

system76



**System76  
Gazelle (gaze14)  
Service Manual**

## Revision history

Author	Date	Version	Remarks
Aaron Honeycutt	2019-06-12	Initial	
Thomas Zimmerman	2019-06-21	Review	

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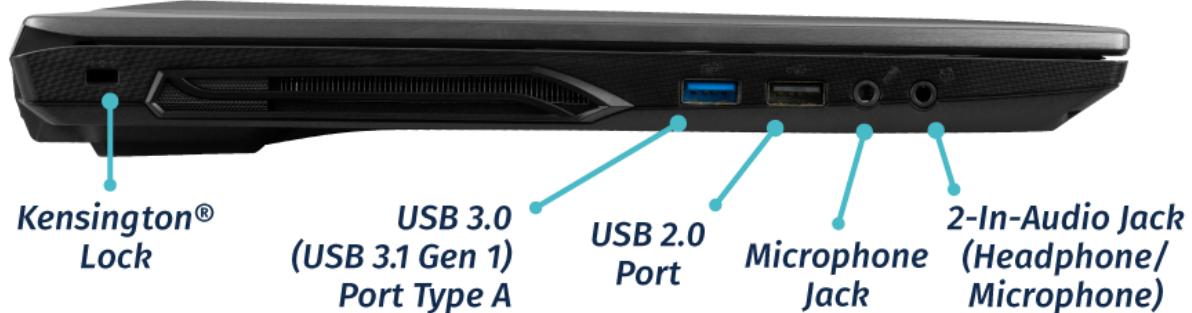
# Hardware overview

## External overview

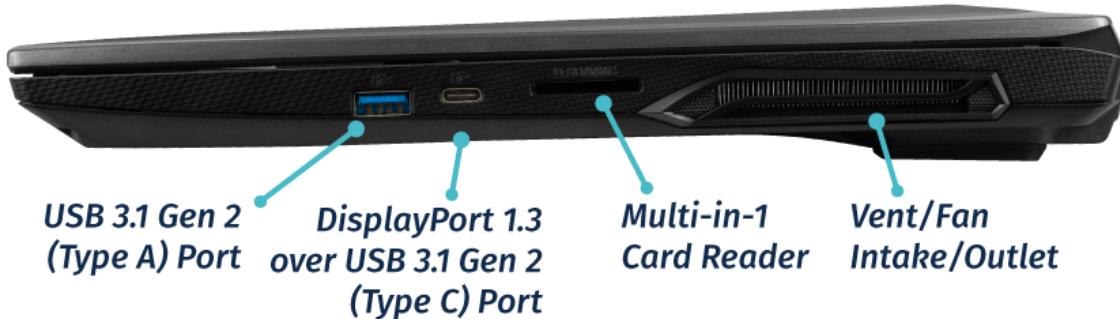
### Ports overview

The Gazelle provides multiple connectivity options.

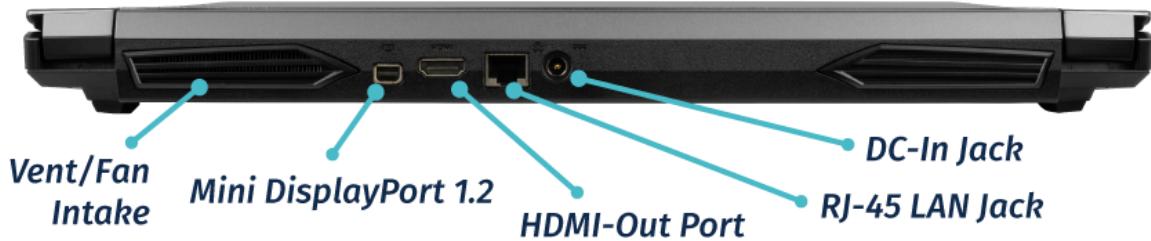
**Gazelle 15" 1650**



**Left side overview**

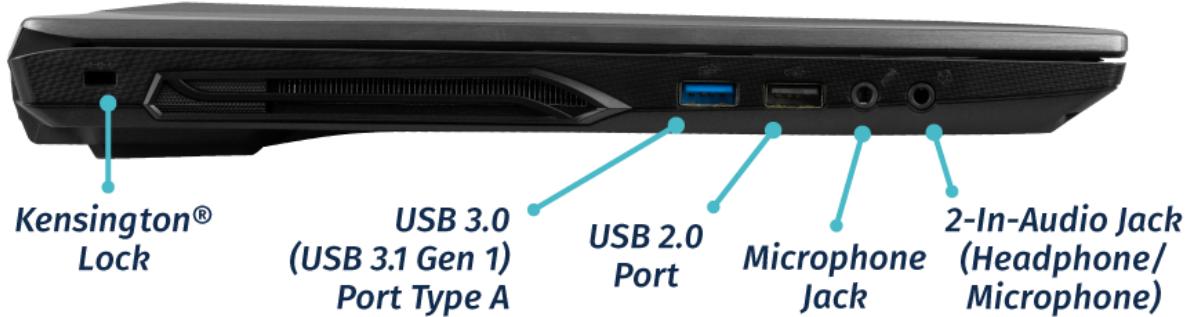


**Right side overview**



**Back side overview**

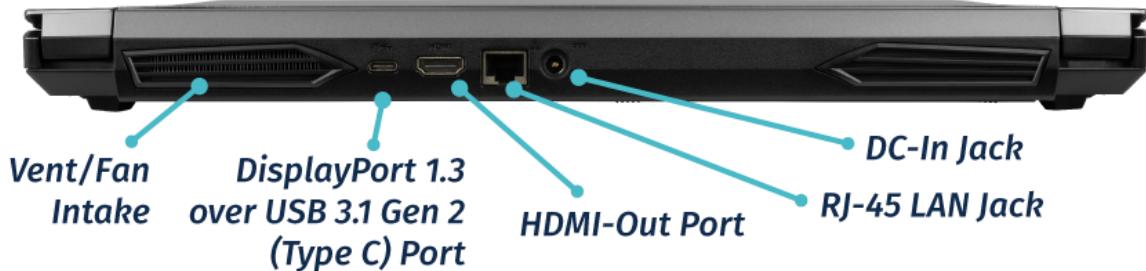
## Gazelle 15" 1660 Ti



## Left side overview



## Right side overview



## Back side overview

## Bottom case screw sizes

The Gazelle has 3 sizes of screws for securing the bottom case.



## Front LED overview



Icon	Color	Description
	Orange	DC power plugged in
	Green	Computer is on
	Blinking green	Computer is sleeping
	Orange	Battery charging
	Green	Battery fully charged
	Blinking orange	Battery critically low
	Green	Airplane mode is ON (WiFi/Bluetooth disabled)
	Green	Hard disk activity

## Hardware keyboard shortcuts

Your Gazelle has several actions available using the Fn and Function keys.

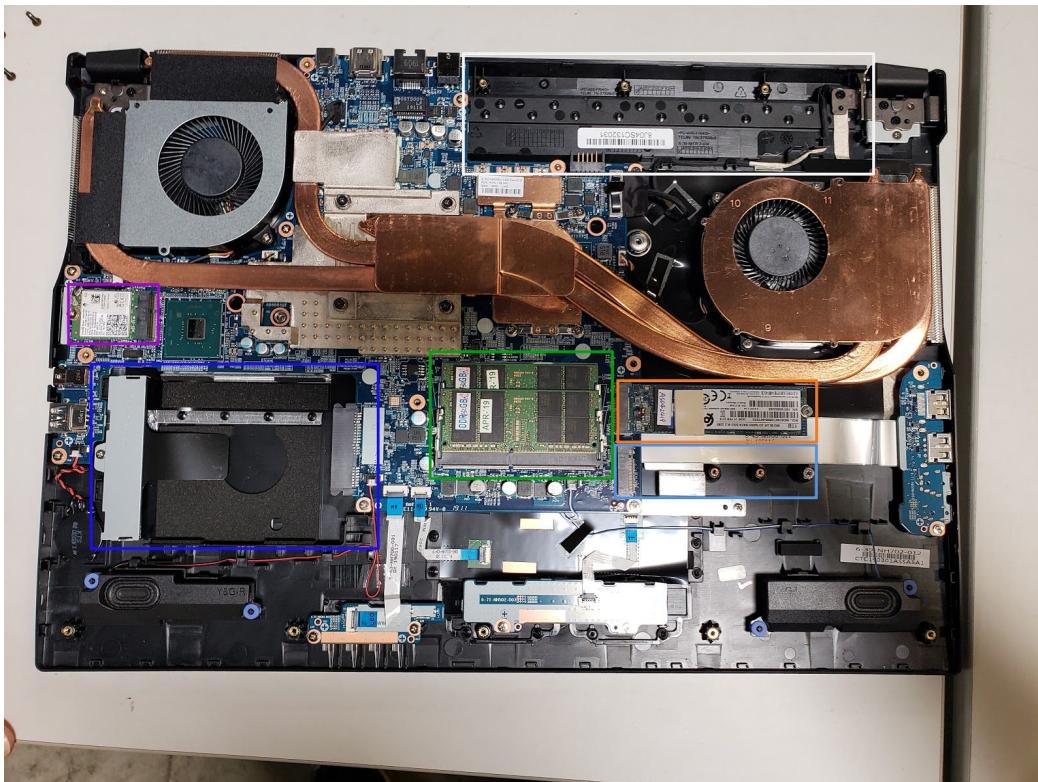
Key	Shortcut	Action
	Fn+F1	Toggle trackpad
	Fn+F2	Toggle built-in LCD
	Fn+F3	Mute
	Fn+*	Toggle keyboard backlight
	Fn+F5	Volume down
	Fn+F6	Volume up
	Fn+F7	Toggle displays
	Fn+F8	Brightness down
	Fn+F9	Brightness up
	Fn+F10	Toggle webcam
	Fn+F11	Toggle airplane mode
	Fn+F12	Suspend
	Fn+`	Play/Pause
	Fn+1	Toggle fan between max/automatic
	Fn+/-	Cycle Keyboard Color
	Fn+-	Decrease Keyboard Brightness
	Fn++	Increase Keyboard Brightness

## External displays

Aside from the standard Mini DisplayPort (MiniDP) and HDMI, the Gazelle with the 1660 Ti also supports DisplayPort (1.3) over USB-C (3.1).

### Internal component overview

Below is a color-coded diagram of the Gazelle's internal components.



CPU fan is highlighted in cyan

GPU fans are highlighted in light orange

CMOS battery is highlighted in red

RAM is highlighted in green

M.2 SSD is highlighted in orange

M.2 NVMe is highlighted in light blue

Wireless/Bluetooth module is highlighted in purple

Battery is highlighted in white

# User-serviceable parts and repairs

Many components on your Gazelle can be upgraded or replaced as necessary. Follow these step-by-step guides for instructions.

## Replacing the keyboard

Keyboard replacement is simple and requires only a cross-head screwdriver.

**Tools required:** Cross-head (Phillips) screwdriver

**Time estimate:** 10 minutes

**Difficulty:** Low

**Screws:** 2 total

- 2 large M2, black (Keyboard M2)

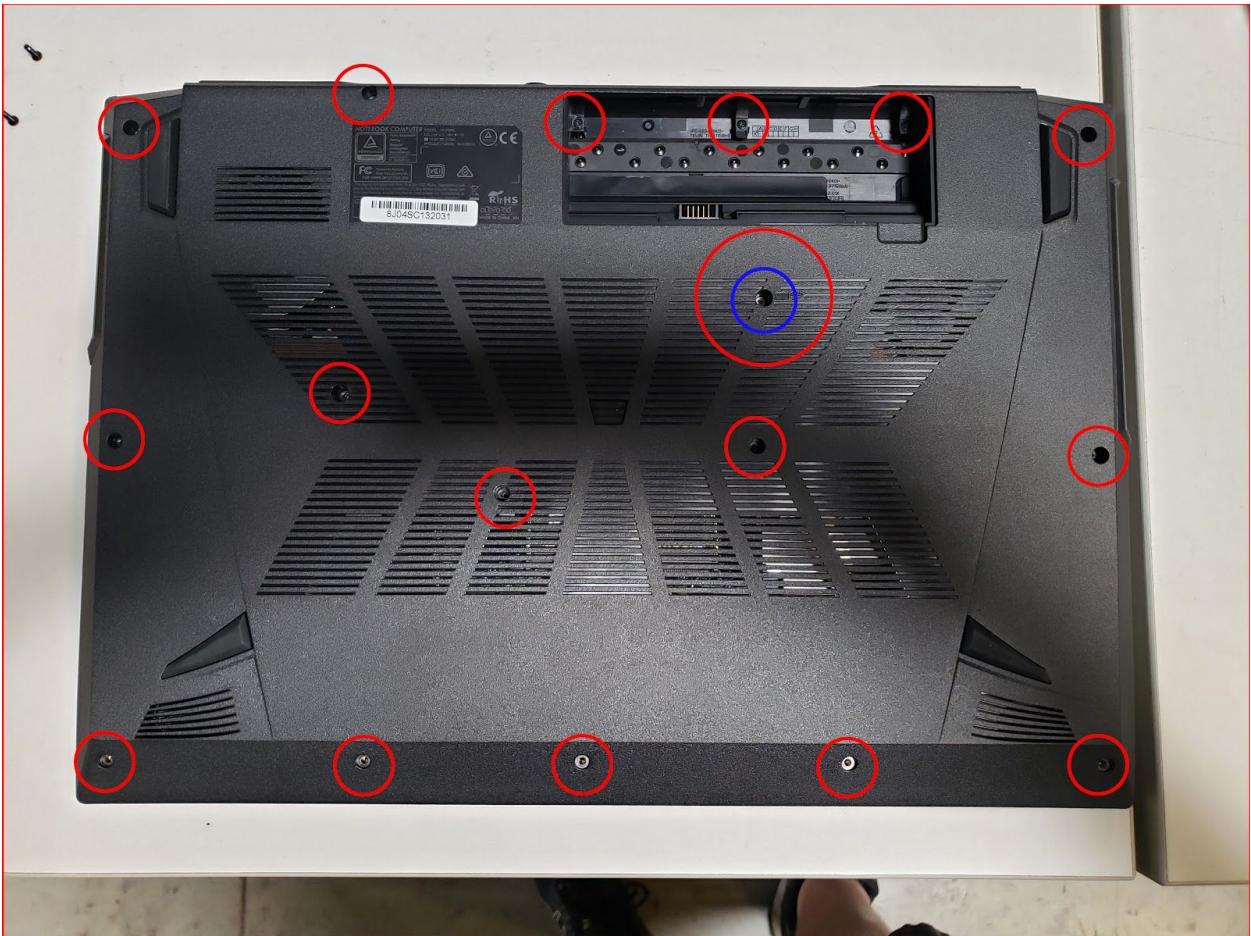
### Steps to replace the keyboard

**Photos are provided in order below these steps.**

1. Find a surface suitable for work. A desk or table works well.
2. Place something soft on the table, like a towel or anti-static mat.
3. Place the Gazelle lid-side-down.
4. Remove the 2 keyboard screws, indicated by the small keyboard icons.
5. Open the Gazelle and place it on its side.
6. Push the screwdriver into the keyboard push point until the keyboard pops out.
7. Set the Gazelle down, then starting from the top side, pull the keyboard loose.
8. Flip the keyboard over onto the trackpad.
9. Pull the large ribbon cable out of the connector.
10. The small ribbon cable connector has latches. Gently pull the latches from both sides and remove the ribbon cable.
11. Remove the keyboard and replace it with the new one.
12. Insert the large ribbon cable into the connector.
13. Seat the small ribbon cables, then apply pressure equally to both sides of the connector to secure.
14. Flip the keyboard over and press the bottom tabs of the keyboard into the case.
15. Secure the keyboard by pressing down on the edges of the keyboard.
16. Flip the Gazelle over.
17. Replace the 2 screws holding the keyboard in place.
18. Boot your Gazelle and confirm the keyboard is operational.

## Photo guide for keyboard replacement

1. Gazelle lid-side-down. There are two keyboard screws and one has a red circle while the other one has a red and blue circle indicating the keyboard push point.



2. Gazelle on its side with screwdriver in keyboard push point.



3. Set the Gazelle down and remove the keyboard starting along the top edge.



4. Flip the keyboard over and rest it on the trackpad. Pull the large ribbon cable out of the connector. The smaller ribbon cables have latches. Gently pull it forward to release the connector, then remove the ribbon cables.



## Removing the bottom cover

Removing the cover is required to access the internal components. Prior to removing the cover, ensure the AC power is unplugged, and all peripherals (including SD cards and USB drives) are unplugged or removed from the system.

**Tools required:** Cross-head (Phillips) screwdriver

**Time estimate:** 10 minutes

**Difficulty:** Medium

**Screws:** 17 total:

- 13 small M2 perimeter, black
- 2 large M2 keyboard, black
- 3 small M2 battery section, black

## Steps to remove the cover

**Photos are provided in order below these steps.**

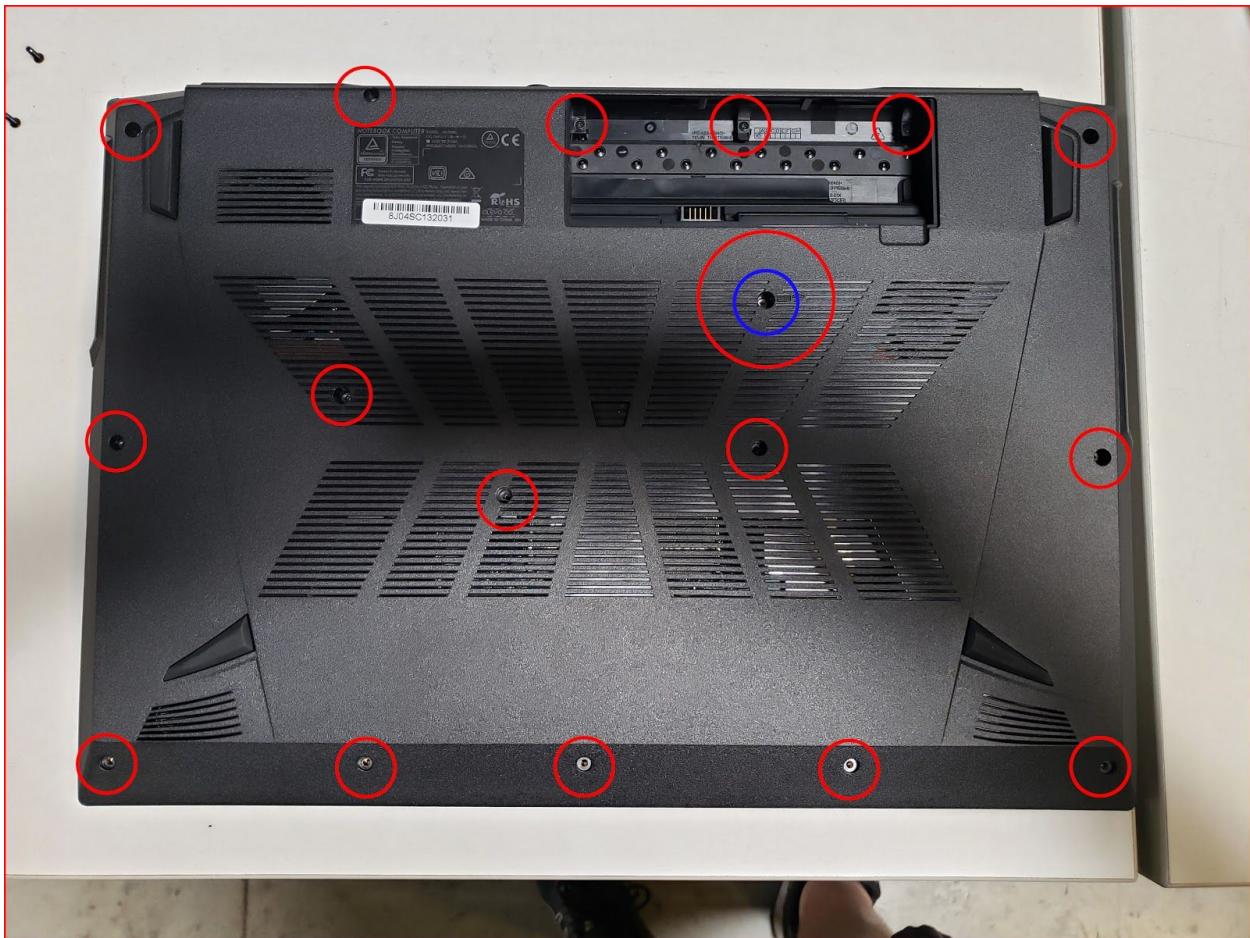
1. Find a surface suitable for work. A desk or table works well.
2. Place something soft on the table, like a towel or anti-static mat.
3. Place the Gazelle lid-side-down.
4. Remove the 13 perimeter screws.
5. Remove the 2 keyboard screws, indicated by the small keyboard icons.
6. Remove the 3 small battery section screws.
7. The bottom cover will lift off, starting from the front corners working to the back near the hinges.

## Steps to replace the cover

1. Align the bottom cover to the case towards the back and hinges.
2. Set the bottom cover along the edges and confirm the bottom cover is seated.
3. Replace the 13 perimeter screws.
4. Replace the 2 keyboard screws as well as the 3 small battery section screws.
5. Replace the keyboard by inserting the tabs into the bottom edge near the trackpad and press around the edges of the keyboard to ensure it is fully snapped into place.
6. Flip the Gazelle and replace the 2 keyboard screws.

## Photo guide for bottom cover removal/replacement

1. Gazelle lid-side-down. There are two keyboard screws and one has a red circle while the other one has a red and blue circle indicating the keyboard push point.



# Replacing the RAM

RAM acts as temporary storage for your computer. More RAM generally provides better performance. If you've purchased new RAM, need to replace your RAM, or are reseating your RAM, follow these steps.

**Tools required:** Cross-head (Phillips) screwdriver

**Time estimate:** 15 minutes

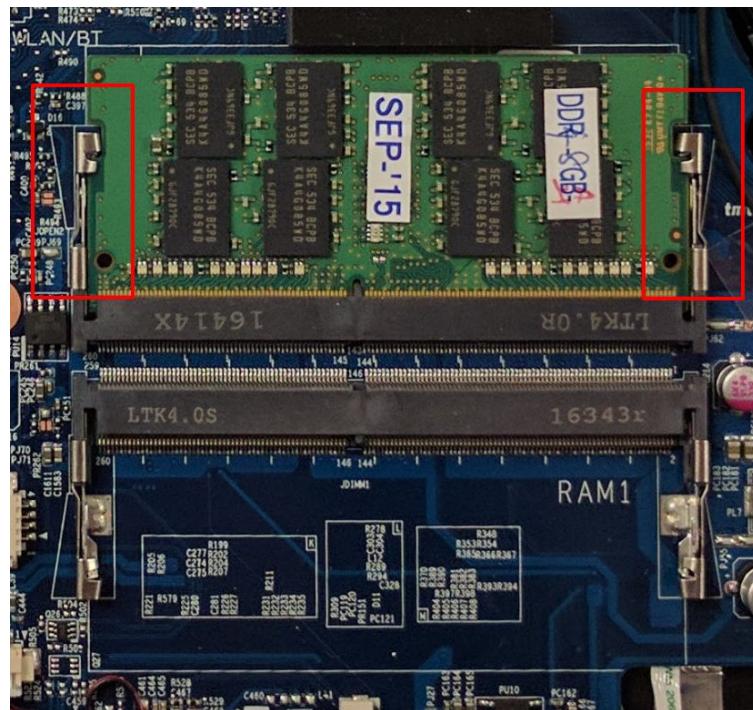
**Difficulty:** Medium

## Steps to replace the RAM

1. Follow the steps above to remove the cover.
2. Press the small tabs on both sides of the RAM simultaneously.
3. Remove the RAM from the slot.
4. Insert the new RAM (or reseat the existing RAM) by placing it in the keyed slot and pressing down on the RAM until it clicks into place.

## Photo guide for replacing the RAM

1. Press the tabs indicated in red to release the RAM from the slot.



## Replacing an M.2/NVMe SSD

M.2 SSDs offer, at minimum, SATA3 speeds and performance in a package about the size of a stick of gum. NVMe M.2 SSDs offer even higher performance. The Gazelle supports 2 M.2 devices:

1. SSD M.2 2280 Card with SATA / PCIe Gen3x4 interface
2. SSD M.2 2280 Card with PCIe Gen3x4 interface

**Tools required:** Cross-head (Phillips) screwdriver

**Time estimate:** 5 minutes

**Difficulty:** Medium

Steps to replace the M.2 drive

1. Follow the steps above to remove the cover.
2. Locate the M.2 drive (or drive slot).
3. Unscrew the retainer screw opposite the M.2 slot.
4. Remove the existing M.2 drive by pulling it out of the slot.
5. Insert the new M.2 drive into the slot and hold it in place.
6. Replace the retainer screw.

## Replacing the CPU/GPU heatsink / CPU fan / thermal paste

In rare cases, or after several years, it may be necessary to apply new thermal paste between the CPU/GPU and the heatsink. Thermal paste helps facilitate effective heat transfer between the CPU/GPU and the cooling equipment. These instructions can also be used in the event your CPU fan or CPU/GPU heatsink needs replacing.

**Tools required:** Cross-head (Phillips) screwdriver

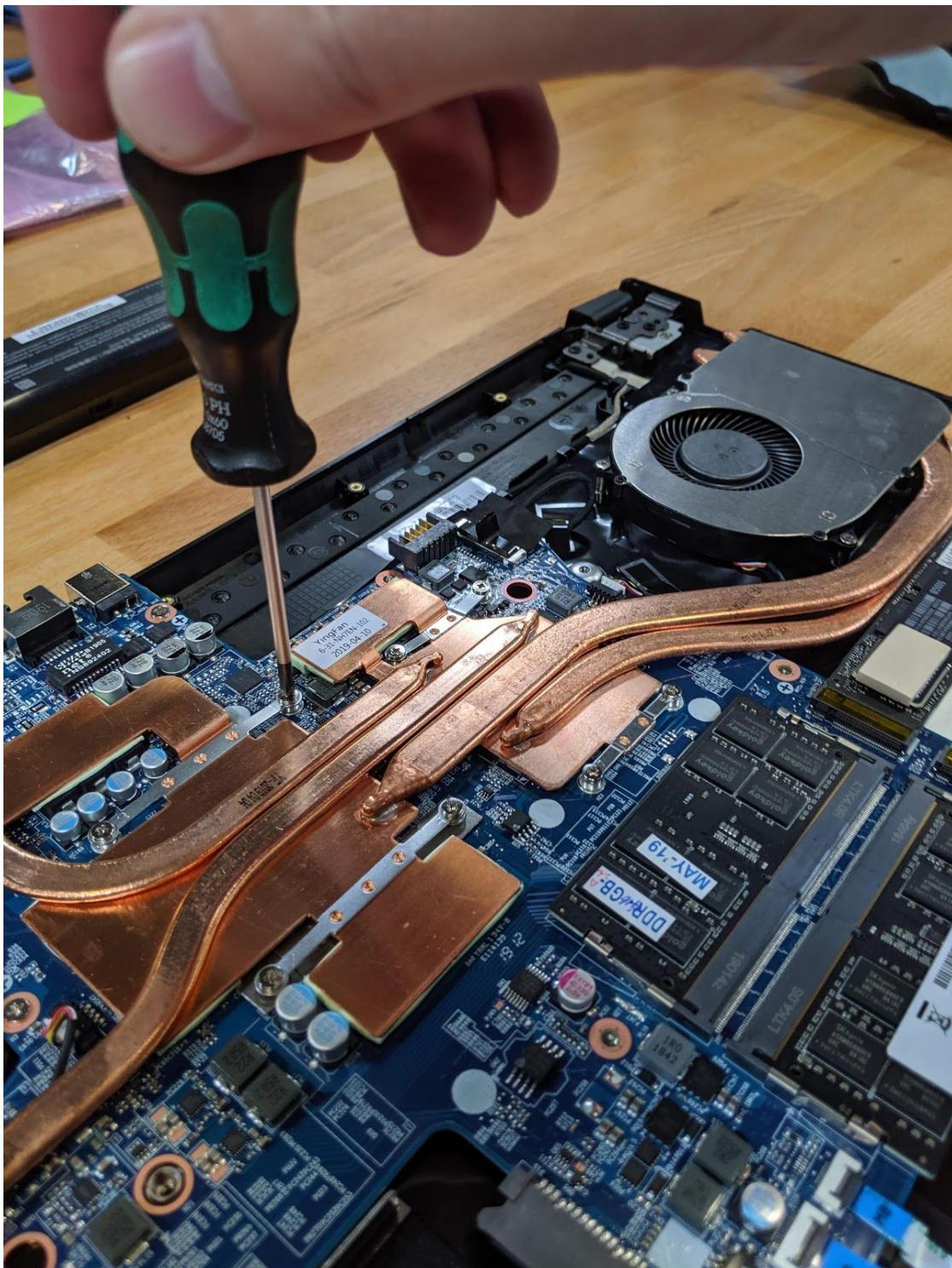
**Time estimate:** 5 minutes

**Difficulty:** High

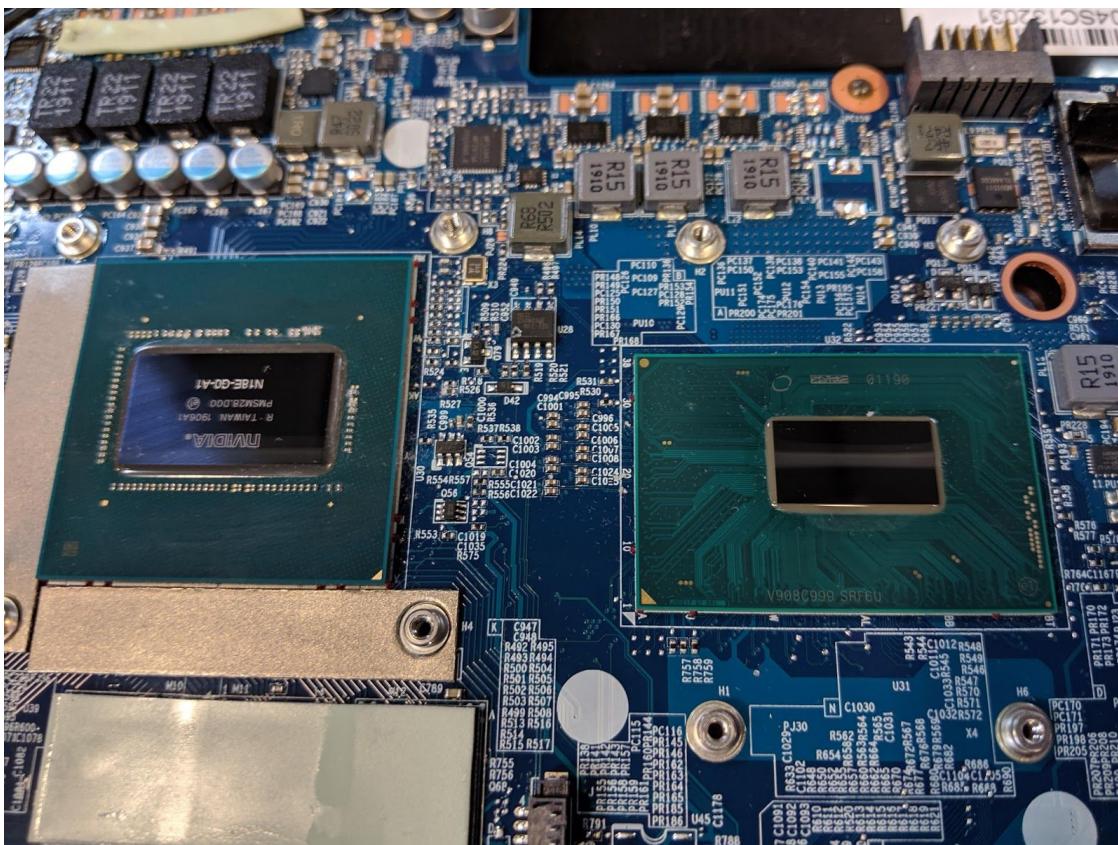
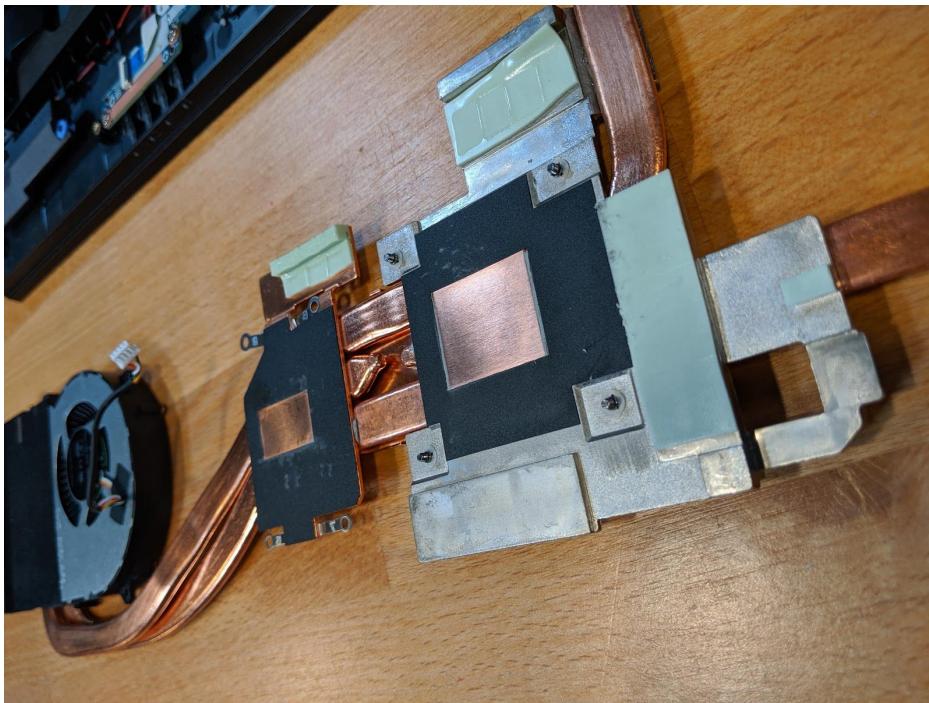
Steps to replace the CPU heatsink/thermal paste

1. Follow the steps above to remove the cover.
2. Locate the CPU heatsink screws.

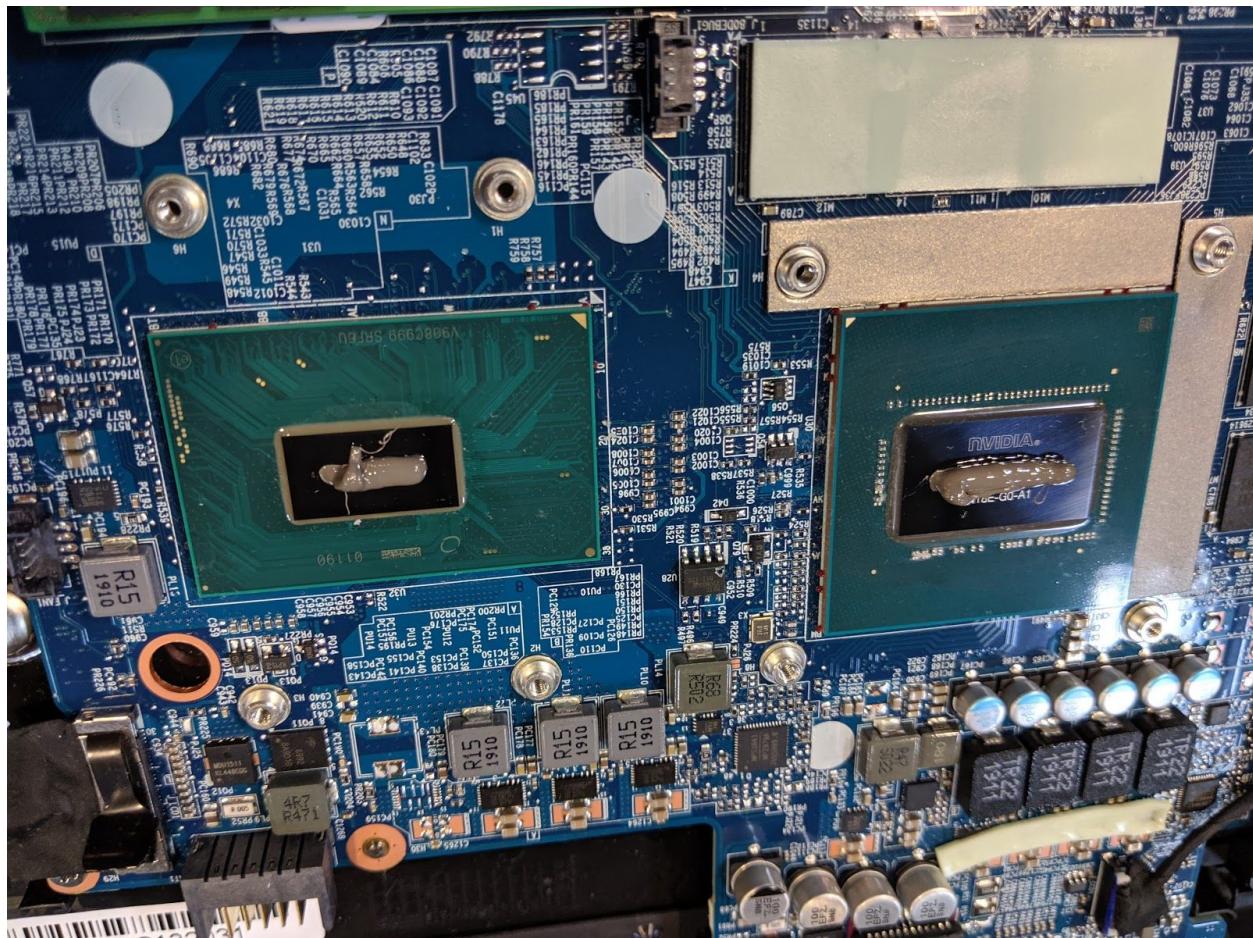
3. Remove the screws, starting with #1, then #2, #3, #4, #5, #6, #7, #8, #9, #10, #11.



4. Carefully remove the heatsink from the case. Using a paper towel, remove the existing thermal paste. You may also use a small amount of rubbing alcohol to remove excess or difficult-to-remove paste.



5. After cleaning the CPU and heatsink, apply a small line of thermal paste directly onto the CPU core and GPU core.



6. Carefully replace the heatsink and fan.
7. Replace the screws, starting with #1, then #2, #3, #4, #5, #6, #7, #8, #9, #10, #11. Do not fully tighten until all of the screws have been started, then fully tighten all screws.

## Replacing/Resetting the CMOS battery

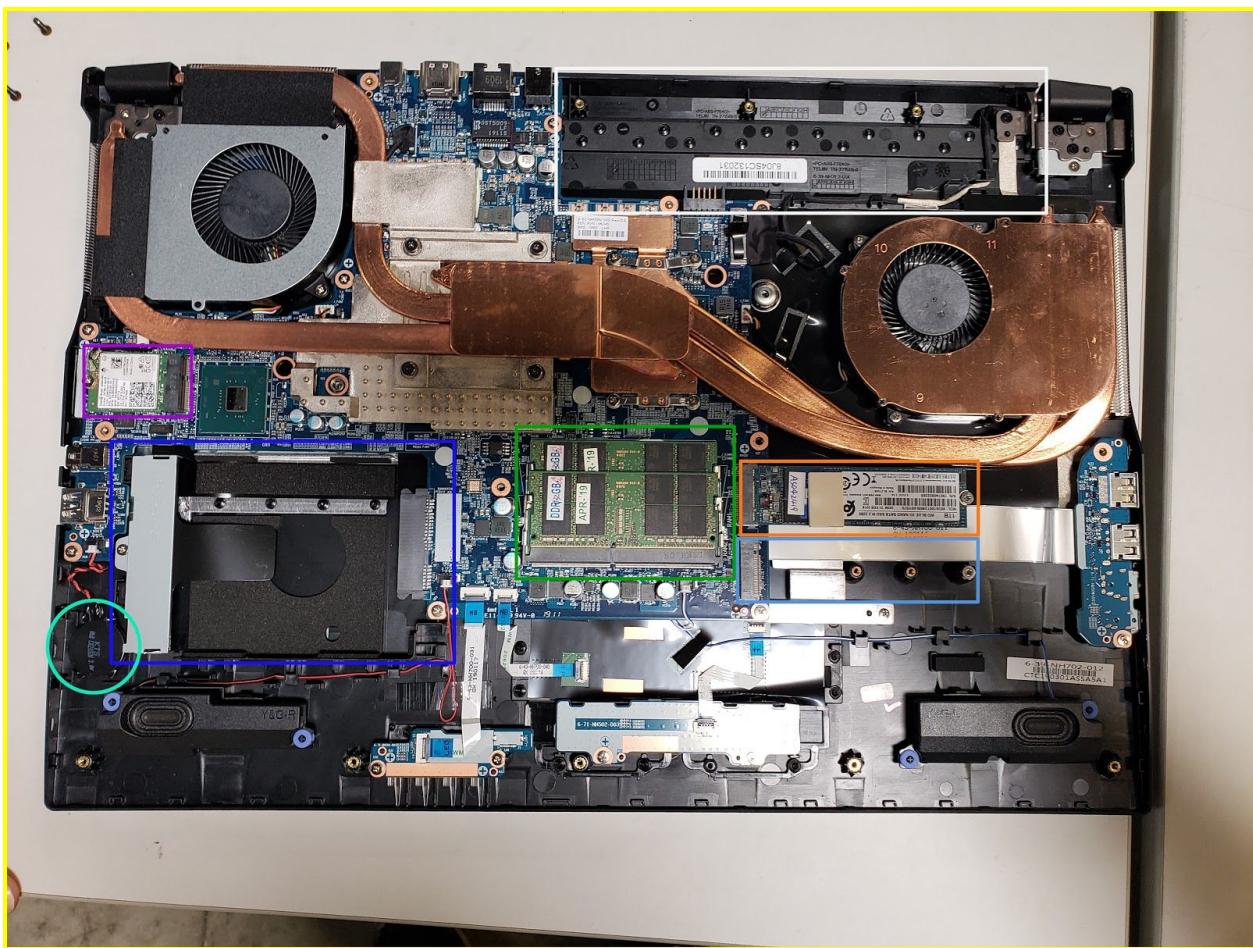
The CMOS battery supplies power to the Gazelle's CMOS chip. Changes you make to the BIOS and the computer's hardware clock are stored on the CMOS. If your Gazelle doesn't boot, you can reset the CMOS to force a low-level hardware reset. If your clock is constantly resetting, it's likely your CMOS battery needs replacing.

**Tools required:** Cross-head (Phillips) screwdriver

**Time estimate:** 5 minutes

**Difficulty:** Medium

The CMOS battery is highlighted in a teal color in this photo:



## Steps to replace/restart the CMOS battery

1. Follow the steps above to remove the cover.
2. Locate the CMOS battery. There is a red and black wire connecting the battery to a white connector.
3. Unplug the white connector for 1 minute, then reseat the connector.
4. Power up the Gazelle. The system may power itself off and on after initial boot, this is normal.
5. Press Enter at the CMOS/BIOS reset message prompts.
6. If you are booted into the BIOS, press F4 to load defaults, then F10 to save and resume normal boot.

## Replacing the external battery

The battery provides primary power whenever the system is unplugged.

**Tools required:** None

**Time estimate:** 1 minute

**Difficulty:** Low

### Steps to replace the internal battery

1. Slide the locks that hold the batter to their unlock positions.
2. One lock will slide back and one will stay in place.
3. Hold the lock that slides into the unlock position.
4. Remove and replace the battery.

## Replacing the WiFi/Bluetooth module

Your Gazelle's WiFi and Bluetooth are both handled with the same module. It is a standard M.2 2230 slot with PCIe & USB Interfaces (A Key).

**Tools required:** Cross-head (Phillips) screwdriver

**Helpful Tools:** set of tweezers

**Time estimate:** 5 minutes

**Difficulty:** Medium

### Steps to replace the WiFi/Bluetooth module

1. Follow the steps above to remove the cover.
2. Locate the wireless module.
3. Gently remove the two antennas by pulling them up and away from the wireless module.
4. Remove the retaining screw opposite the M.2 slot.
5. Remove the wireless module from the slot.
6. Insert the new wireless module.
7. Replace the retaining screw.
8. Attach the two antennas by aligning the circular fitting and pressing onto the wireless card. The connector will snap into place. **Use caution when attaching the connectors, the pins can bend, break, or snap.**

# BIOS utilities

When starting your Gazelle, it takes a few seconds to conduct a quick check of the components. As it proceeds, it will notify you if anything is wrong. Any issues that prevent the system from booting will be displayed and you will be prompted to enter the Setup. If no problems are detected, your Gazelle will load GRUB and then Ubuntu/Pop!\_OS.,

**For Setup/BIOS, hold F2 while booting.**

**For boot options, hold F7 while booting and choose your preferred boot device.**

## Updating the BIOS

BIOS updates and instructions are sent out as needed. System76 will notify you if a BIOS update is available for your Gazelle.

## BIOS overview

The Setup/BIOS utility allows you to make low-level changes to your Gazelle. It's not recommended to make changes unless the settings are provided by Support, or if you understand what you're changing.

### Main menu

Option	Description
SATA Port #	Pressing Enter opens the sub-menu to show the configuration of a SATA device on the SATA ports.
OffBoard SATA/NVMe Controller Configuration	Pressing Enter opens the sub-menu to show the configuration of any devices on the offboard SATA/NVMe controller, if installed.
System Date/Time	Set the system date/time using the hardware clock.
System/Extended Memory	Information on the amount of RAM installed.
ME FW/ MB Series/ BIOS Version/ KB/EC Firmware Rev.	Information on the BIOS version(s) and network adapter address.

System Memory/ Extended Memory/ MB Series/ BIOS Version/ KBC/EC/ MAC Address	
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## Advanced

Option	Description
Advanced Chipset Control	Options for VT-d, FlexiCharger, SGX, Fast Boot, DDI Control
> VT-d	Enable/disable Intel Virtualization Technology for Directed I/O. Extends Intel Virtualization Technology (VT) by providing hardware assets for virtual hypervisors.
> FlexiCharger	The sub-menu here allows you to enable/disable the FlexiCharger. The FlexiCharger can be set to automatically start charging your battery when the battery reaches a certain capacity level (e.g. you could start the battery charge level at 40%).  You can then set the level to stop charging (e.g. 100%), but the stop charge level must be higher than the start charge level. <b>It is not recommended to enable FlexiCharger for extended periods of time.</b>
> SW Guard Extensions	Enable or disable Intel SGX (Software Guard Extensions.)
> GPU Performance Scaling	Enabled or Disabled NV GPU Performance Scaling Support
> UEFI OS Fast Boot	If enabled the system firmware does not initialize keyboard and check for the firmware menu key
> ME State	When Disabled ME will be put into ME Temporarily Disabled Mode.
SATA Mode	The SATA (Serial ATA) controller is designed to operate in AHCI (Advanced Host Controller Interface) mode only.
Power on boot beep	Enable/disable a beep as the computer starts up.

Battery low alarm beep	Enable/disable a beep when the battery is critically low.
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## Security

Option	Description
Set Supervisor Password	Sets a password for the Setup Utility. This does not affect access to the computer or Ubuntu/Pop!_OS./Pop!_OS, only the BIOS.
TPM Configuration	Trusted Computing Settings
> Security Device Support	Enable or Disable BIOS support for TPM 2.0 security device.

## Administer Secure Boot

Option	Description
Secure Boot	Enables support for Secure Boot. This is not recommended or required for Ubuntu/Pop!_OS.

## Boot

Option	Description
Network Stack	Enable or disable support for Intel PXE network boot.
> Ipv4 PXE Support	Allow PXE booting using IPv4.
> Ipv6 PXE Support	Allow PXE booting using IPv6.
UEFI Setting	
> Network Stack	Enable or Disable network boot
> PXE Boot capability	Change IPv4 or IPv6 or Both (or disable)

## Boot Manager

Option	Description
Boot Option Priorities	Determine the boot order for system devices. Boot option #1 will be tried first. It's recommended to set your boot drive as the 1st option and use the F7 key when temporarily booting from an external device or PXE booting

## Specifications

Component	Specification
Processors	<b>Intel® CoreTM i7-9750H (2.6 w/ turbo 4.5GHz)</b> 2.6 up to 4.5GHz - 12MB Cache – 6 Cores – 12 Threads
Display	15.3" or 17.3" Full HD 144 Hz Matte
Memory	<p><b>Dual Channel DDR4</b></p> <p>Two 260 Pin SO-DIMM Sockets Supporting <b>DDR4 2666 MHz</b> Memory</p> <p><b>GTX 1650 : Memory Expandable up to 32GB</b> Compatible with 4, 8 or 16 GB Modules</p> <p><b>GTX 1660 Ti: Memory Expandable up to 64 GB</b> Compatible with 4, 8, 16 or 32 GB Modules</p>
Graphics	<b>NVIDIA GeForce GTX 1650 or 1660 Ti</b>
Storage	<p>One M.2 SSD 2280, SATA/PCIe Gen 3x4 Interface</p> <p>One M.2 SSD 2280, PCIe Gen 3x4 Interface</p> <p>One 2.5" 7mm SATA Drive</p>
Audio	<p>High Definition audio interface</p> <p>Built-in Array Microphone</p> <p>2 Built-in Speakers</p> <p>Sound Blaster™ Cinema 5</p>

Component	Specification
Touchpad & Keyboard	<p>ClickPad with Multi-Gesture and Scrolling Functionality</p> <p>Single Zone Multi-Color illuminated full size keyboard with numeric pad. (15 colors to select)</p>
Webcam	1.0M HD Camera Module with USB interface
Interfaces	<p>One HDMI output Port (with HDCP)</p> <p>One Mini DisplayPort 1.4 output Port</p> <p>One USB 2.0 Port</p> <p>One USB 3.0 Port</p> <p>One USB 3.1 Gen 2 Port (Type A)</p> <p>One USB 3.1 Gen 2 (Type-C)</p> <p>One 2-in-1 Audio Jack (Headphone / Microphone)</p> <p>One Microphone Jack</p>
Card reader	6-in-1 Card Reader (MMC/RSMMC/SD/Mini-SD/SDHC/SDXC)
M.2 Slots	<p><b>Three</b> M.2 Card Slots:</p> <p><b>Slot 1</b> for M.2 2230 WLAN Combo Module with PCIe &amp; USB Interfaces (A Key)</p> <p><b>Slot 2</b> for SSD M.2 2280 Card with SATA / PCIe Gen 3 x4 Interface (M Key)</p> <p><b>Slot 3</b> for SSD M.2 2280 Card with PCIe Gen 3 x4 Interface (M Key)</p>
Network	<p>Built-In 10/100/1000Mb Base-TX Ethernet LAN</p> <p>Intel Dual Band Wireless-AC 9560 M.2 AC Wireless LAN up to 867 Mbps + Bluetooth</p>

Component	Specification
Power and battery	<p>Full Range AC/DC Adapter            AC input 100 - 240V, 50 - 60Hz,            DC Output 19.5V, 6.15A (120 Watts)</p> <p>Embedded Smart Lithium Ion            Battery Pack 48.96WH</p>
Security	<p>Security (Kensington® Type) Lock Slot</p> <p>Disabled ME</p> <p>BIOS Password</p> <p>Trusted Platform Module 2.0 (disabled by default)</p>
Operating System	Ubuntu/Pop!_OS
Indicators	LED Indicators - Power/Suspend, Battery, HDD, Airplane Mode, Camera
Environmental	<p>Temperature</p> <p>Operating: 5°C - 35°C</p> <p>Non-operating: -20°C - 60°C</p> <p>Relative humidity</p> <p>Operating: 20% - 80%</p> <p>Non-operating: 10% - 90%</p>
Dimensions & Weight	<p>Height x Width x Depth</p> <p><b>15.3"</b> : 0.98" x 14.21" x 10.16"</p> <p><b>15.3"</b> : 4.85lbs, 2.2kg</p> <p><b>17.3"</b> : 1.15" x 15.74" x 11.11"</p> <p><b>17.3"</b> : 5.51lbs, 2.50kg</p> <p>base weight, varies with configuration.</p>