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Q1: Mention and explain the functions of 10 important hardware of an Editing Machine.

Videos or photos editing hardware have come a long way in the recent decades. In the recent years many powerful tools have been made available both for the professional people, as well as, those people who want to begin their new career. I have compiled here the ten important hardware needed for such intensive process, and have listed the many crucial functions they serve in photos/video editing. This list was compiled for the PC users, and not for the Linux, and Macintosh users.

List of important editing Hardware and their functions:

1) RAM (Random Access memory)

The RAM or random access memory is an important hardware that is essential for the process of video/photo editing. Now, depending on the software that a professional editor uses the minimum requirement ram is eight Gigabytes of dedicated RAM. This is because while editing, a computer will use the memory of the RAM to place RAW files and to access them when needed. The size of these RAW files plays a crucial role. In case of 720p video files these will usually take around 3MB of RAW files, while the 4K videos will occupy around 30MB. As such, we can observe that editing high-quality footage requires more RAM.

2) Graphics Card

Powerful Graphics cards have built in GPUs (Graphics processing units) that are more specialized towards gaming, videos, and photos. In editing process a powerful graphics card is a must for faster and smoother work. The CPU (Central processing unit) in this case is considered the heavy lifter running all the background programs, while the GPU is more graphics intensive allowing you too quickly and more efficiently than if the entire workload were to be done by the CPU alone. The minimum required memory for a graphics card is 2-GB.

3) SSD (Solid state Drive)

An SSD (Solid-State-Drive) is not a vital component to video editing. But it can greatly increase the work pace of editing and make it much more efficient. Now, an SSD in general terms is a type of PC storage that is able to read and write data much faster than a mechanical hard drive. It has no movable parts and in integrated into the PC. This allows little to no lag during editing process. This makes it more convenient then adding two or three hard drives.

4) Mother board

A motherboard is the main circuit board inside a computer. A mother board contains slots, and connectors for attaching additional components i.e. CPUs, Graphic cards and rams etc. Thus, integrating a powerful motherboard allows for better support to greater CPUs, and rams. This directly affects the efficiency of the editing process.

5) Cooling system

The editing process is a very hardware intensive and frequently prolonged process. The use of the graphics card and the CPU for such a lengthy duration causes them to overheat and in some

cases shut down. To prevent such a scenario professional editors use fans or special cooling liquid to reduce the temperature of the hardware. This prevents overheating and reduces lag from the heating of hardware.

6) Processor

A CPU (Central processing unit) is the heart of any computer system. Any professional built computer system will have a multi-core processor. This is because the process of editing and rendering is a processor intensive work, and some lower processors are unable to handle the load from editing. However, some of the more modern video editing software can take advantage of graphics card through GPU acceleration (GPGPU) by offloading some of the work from CPU. In general the CPU must be at least a core-i5 to run smoothly while editing.

7) High Resolution Monitors

The graphics card, ram, SSD card, and mother board all play a vital role in the process of editing. But what we use to observe and change in a given project is all displayed on our monitors. It is the window which displays all the available information and tools. It is this reason that a high resolution monitor is a must to play the 4k or 8k videos, because not all monitors can support such resolution. Thus, having a 4k monitor will allow you to play 4k videos, while an 8k monitor will allow to play 8k videos. It is to be noted that an 8k video cannot be played on a monitor of a lower resolution.

8) Hard Disk (Storage)

All the saved projects or to be saved projects take up data storage space. Thus having a larger hard drive of more than 500 GB is enough to store all the projects that to be rendered, or are

rendered. It is more of a convenience to have a larger hard drive as having a larger hard drive has little to no effect on the editing process if you have a proper SSD integrated.

9) Power Supply

Again having a 500 Mega-watt or more supply allows us to use heavier and sturdier hardware. A word of caution: Always check your available power supply before integrating a powerful graphics card. This is because a lower power supply can short circuit and irreversibly damage your PC.

10) HDMI (High-definition-multimedia-interface)

Having an HDMI cable is a quick and convenient method of connecting a monitor and the PC. It allows us to bypass the need for the multi-color coded cables, and wires and instead uses a single wire to transmit all the needed data and files.

What is frame rate or fps? Discuss different types of frame rates.

In general terms frames per second, or fps is defined as, *"It is the base unit used to measure the maximum or minimum performance of a display device."* For any display device (Phone screen, monitor or television) each frame is considered a complete scan of the display screen. And the

rate at which each of these scans is displayed is called the fps rate of a display screen. As the rate of frames per second increases, the smoothness and the detail of a film or video increases. In this case we have different types of fps rates. The lowest fps rate is considered to be, 15 fps. It provides the least amount of details or smoothness. Due to which at this rate the video lags to a point of being unwatchable. As we move from 24 fps, to 30 and 60 fps. The quality change becomes more apparent. But recording at such a high fps comes at a cost of storage taken by each video. As a minute video recorded at 60 or 120 fps could take up more than 1 or two gigabytes of storage space.

Q3: Mention and discuss different video resolutions in detail.

Videos come in different resolutions depending on the settings and type of device used to record them. To discuss the different video resolutions we must first discuss what frame resolution is. The term frame resolution means the frame height and frame width of a video. The Frame height tells us about the total number of vertical pixels and similarly, frame width tells us about the total number of horizontal pixels. Now, depending on the frame resolution of the video we have the following video resolutions: 360p, 480p, 720p, and 1080p. The various numbers in "360p, 480p, 720p, 1080p" stands for the number of horizontal lines that the video has from top to bottom. As the number of these pixels increases so does the quality and storage of the video/photo. Now the following explanation will help in a deeper understanding of the different resolutions for a video.

1) **480 x 360 (360p):** The 360p Resolution has a total of 480 pixels going across the screen and 360 pixels going down the screen. It is the least clear among the four video resolutions.

2) **858 x 480 (480p):** The 480p Resolution has a total of 858 pixels going across the screen and 360 pixels going down the screen. Due to the increase in the number of pixels it creates a better picture or video. And is a preferred setting on mobile phones.
3) **1280 x 720 (720p) (Half HD):** The 720 Resolution has a total of 1280 pixels going across the screen and 720 pixels going down the screen. Not exactly full HD these videos are detailed and smooth.
4) **1920 x 1080 (1080p) (Full HD):** The 1080p Resolution has a total of 1920p pixels going across the screen and 1080p pixels going down the screen. A clear picture with a wide range of pixels making it an ideal setting for professional video and photo editors.