

# Senior Design Assignment 1

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- **Basic information about the introduction object:**

The product I present is the Dell's sub brand Alienware, which produce a multitude of high-quality laptops and gains the trust of majority of electronic products enthusiasts.



- I will list the product yearbook to show the release time of the new technology, the competitive situation will present in the following page.

# Technology Yearbook of Alienware Laptop

2018

2019

2020

2021

2022



**17R5**

Significant New Technology:

1. Eye tracker
2. MAX-Q GPU



**51M**

Minor Significant New Technology:  
Fungible CPU & GPU



**M17R5**

Significant New Technology:

1. Zen 3+ CPU
2. Vapor Chamber

# Technology Introduction & Analysis

- 17R5

1. The competitive situation:

**Eye Tracker:** Until today, **Alienware is still the only one which apply eye tracker in their laptop**. Eye tracker is a device that collects the fixation points of human eyes on the screen through infrared camera, and then feeds back to the computer to facilitate the mouse positioning on the screen. For people who often play computer, eye tracker can make your operation more accurate. For office workers, eye tracker can help you get rid of the mouse to a certain extent.

**MAX-Q:** This technology allows us to use GPUs of all levels in laptops and desktops for better image quality and visual experience. **Alienware was the first to use this technology**, which set off the boom of the practice of max-q graphics cards in the field of laptops.

2. Maturity of the technology:

**Eye Tracker:** The eye tracker technology is **provided by a company called Tobii**. Tobii is the world leader in terms of overall market share, technology and patent portfolio in the eye tracker area. It took Alienware and Tobii five years to complete the system construction and hardware design of eye tracker on laptop. Definitely, it is a well-supported technology.

**MAX-Q:** **It is presented by NVIDIA**. Almost more than half of the GPU is produced by NVIDIA, the technology bedrock of MAX-Q is robust.

# Technology Introduction & Analysis

- 51M

1. The competitive situation:

**Fungible CPU & GPU:** Before 51M, no one can imagine that a laptop can replace the GPU and CPU just like the desktop. **Alienware pioneered this field and soon consolidate the absolute position in the gaming laptop industry.**

2. Maturity of the technology:

**Fungible CPU & GPU:** The replacement of the CPU and GPU is a common manipulation in the desktop area. Accordingly, **there is reference for laptop to achieve the technology if replaceable CPU and GPU.**

# Technology Introduction & Analysis

- M17R5

1. The competitive situation:

**Zen3+:** M17R5 uses the latest Zen3+ architecture chip. AMD has a fair amount of different chips in the Zen 3+ lineup, ranging from CPUs that focus on balancing power and performance to models that prioritize performance. These chips are able to keep the TDP above the maximum of 45 watts. **Aside from Alienware, there are currently only 10 laptop products that use the new technology**, including Asus, Lenovo and Razer.

**Vapor Chamber:** The cooling system is also a highlight of the Alienware M17 R5. It adds a large-area VC (Vapor Chamber) vacuum chamber soaking plate between the CPU and the 4 heat pipes, which expands the heat exchange area and realizes the upgrade from "line to surface". The heat is exported more quickly and evenly in the form of steam, which greatly enhances the instantaneous heat absorption and heat transfer capabilities. Combined with the ultra-thin smart fan and the design of dual air intakes and four exhausts, the heat can be quickly expelled from the fuselage to achieve more efficient heat dissipation. **Alienware is the first company to use this technology.**

2. Maturity of the technology:

**Zen3+:** AMD took the lead in adopting the **6nm manufacturing process** on the Ryzen 6000 series, and at the same time upgraded the processor architecture from the ZEN3 of the Ryzen 5000 series to ZEN3+, which further improved the performance per watt compared to the ZEN3 architecture of the 7nm process, thus bringing the M17R5 product Better performance and longer battery life.

**Vapor Chamber:** **Intel provides this technology.** It is equivalent to adding an additional heat sink to the CPU. This mature technology adds stability to the M17R5's cooling system.