



Identification of Make and Model from the Burnt Material of a Laptop

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Case Report

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Abstract

Criminal destroy evidence for the purpose of hiding their identity and information regarding the crime scene after committing the crime. Setting fire is the most common practice to damage the evidences and can burn almost all evidence materials like clothes, plastic and wood. Nowadays computers, mobile phones, laptops and other digital evidence which carry information regarding criminal act are usually found at the scene of crime. In this case victim was kidnapped along with his laptop for ransom and later on murdered. During investigation police seized some burnt material from the suspicious place and sent it for the examination. Police want to know whether burnt material have remnant of laptop or not. They also want to know the make and model of the laptop to establish the link between burnt material and victim, as the detail of victim's laptop mentioned in F.I.R. The burnt material was examined in the laboratory and identified as laptop with its make and model. This paper reveals the process of handling of burnt laptop and identifying the internal parts, make and model of the laptop with the help of marking, shape & size of the metallic parts.

Keywords: Ransom; Murder; Fire; Damage; Laptop; Make and Model

Introduction

In the digital era machines like computers, mobile phones and laptops becomes important part of our daily life. Use of laptops becomes so popular due to its portability, affordability, flexibility and adaptability. In every field of life like, hospitality, railways, metro trains, corporate houses, academics, professionals etc. we found the use of laptop/computers for different purposes. Laptop usage is very much popular in between the students whether their residential status is urban and rural. It's the present day demand to run hand with the latest technology. This technology not only simplify student's task but it also seem to morale boost up of the students. Students found themselves connected with the entire world with the help of Laptops [1] The use of computers and laptops in schools has become popular under the premise that these information and communication technology will facilitate student learning, and therefore,

technology will improve the quality of education [2]. Indeed, computers and laptops may provide access to more resources, offer a delivery and holding mechanism for many texts in electronic format in the device's memory and allow access to the Internet. Laptops may provide opportunities to students in developing countries [3]. Personal as well as confidential data of an individual or an organization was stored in the laptops. Large numbers of cases regarding laptop and mobile stolen was registered in all over the world. Out of the 265 laptops per organization lost or missing, on average only 12 laptops were recovered. Forty-two percent of laptops were lost off-site (working from a home office or hotel room), 32percent say they are lost in transit or travel and 13 percent are lost in the workplace. Thirteen percent say they don't know where employees or contractors lose their laptops. Laptops with the most sensitive and confidential data are the most likely to be stolen. However, these laptops also are more likely to have disc encryption [4].

In this case a student was kidnapped along with his laptop for ransom and later on murdered. During investigation police seized some burnt material from the suspicious place and sent it for the examination along with following queries.

- 1) Whether the burnt material is burnt laptop material or not.
- 2) If yes, then identify its make and model.

Nowadays a lot of evidential information is available in digital media. This information stored in digital evidences play a crucial role to trace and solving criminal riddle. In case of Email fraud, internet fraud, identity theft, credit card fraud, software piracy, cyber stalking, phishing, virus dissemination, hacking, cyber extortion, cyber espionage, fraud calls, scams, kidnapping, murder, theft, arson and other criminal act where criminal burnt the whole media so that relevant information including make and model etc. cannot be determined. In such type of cases where laptops are completely burnt and digital information and data stored in hard disc becomes quite impossible due to severe burning. Information other than hard disc like make and model, brand and type of laptop play a vital role and could be useful information to investigation purpose. This study aim the process of these severely burnt laptop and identify whether burnt residue is of a laptop or not and also identification of make and model of the laptop from the burnt residue [5].

Material and Method /Experimental Technique

Cleaning of Burnt Material

As opened the parcel, burnt material i.e. some metallic sheets, metallic parts, broken black glass pieces, metallic frame with some screws (Figure 1) was found.



Figure 1: Burnt material.

There was no any kind of plastic material was left only metallic residue was remaining. These metallic parts were separated and individualize on the basis of their shape and size. Soot deposition was observed on the metallic parts.

These parts were cleaned and examined with the help of following items

- 1½ inch flat brush
- 300 to 600 grit fine sandpaper
- 10% ethanol solution
- Cotton swabs
- Magnifying glass for detail examination (Figure 2)



Figure 2: Cleaning items & tools.

After removing the soot and carbon deposited on the metallic parts, these were appearing to be electronic parts. Some engraved characters were observed in the specific area and position of these metallic parts. The surface of the metallic parts was cleaned with the help of 300 to 600 grit fine sandpaper and treated with the cotton swab of 10% ethanol solution and these characters were deciphered as unique serial number by using magnifying glass.

Comparison of the Burnt Parts with Concerned Laptop Parts

To ascertain whether these parts belong to a laptop or not, these parts were compared with the internal parts of the different laptop brand. Image of internal parts of Dell, HP, Lenovo, Acer, Asus, Compaq, Sony and Toshiba were taken from the different resources. These images of internal laptop parts were compared with concerned images of burnt metallic parts to know if the burnt parts are of a laptop or not. The photographs of internal parts of different brands laptops compared with the burnt parts and similarities noticed as shown in Figure 3.

Searching and Tally Unique Serial Number on Individual Metallic Parts

Deciphered characters on every individual metallic parts were unique serial numbers. These serial numbers were directly searched on the www.google.co.in to check the record of these serial numbers on different e-commerce websites on internet. Items with description (including item name, brand, MPN, compatible model and compatible product line) were found on www.ebay.com and www.amazon.com etc.

and it was also noticed that these unique serial numbers were known as MPN (Manufacturer Part Number) [6].

Comparison of the Images of Burnt Parts with Images from Original Service Manual Book of Concerned Model

To authenticate the information provided by websites i.e. www.ebay.com and www.amazon.com, original service manual of the same model (as described in e-commerce websites on internet) was downloaded from the genuine website of the concerned brand. Images of the internal parts of the laptop from original service manual were obtained and compared with images of burnt metallic parts. Burnt laptop parts were arranged and assemble on basis of their shape and size according to the original service manual and image of the burnt parts assembly were prepared. The images of the burnt parts assembly were compared with the images of assembled internal parts of laptop from the original service manual to verify the position of the burn parts in assembly.

Results and Discussion

After cleaning the burnt parts, these parts were appearing to be electronic parts. On preliminary examination it is suspected that these parts may be the parts of a laptop. So, to know whether these parts belong to a laptop or not, images of these metallic burnt parts were compare with the images of the internal parts of the HP, Dell, Lenovo, Acer, Asus, Compaq, Sony and Toshiba taken from the different resources. After comparison it was found that these metallic parts were similar to the parts of Dell Inspiron 135000 series, Lenovo ideapad 110-15ISK, Dell Studio XPS 1640, Acer Aspire 5, Lenovo Thinkpad E590 and Sony VAIO in respect of shape, design and overall appearance and some of parts from the burnt material were identified as frame of laptop(A), cooling fan(B), motherboard(C), USB port(D), hard disc(E), RAM(F), CMOS battery(G) and DVD drive(H) in Figure 3. By identifying these parts it was clear that these parts are the parts of a laptop.

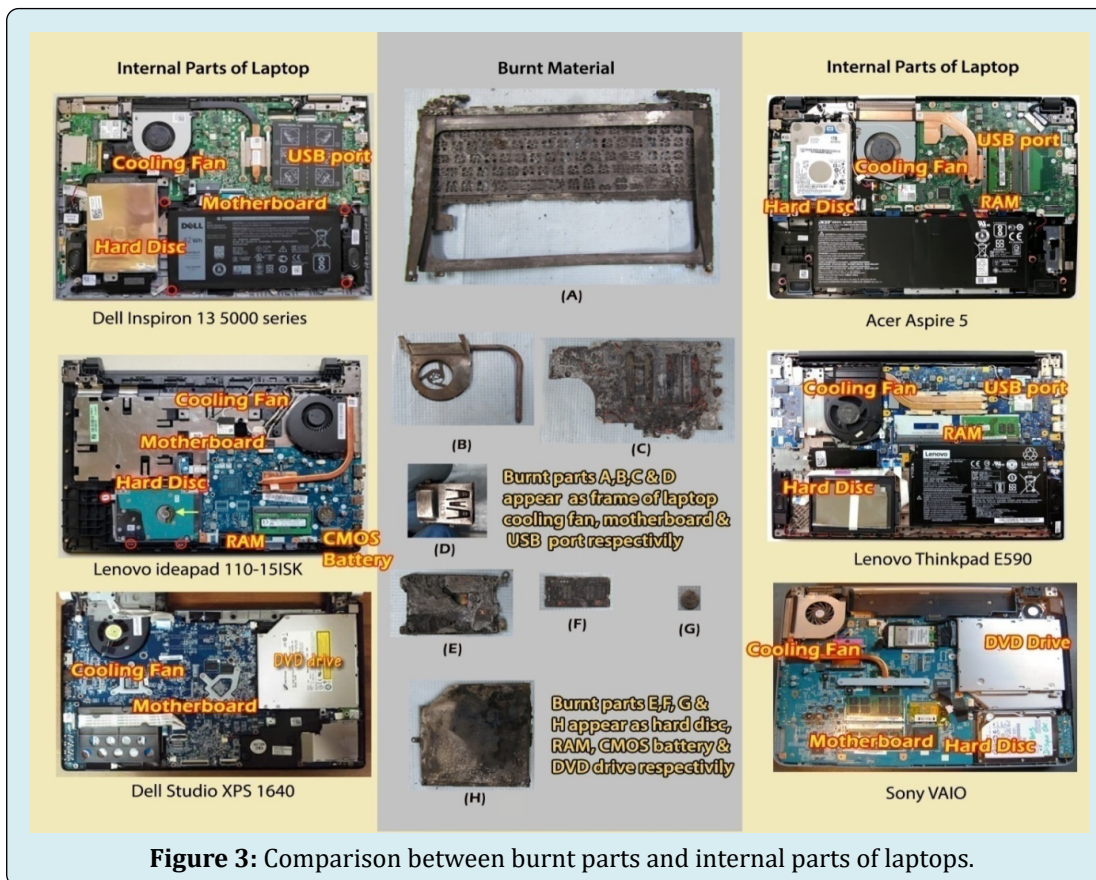


Figure 3: Comparison between burnt parts and internal parts of laptops.

Every metallic part has its unique serial number. These serial numbers were examined under magnification and these were deciphered as AM1P6000100 on rectangular metallic frame, AM1P6000200 on hard disc, EC1P6000200 on quadrilateral frame and AM1P6000900 on rectangular

plate (Figure 4).

Items with description (including item name, brand, MPN, compatible model and compatible product line) were found on www.ebay.com and www.amazon.com etc. (Figure

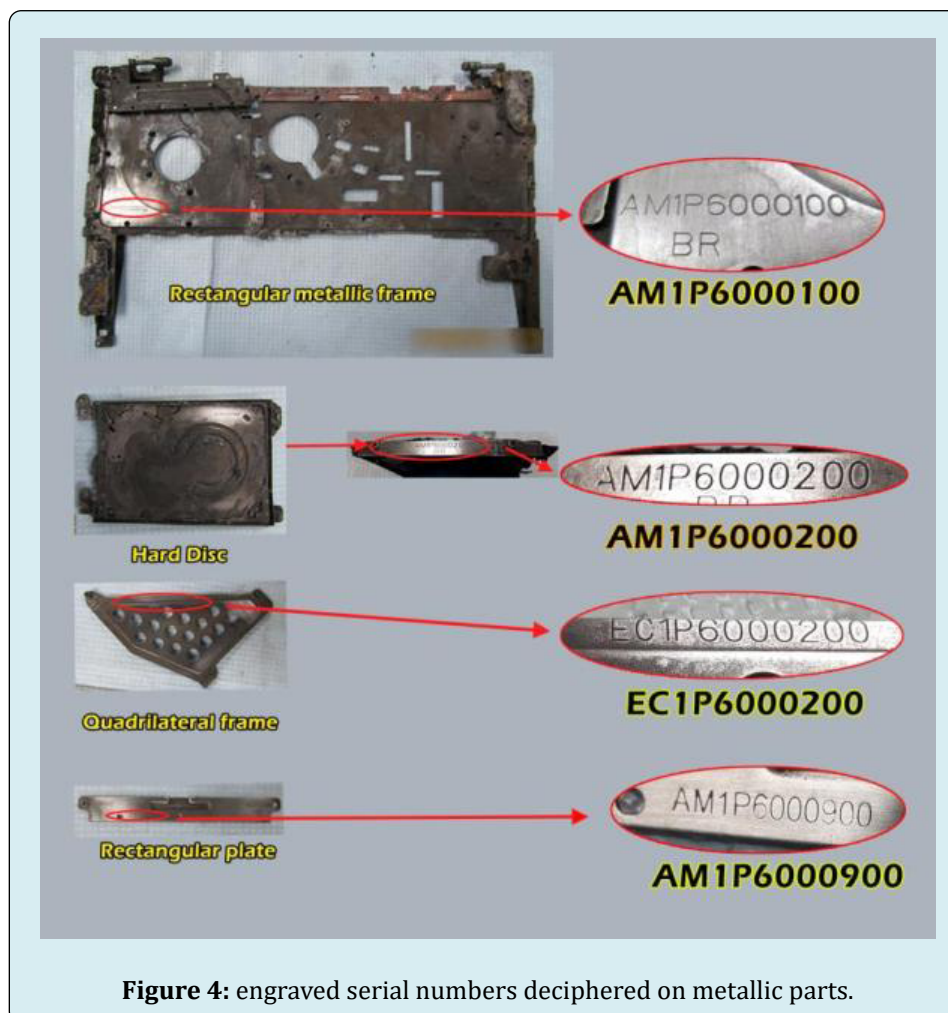
5).

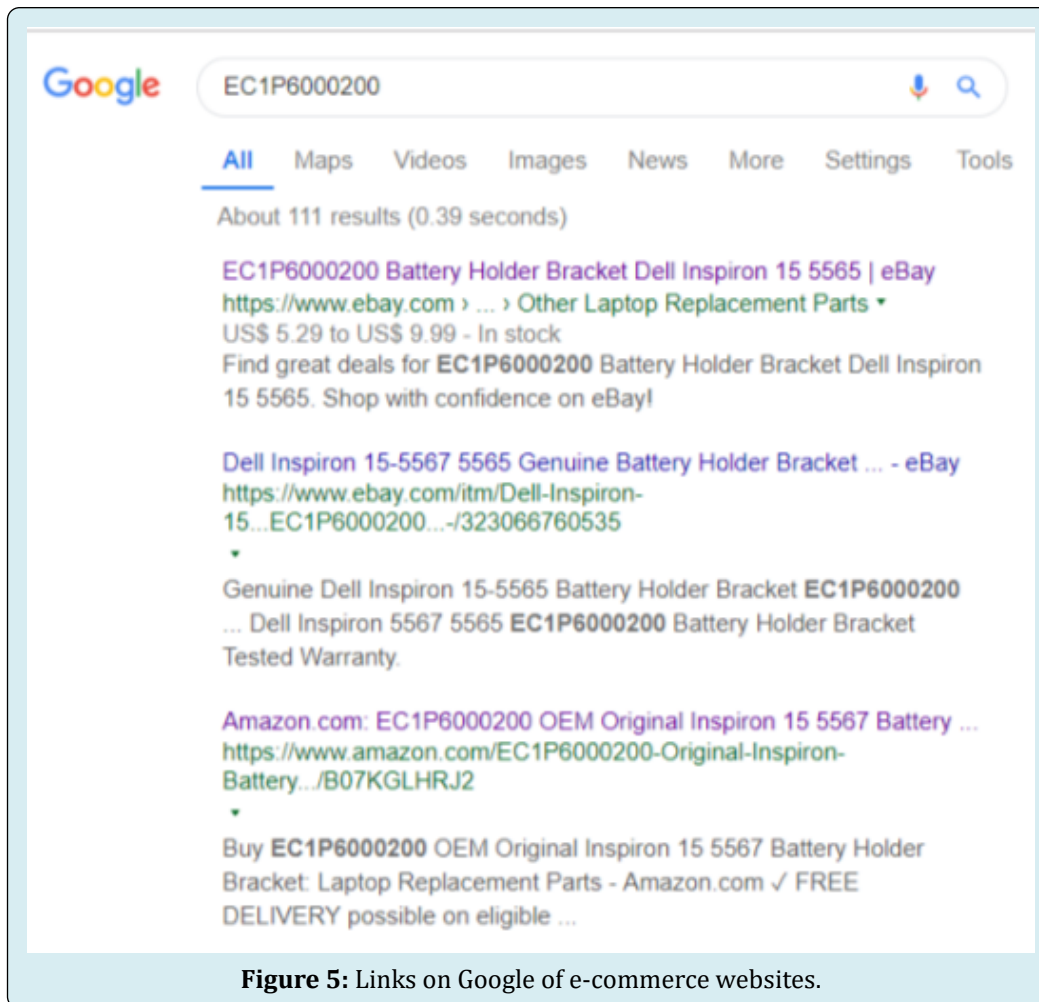
The serial numbers were noticed as MPN (Manufacturer Part Number). Rectangular metallic frame having MPN AM1P6000100 was identified as key board support bracket, hard disc having MPN AM1P6000200 was identified as hard drive caddy, quadrilateral frame having MPN EC1P6000200 was identified as battery holder bracket and rectangular plate having MPN AM1P6000900 was identified as touchpad support bracket on different e-commerce websites. According to description e-commerce websites, these parts were belonging to brand- Dell, compatible product line- Inspiron and compatible model -5565 & 5567 (Figure 6) [7].

As serial number/MPN (manufacturer part number) and other description indicated that these metallic parts belonging to the brand and model i.e. Dell Inspiron 15 5565/5567. So original service manual i.e. Inspiron 15 5000 Service Manual Computer Model: Inspiron 15-5565 Regulatory Model: P66F Regulatory Type: P66F002/P66F003 (2017 - 02 Rev. A02) and Inspiron 15 5000 Service Manual Computer Model:

Inspiron 15-5567 Regulatory Model: P66F Regulatory Type: P66F001 (2016 - 08 Rev. A00) was downloaded from www.dell.com. Specific images from the original service manual were compared with the burnt parts to check the authenticity and validation of information provided by the e-commerce websites. Images of the burnt parts and images of internal parts of concerned laptop from original service manual were compared. After comparison, image of laptop mother board, touchpad, support bracket for touchpad, keyboard support bracket and optical drive bracket was found similar to the images of concerned parts from the original service manual in respect of shape, design and overall appearance (Figure 7).

Image of the burnt parts assembly compared with image of internal setup from original service manual and it was found that position of the cooling fan, heat sink, power ports, HDMI, USB ports, RAM, motherboard, CMOS battery, battery holder bracket and hard drive matched with the position of the concerned parts images from the original ++service manual (Figure 8).





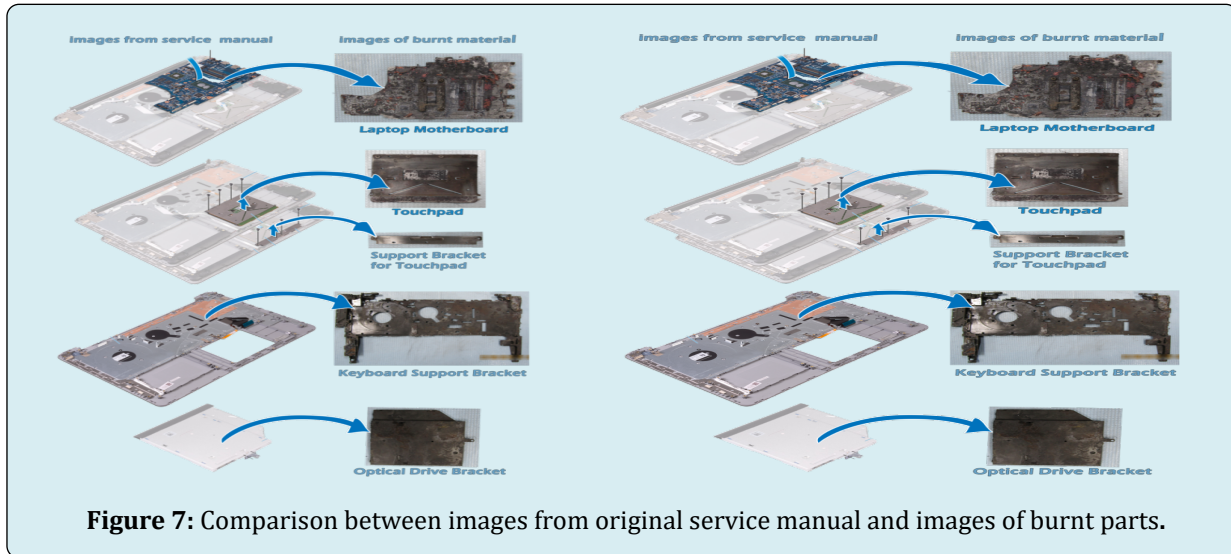


Figure 7: Comparison between images from original service manual and images of burnt parts.

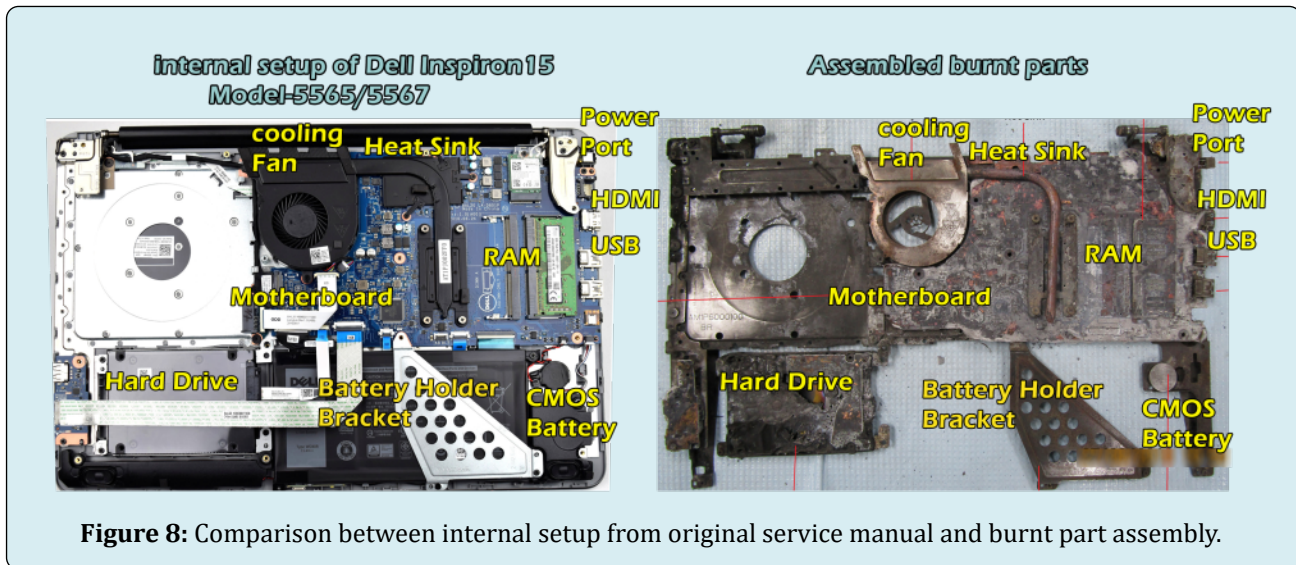


Figure 8: Comparison between internal setup from original service manual and burnt part assembly.

Conclusion

Shape or design play role to know the parts name and location when compared with images of different laptop parts from different resources. MPN (manufacturer part number) play role to know the description of metallic parts. Position of parts play role to know the make and model when compared with images of internal parts assembly from the original service manual. hence, Shape or design, MPN (manufacturer part number) and Position these three important factor play a vital role to know whether burnt material belongs to a laptop or not and identification of brand and model.

On basis of above examination and observation it is concluded that the burnt material having parts of Dell Inspiron 15 5565 laptop or parts of Dell Inspiron 15 5567 laptop.

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