



SELF CHARGE Dynamo

VRC REVERSE ENGINEERING SUBMISSION

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INTRODUCTION

The *Self Charge Dynamo* is a small device equipped with various helpful inbuilt features such as a flashlight, a phone charger, a radio, and a blaring emergency siren.

But despite all of these, the focal feature that the *Self Charge Dynamo* is most commonly recognised for is the fact that you are able to manually generate and produce electricity through the means of rotating a crank, which is then stored and utilised to help the other mechanisms function.



The central reason that we chose the *Self Charge Dynamo* is because it is often used within native bush and can provide great assistance to someone lost or in trouble. Native bush exists all throughout New Zealand, so we felt that the *Self Charge Dynamo* could prove to be especially helpful around our home and beyond, thus reinforcing our decision to choose it.

DECONSTRUCTION PROCESS

Prior to the start of each deconstruction session, we equipped safety-goggles and gathered the required tools.

1. Firstly, we unscrewed the 4 corner screws and gently pulled the device into 2 main pieces, while being sure to safely separate the wires connecting the 2 pieces together.

Halve 1 = Top Halve 2 = Bottom

2. Secondly, we unscrewed and removed the 2 white gears from *Halve 1*. As a result of this, the 'Hand Swing Generator Lever' fell off.
(We were unable to remove the yellow circular piece from the case, so we left it there.)

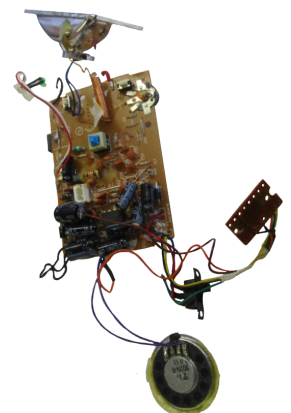
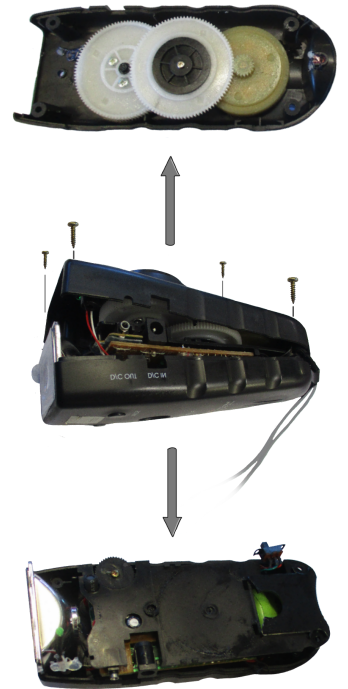
3. We then moved to *Halve 2* and unscrewed the black plastic cover, exposing the Motherboard.

4. We also removed a battery pack and small circuit board (which were attached to the underside of the cover) too.

5. Next, we unscrewed and detached the Motherboard from the case using a metal-probe to unstick the hardened glue and snip the wires.

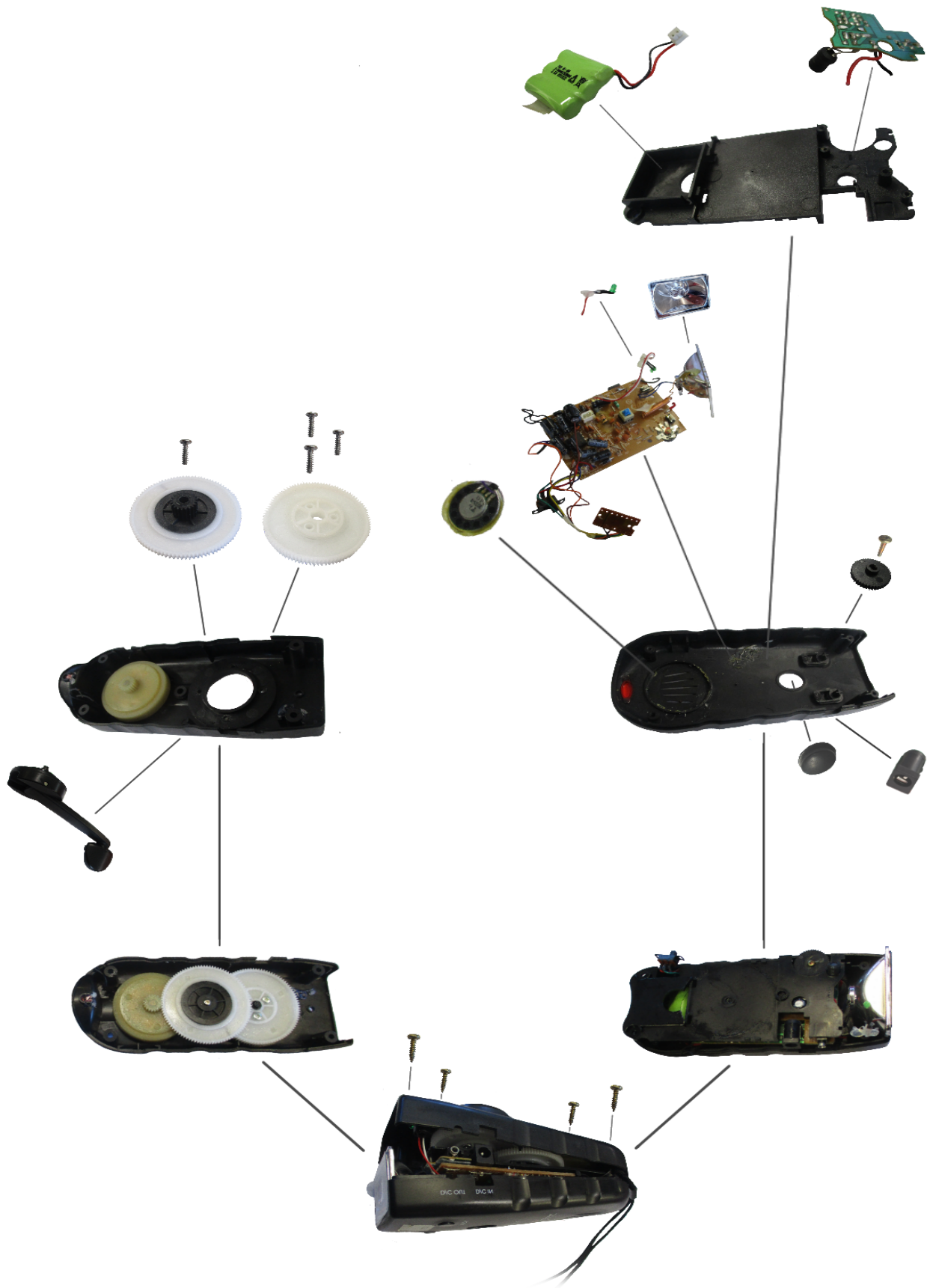
6. The 'Flashlight On/Off button' and the 'Radio On/Off & Volume disc' were subsequently detached.

7. Finally, after no removable pieces remained, we performed some research on the various components and gadgets that were left on the Motherboard.



EXPLOSION DIAGRAM

Below is an Explosion Diagram displaying how the numerous parts of the *Self Charge Dynamo* fit together.



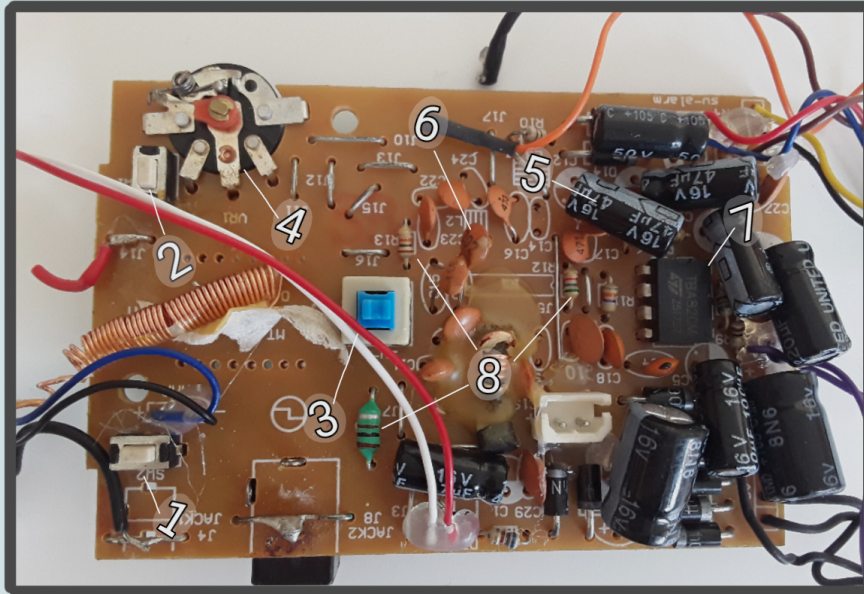
IDENTIFIABLE PARTS LIST

After conducting some research on the numerous parts collected over the course of this deconstruction (using *Google* and *Google Lens*) we have identified their names and the roles that they play:

NAME	IMAGE	ROLE
Screw		Fastens and holds various pieces together within the device, while also allowing the circular pieces to rotate.
Disc		Triggers the radio and alters its volume when manually rotated.
Button		Turns the flashlight on and off when pressed.
Slide Switch		Toggles the entire device on and off when clicked.
Charging Port		Charges any device that is connected to it (through the provided charging cable.)
Hand Swing Generator Lever		Generates power when manually cranked.

Gears		Serves as the connection between the <i>Hand Swing Generator Lever</i> and the <i>Small Dynamo</i> .
Small Dynamo		Produces the power that circulates throughout the device.
Triple Battery Pack		Stores and accumulates the electricity that is manually generated.
Miniature Speaker		Outputs the siren and radio audio.
LED Flashlight		Emits a vivid light.
Charging Indicator		Lights up and signals when a device is charging.

MOTHERBOARD PARTS LIST



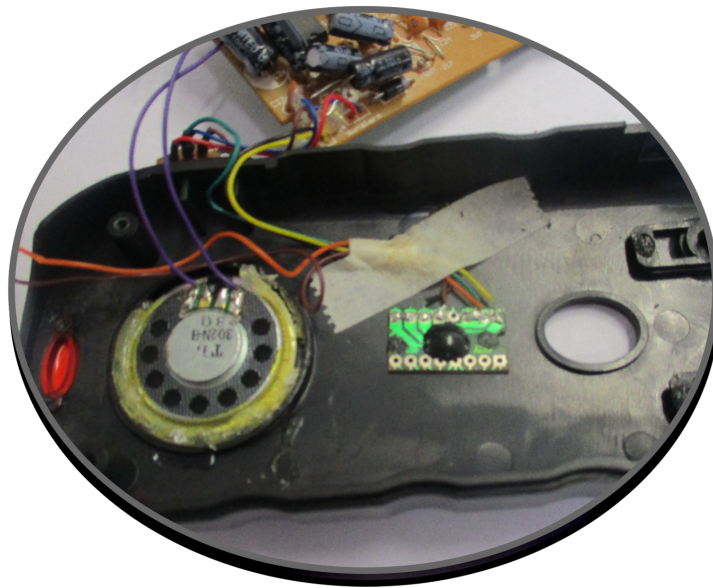
- 1 - *Radio Station Scan Button.*
- 2 - *Radio Station Reset Button.*
- 3 - *Flashlight On/Off Button.*
- 4 - We think that this could possibly be the *Radio Receiver*, as it loosely matches the description of one, and we cannot find any other piece which could fit the role.
- 5 - *16v Capacitors:* These elements have the capability of storing electrical charge and energy.
- 6 - *Ceramic Disc Capacitors*
- 7 - We think that this is an *Integrated circuit*, as it is almost identical to one.
- 8 - *Resistors:* These elements are utilised in order limit any flow of electrical current that will pass through it.

EXTRA FINDINGS & CONCLUSION

During the deconstruction process, we discovered some peculiar things within the *Self Charge Dynamo*, such as multiple hot glue blobs and strips of tape sticking things together.

We suspect that hot glue was used instead of solder (in certain areas), as solder is excellent at conducting electricity, which would not necessarily benefit the device and certainly do the opposite.

The thing that we were most surprised to see though, was the tape being used to hold various wires in place, since tape can easily erode and wear off quite quickly. However, this didn't cause too much of an impact on our research, but it was still an interesting discovery nevertheless.



In conclusion, through the deconstruction and investigation of the *Self Charge Dynamo*, our group has successfully managed to gain a better understanding of the electrical components and inner-mechanisms present within electrical devices, accomplishing our overarching goal of this project.

