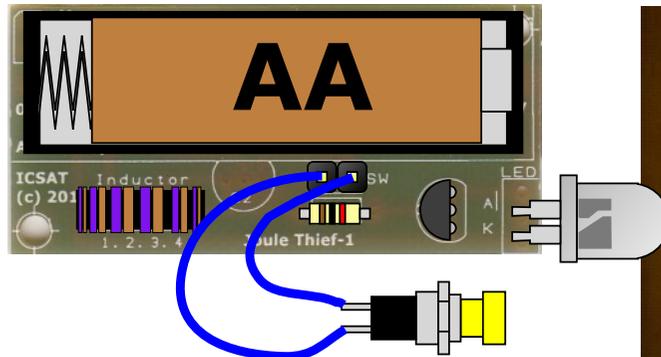
3

Completed Joule Thief V1 Reference diagram



With the addition of a 1.5V AA battery you are ready to go, press the button and light up your Ultra bright LED.

A 3V LED powered from a 1.5V battery – thanks Michael Faraday



Additional solutions with Joule Thief V1

Version 2

With the addition of 3V Solar Cell, Super-capacitor and a diode, you can make a version which will be charged the Super-capacitor (which acts like a small battery) to operate the circuit.

Version 3

By adding two additional resistors, a transistor and a rechargeable AA battery, version 2 can be made to charge the battery (which will operate for a longer time than the Super-capacitor) and switch itself on when it is dark and off when it is light. In this case the Solar cell is acting as a light sensor as well as producing electricity. This is the type of circuit used for LED Garden Lights.



We can provide kits for these version or expansion kits to update the version kit.

Support

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