NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

June 15, 2017

Electronic Devices

Specialist's Factual Report
by Jane Foster

1. EVENT

Location:	Williston, Florida
Date:	May 7, 2016
Vehicle:	Tesla Model S
Vehicle Identification Number (VIN):	5YJSA1S26FF[redacted]
Operator:	Private
NTSB Number:	HWY16FH018

For a summary of the accident, refer to the *Crash Summary Report*, which is available in the docket for this investigation.

2. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following devices:

Device 1:	Laptop Computer
Device 1 Serial Number:	ECN0CX305107503
Device 2:	Chromebook
Device 2 Serial Number:	FCNLCX051001518
Device 3:	Chromebit
Device 3 Serial Number:	100A-CM2XXNF
Device 4:	Micro SD Memory Card
Device 4 Serial Number:	n/a

2.1. Laptop Computer Device Description

A Laptop Computer is a portable computing device. Portable computing devices are typically capable of internet access, email, messaging services, and can run user-installed applications to perform specific tasks. Laptop computers contain user and system data that is typically stored on non-volatile memory[1] and can be accessed through manufacturer-provided interfaces.

[1] Non-volatile memory is semiconductor memory that does not require external power for data retention.

2.1.1. Laptop Computer Data Recovery

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed the unit had sustained minor impact damage and information was extracted using the forensic software normally, without difficulty. Figures 1 and 2 show the laptop computer as received.

Figure 1. Top of Laptop Computer as received.

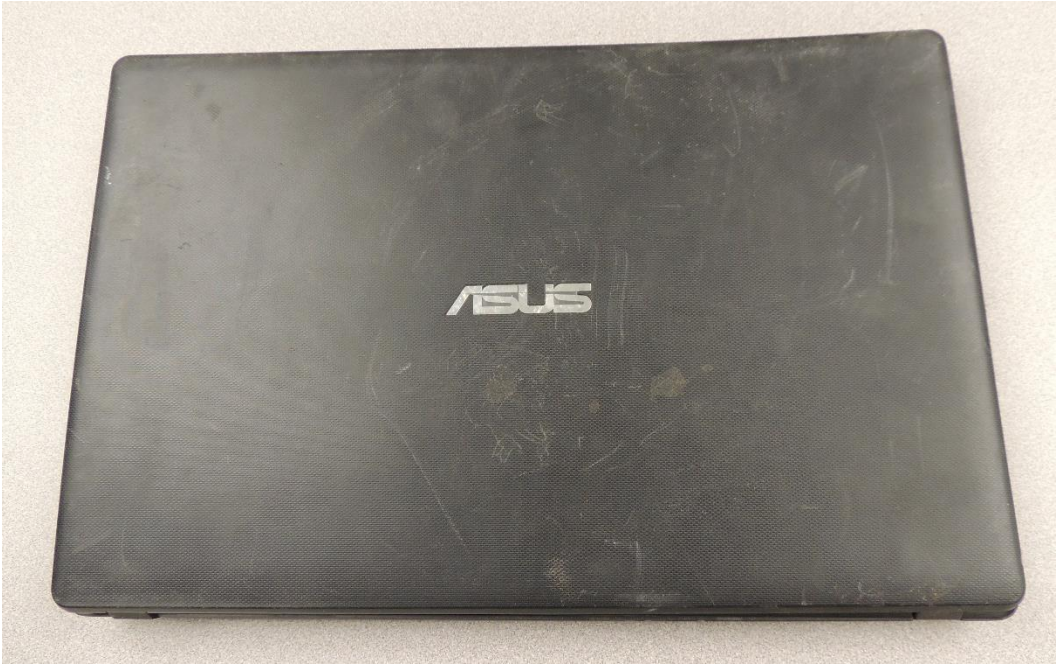


Figure 2. Bottom of Laptop Computer as received.

2.1.2. Laptop Computer Data Description

The hard drive was removed from the laptop and was imaged using forensic software. The image of the hard drive was reviewed. The most recent accessed, modified, and created files were from April 6, 2016. The screen of the laptop was broken so the clock drift of the laptop could not be determined. Without the offset of the laptop clock to real time, it could not be concluded whether or not the driver was on the laptop at the time of the crash. No Harry Potter movie file was found on the hard drive of the device.

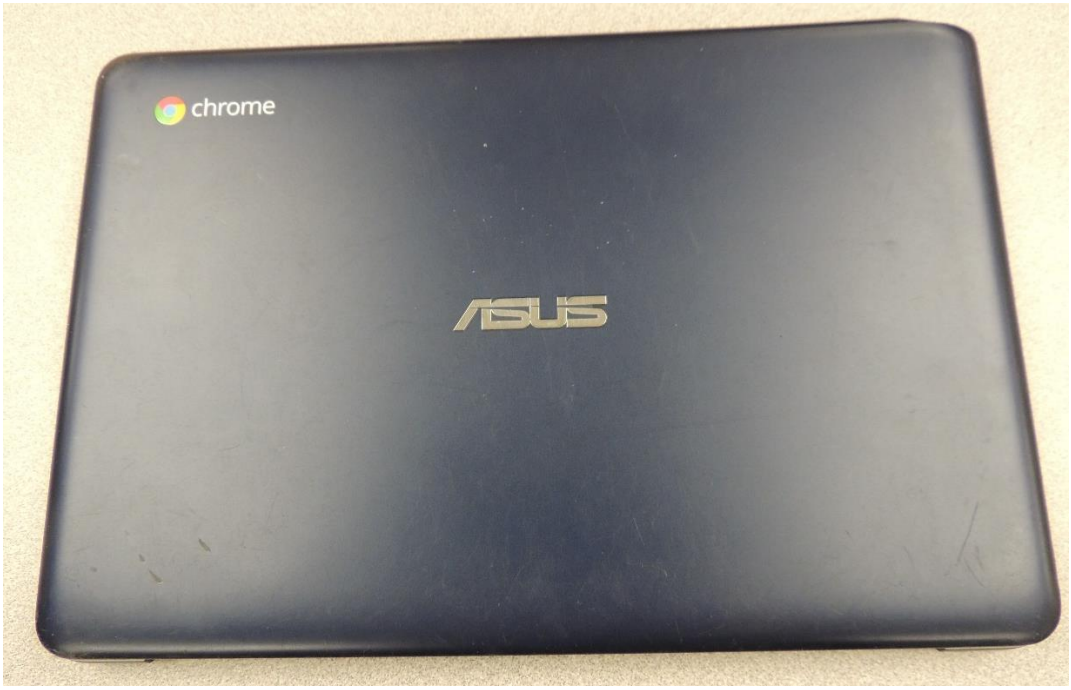
2.2. Chromebook Device Description

A Chromebook is a portable computing device. Portable computing devices are typically capable of internet access, email, messaging services, and can run user-installed applications to perform specific tasks. Chromebooks contain user and system data that are typically stored on non-volatile memory and can be accessed through manufacturer-provided interfaces. Data can be stored in Embedded MultiMedia Card (eMMC)[2] rather than typical hard drive or solid state memory format.

2.2.1. Chromebook Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained impact damage to the screen. Information was extracted using the manufacturer's software normally, without difficulty. Figures 3 and 4 show the Chromebook as received.

Figure 3. Top of Chromebook as received.



[2] eMMC is a memory chip for internal data storage containing a controller and flash (nonvolatile) memory.

Figure 4. Bottom of Chromebook as received.

2.2.2. Chromebook Data Description

The Chromebook was too damaged for normal data recovery. Further efforts using chip removal of the eMMC data storage would not yield usable data.

2.3. Chromebit Device Description

The Chromebit is a device that runs Google's Chrome operating system. When placed in the HDMI port of a television or a monitor, this device turns that display into a personal computer. Chromebit allows adding a keyboard or mouse over Bluetooth or Wi-Fi. The Chromebit contains a CPU, memory, and internal storage.

2.3.1. Chromebit Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had not sustained any damage. Figures 5 and 6 show the Chromebit as received.

Figure 5. Top of Chromebit as received.

Figure 6. Bottom of Chromebit as received.

2.3.2. Chromebit Data Description

The Chromebit could not be imaged due to charging issues. No data was recovered from the device.

2.4. Micro SD Memory Card Device Description

A micro SD card is a flash memory card used for storage in portable devices. Micro SD cards use non-volatile memory to store data and information.

2.4.1. Micro SD Memory Card Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had not sustained any damage; information was extracted using forensic software normally, without difficulty. Figure 7 shows the micro SD card as received.

Figure 7. Front and back of micro SD card as received.

2.4.2. Micro SD Memory Card Data Description

The micro SD memory card contained photos and music files. The photos were not pertinent to the investigation and the music included parts of the Harry Potter movies' soundtracks.