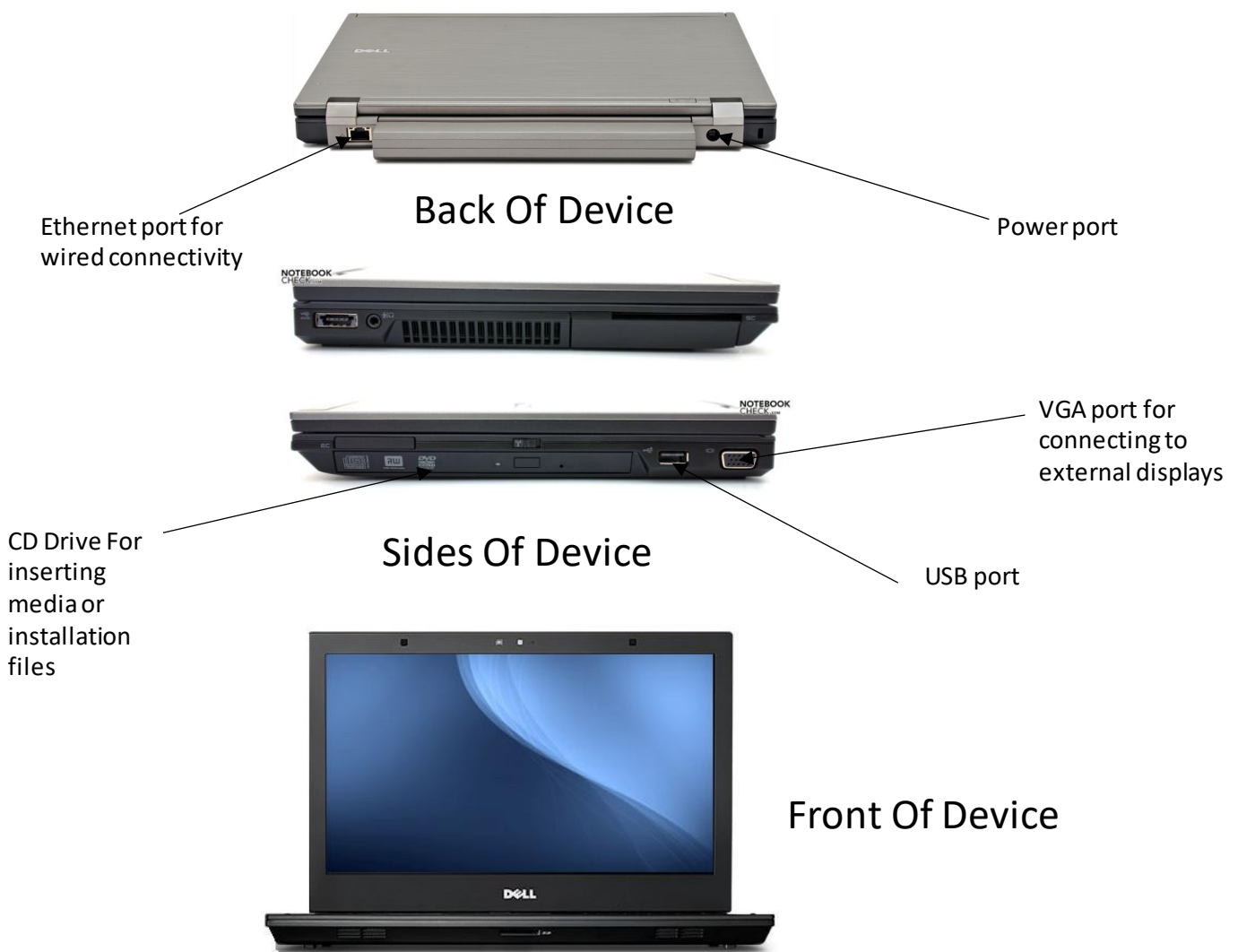# Reverse Engineering A Dell Latitude E4310

13765C; London, United Kingdom

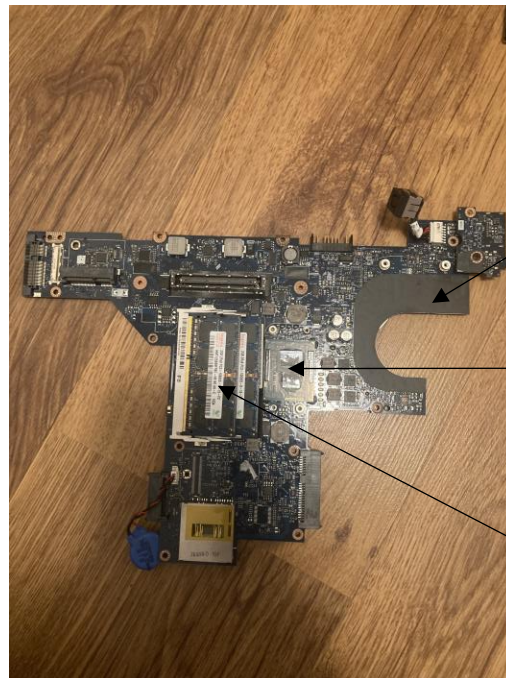# Why I Chose To Reverse Engineer This Device

The Dell Latitude E4310 is a laptop manufactured by Dell and released in 2010. But why did I choose it? This laptop has a 13.3-inch display (diagonally) with plenty of in-built security hardware such as a fingerprint scanner and an ethernet port for connectivity as well as a CD Drive for playing media or installing software. It also has an Intel Core i5 and runs Windows 7 Professional, which was modern when it released.

Photos Of This Device Before Disassembly

Ethernet port for wired connectivity

Back Of Device

Power port

VGA port for connecting to external displays

CD Drive For inserting media or installation files

Sides Of Device

USB port

Front Of Device

Components

Motherboard

Area where fan sits

Intel® Core™ i5 i5-520M 2.4 GHz which is good for moderately heavy tasks

2 2 GB C3-8500 DDR3-1066 204pin SDRAM SODIMM which the computer uses to store files that need memory temporarily

Fan

Heatsink

The fan lies on the edge of the motherboard and the heatsink leading to it screws directly above the processor, so that it can take heat away from it to keep it cool for better overall performance.

Storage Drive

The storage drive which this computer utilises is a 256 GB 7200 rpm (how many times it spins a minute) HDD (Hard Disk Drive). This is used to store media

CD Drive

The CD Drive is used for inserting media into. It slots into the side of the computer with the black ledge (right of image) on the outside of the computer. This makes it very convenient to take out as well.

RAM

The RAM consists of 2 2GB sticks. The RAM allows for more tasks to be run simultaneously on the computer. It can be accessed by screwing off a panel on the bottom of the device, which makes it easy to replace.

WLAN Card

The WLAN (Wireless Network Interface Controller) card is a network interface controller card which connects to a wireless network, such as Wi-Fi or Bluetooth, rather than a wired network, such as a Token Ring or Ethernet. It makes the laptop portable and able to be taken to many places, without needed to be physically connected to the internet.

Various Ports Board

Ethernet Port

VGA Port

USB Port

This is the board which 3 of the ports of the laptop (Ethernet, VGA and USB) are located in is in situated in the top right corner of the chassis (when the laptop's open screen is facing you). This board then connects to the motherboard. This board is vital in making sure that these ports work as they are supposed to.
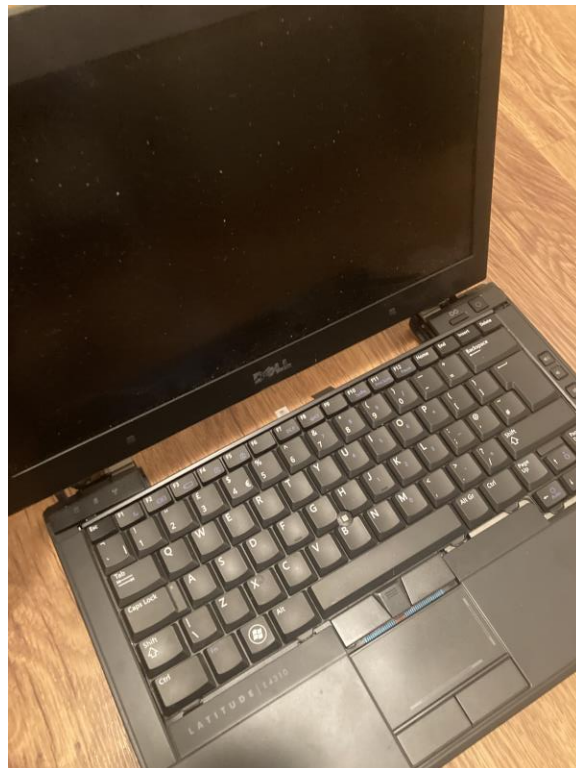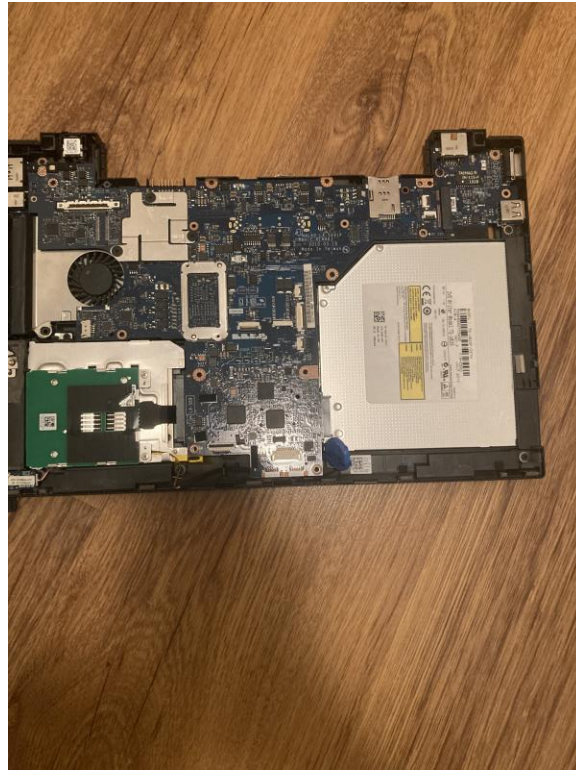
Device Board Schematic
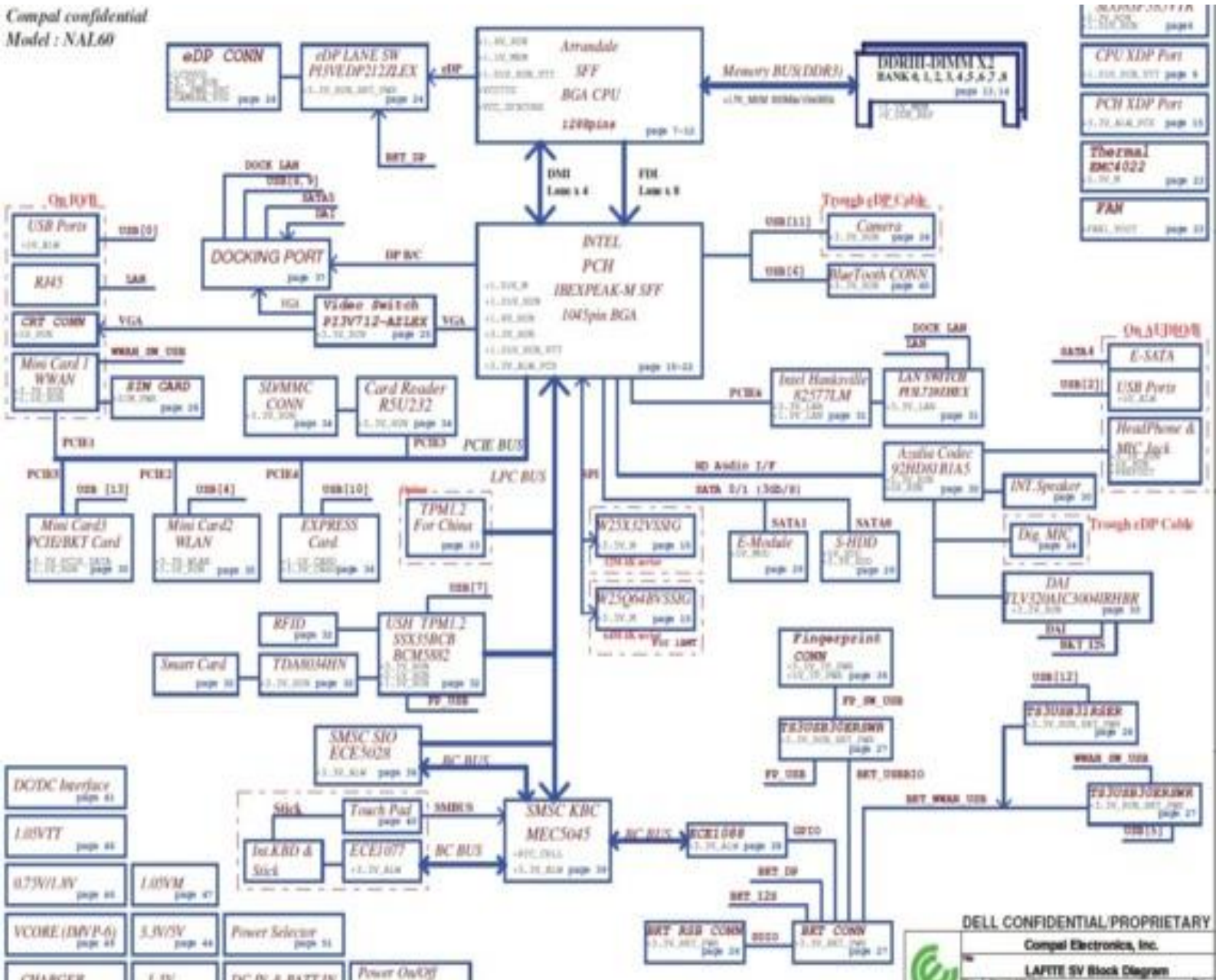
This is the schematic that we used to identify all the components and the motherboard. It shows how different parts interact with each other to create a successful system.

Photos Of This Device After Some Reassembly

Summary Report

The Dell Latitude E4310 was a phenomenal device in what it could achieve.

One of the main thing it had a firm grasp in was security. In addition to a fingerprint scanner, the Dell Latitude E4310 had a TPM 1.2 chip and a SmartCard slot. It came with a fully encrypted hard disk with FIPS certification for even more security. This meant that all your work would be safe and your machine would be hard to get hacked into.

It also appealed a lot to professionals who needed a device that could power their needs. The Intel® Core™ i5 i5-520M 2.4 GHz was an extremely fast chip that could power moderate tasks and comprised of a fan system with a heatsink right above it in order to keep the CPU cool and be able to endure heavy tasks. This laptop also came with 4GB of RAM default which was a good amount back in 2010. It can also be swapped out by accessing the hatch at the bottom of the device, only held in by a few Philips Head Screws. This system also came with Windows 7 Professional, which as the name suggests was for professional users. This OS upgrade from the tier just below it (Windows 7 Home Premium) includes some better features, such as allowing device backups over networks instead of just to a physical drive.

The port selection is also very generous. There is a CD drive for media and installation files, as well as a USB port for peripherals and a VGA port for connecting to external displays. There is also an ethernet port for wired connectivity and a power port. The battery can easily be slid off from the back of the device if needed to be replaced.

Aside from the knowledge we gained from this device opening, we had faced some issues. One of these in particular was learning how to disassemble the device. Through the disassembly, we had some minor slip ups where components would slightly bend, but we fixed this by carefully looking at guides and understanding fully each step before we executed it. The time we spent working on this improved our attitude when facing deice disassembly issues. This can help us in the future as we pursue our dreams of becoming efficient engineers.

Word Count: 386