VIQC MIDDLE SCHOOL – REVERSE ENGINEERING CHALLENGE

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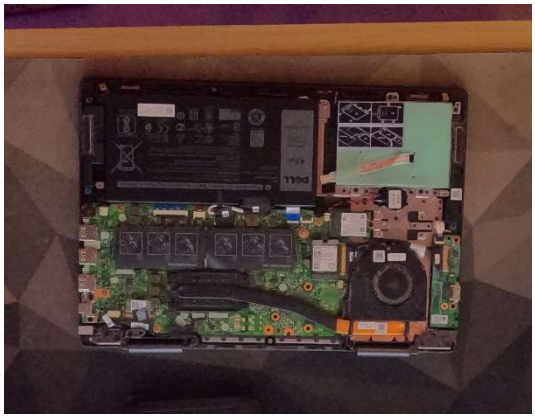
Dell Inspiron 13 5000 Series 2 in 1 Laptop

For this challenge, I decided to investigate the laptop that our team used during 2022. I had never looked inside it before this challenge and this is one of two reasons why I chose this device for the challenge; the other reason is that this laptop has been put under heavy stress for around two years with CAD, Vex code and video editing. I therefore wanted to see whether there was any visible damage to the robot, or whether the slowing down of the laptop was caused purely by aging. The first part of the operation was taking the back cover off. I took off the 8 thumb screws and prised the panel off with a flat head screwdriver. This took some time as I had to be careful not to break any of the fragile connections of wires inside the device. I was baffled when I first opened the laptop, as I have only had experience with ATX and Micro ATX boards, so this laptop board was a new territory for me. I was fascinated by the proportions, with the SSD and the processor being the most surprising as the SSD was 50% of the size, and the processor was miniscule.



The first, and biggest component I chose to research was this INTEL 9560NGW R. It is not very prominent on the internet, but I managed to find one reddit thread about the device, in which people were advising on how to replace this hybrid Bluetooth/Wi-Fi card. It is a Wave2 80MHz Bluetooth 5.1 PCie based card, and interestingly takes up only 50% of the assigned motherboard space as it was designed to fit the socket of its predecessor the 9560NGW that was designed for miniature laptops in the late 2010's. It was eye catching, as it had no clear route to the cooling, and was mounted extremely close to the battery. This told me that it must not be a heat-dependent component as I know from experience that the battery gets very hot under heavy loads.

The second component I investigated was this SK Hynix 256GB SSD. This was used almost solely as a boot drive, as our files were stored on OneDrive. This component was small, and caught my eye, I have worked on SSDs before, but this one was different, it was half the size and is mounted on a bracket in the middle of the NVMe slot. It had very little external damage, except for the fact that a few of the solder points connecting the NVMe slot to the motherboard had come loose, allowing the SSD to shift around in the mount quite a lot.

This challenge inspired me to take a dive into an abundance of technology and has piqued my interest. I learnt about how the ATX, and laptop boards can differ, and it proved to me just why laptop repairs are so expensive. The custom sized parts would cost a premium over the regular ATX components.

Parts List:

- Dell inspiron 13 5000 series 2 in 1
- 8x T9 screws
- T9 screwdriver
- T6 screwdriver