To: Mr. Samenda, Great North Recording Studios

From: Frances Resma, IT specialist

Date: June 23, 2024

Subject: PC Build as Requested

With the $1650 CAD budget that you have provided me, I managed to build a PC that has appropriate parts for Avid Pro Tools software, can communicate with your own recording equipment, and a solution to your data loss. Below is an explanation of each component to give you an understanding of the chosen products. The total cost of the PC is $1648.55, including the peripherals.

The central processing unit or CPU acts as the brain of the computer; inside are cores and threads. Cores are individual processing units inside the CPU that process data and instructions from the computer. CPUs can have multiple cores, which means the more cores a CPU has, the more tasks it can perform. While threads are sets of commands from the computer that can be executed by cores, with multiple threads, a single core can work on multiple tasks. In simpler terms, cores are the workers and threads are the task they perform. In the context of using audio editing tools like Avid Pro Tools, having a CPU with multiple cores and threads makes a big impact. For the PC I built for this purpose, I chose the Intel Core i5-11400 Processor with 6 cores and 12 threads; Pro Tools would be able to handle lots of audio tracks, effects, and plugins at once, without interruptions. This leads to smoother playback, quicker processing, and overall better performance when creating or editing music. The base speed of i5-11400 is 2.6 GHz, which is above the recommended speed for running Avid Pro Tools. This CPU can also reach up to 4.4 GHz when overclocked if you would like to reach the highest possible speed. The i5-11400 offers excellent performance at a very reasonable price, making it a good investment for your audio editing setup.

As PCs operate, the CPU produces a lot of heat, so it is important to have a component that will cool the CPU, or it will shut down to protect itself. It can also reduce the average speed of your components and worse, damage them. Most of the time, CPUs come with a stock fan (one small fan), to cool the CPU. Stock fans are often used when building a PC on a tight budget. However, it is highly recommended to put extra money into a much better fan for the CPU to reduce the risks of damaging the component. The most common way to cool the CPU by liquid cooling is using an AIO. AIO stands for all in one because it consists of fans, tube, water, and pump in one package. The AIO cools the CPU by circulating the water inside using the pump and the fans take in cold air to cool the water. This is more efficient than air cooling because the fan is

directly facing the outside of the case, unlike air cooling, since the air cooler is only inside the case, the heat from the CPU will stay inside. It can be solved if there are more fans to cool the inside of the case, however, with AIO, extra fans are not needed. It is still important to have good airflow inside the case to give better performance. For the PC I built for you, I chose Vetroo V240 Black CPU Liquid Cooler to cool the CPU. It is compatible with the i5-11400 as it supports multiple CPU sockets including LGA 1200, which is the i5's socket. Its radiator uses two fans to exhaust the hot air out of the case. Not only does this help cool the CPU, it also helps take the hot air out of the PC case. In addition, I bought a thermal paste to stick the AIO to the CPU as it should be applied on the CPU before installing the cooler to fill in the air gaps between the cooler and the CPU and give better cooling.

Hard disk drives (HDDs) have been used to store data since the beginning of computers. They are bigger than SSDs as HDDs are cases that contain magnetic disks inside. Data is stored on the disks, and they spin at a high speed. Inside is also an actuator arm; its job is to read and write data to and from the disks. In contrast, solid state drives (SSDs) are more advanced, smaller and quieter as they do not have any moving parts. SSDs read and write data electronically using flash memory chips, which load data faster than the spinning disks, resulting in better performance and loads the OS and applications faster. Other than the fact that SSDs are faster than HDDs, if HDDs are damaged, the disks could break, and all data stored could be lost. This is similar to the problem with the data loss using a USB 2.0 external HDD you addressed; it could be damaged or old, causing data to be lost. To solve this, I chose an M.2 SSD; Kingston NV2 with 2 TB of storage. This SSD offers a huge storage at a reasonable price and loads data faster than HDDs. For additional storage for data, using a cloud storage called AWS S3 would be great. Amazon S3 allows you to store as much data as you need; it automatically adjusts to fit the storage that you need, so running out of storage is not a problem. Using the AWS pricing calculator, S3 is approximately $0.36 CAD per GB of storage you are using per month. S3 is very reliable as your data is extremely protected. It offers different ways to store data depending on how often you access it, so you can save money by choosing the best option for your needs.

Random access memory (RAM) accesses and stores data the computer needs at the moment. While SSD and HDD stores data permanently (unless deleted), RAM stores data temporarily; it loses all its stored data once the computer is turned off. The data and programs stored in the drive need to be loaded into RAM first before they are run by the CPU. With low storage of RAM, it cannot hold all the data that the CPU needs, this results in data going back and forth between the drive and RAM and slows down the computer. Over time, a new technology called double data rate (DDR) was introduced to speed up RAM. The name is straightforward, it doubles the amount of data it can load at a higher speed than non-DDR. Following DDR, DDR2 was developed that loads data faster than DDR. A new batch of DDRs have been developed as years go by with the latest being DDR5, and many more to come. For the PC I built, I chose Corsair

Vengeance LPX that has DDR4 and 16 GB which is enough storage to run audio editing smoothly.

Although the PC will be used for the purpose of editing audios, it would be a good idea to have a PC that can display high quality graphics if needed for image and video editing purposes. GPUs are responsible for controlling image display and enhancing the graphics. GPU also consists of video random access memory (VRAM), that stores all the graphical data that influences the graphics on the screen. With a large VRAM, this allows the computer to display more detailed graphics on the monitor. However, for audio editing purposes, a large VRAM is not necessary, so the GPU I picked is MSI D6 VENTUS XS OCV3 GeForce GTX 1650 G6 with 4GB of VRAM. This GPU is decent to display graphic at a reasonable price while not being overkill. I also chose KOORUI S01 21.4" 100 Hz Monitor to display the graphics.

Motherboard is the main circuit board of the computer where all the components connect. It has a chipset called platform controller hub (PCH) that connects all components connected to the motherboard to connect to the CPU, the brain of the computer. Motherboard includes the CPU socket, RAM slots, and expansion slots where the Channel Sound Card and GPU are placed. The motherboard I chose is the MSI B560M PRO-E. It includes PCIe x16 slot for the GPU and additional PCIe x4 to connect the Channel Sound Card you asked for. The motherboard also has a built-in network interface controller, so buying a network extension card is not necessary to be able to connect the PC to the internet.

To power the computer, a power supply unit (PSU) is needed. It comes with a number of pins for specific components. The ATX 24-pin connector is plugged directly into the motherboard to give power to all components connected. There are also pins to give more power specific components; the EPS connector that plugs into the pin socket located above the CPU socket on the motherboard for the CPU, the six and eight pin PCI Express power connectors for the GPU that are directly plugged into the GPU pin sockets, and a SATA connector that connects to HDD and/or SSD. PSU are sold with different wattages, depending on your computer and preferences. The estimated wattage of the PC I built is 254 W, but I still decided to get the Corsair CX (2023) 80+ Bronze Certified ATX Power Supply that provides 550 W. A higher wattage PSU gives you room to upgrade the PC with more powerful parts later on, like more extension cards or extra storage because they will need more power. A higher wattage PSU also runs more efficiently and lasts longer because it is not maxed out all the time. This way, the PC will be stable and reliable, reducing the chance of problems.

I have also bought the Microsoft Windows 11 Home OEM - DVD 64-bit as the PC’s operating system; the one that you are familiar with.

The PC case, Lian Li LANCOOL 215 ATX Mid Tower Case, includes three fans so buying additional fans is not necessary and they are enough to keep the PC cool and give good performance. I have also bought KOORUI Wired Keyboard and Mouse and Audio-Technica ATH-M20X Headphones that give great audio quality at a reasonable price. As well as AmazonBasics Digital Optical Audio Toslink Cable to connect the Channel Sound Card and Cat8 Ethernet Cable to connect the PC directly to the router.

The link below is a link to the list of the components with the details and price:
https://ca.pcpartpicker.com/list/KtBqvj

Part Type	Part Name	Price	Reference
CPU	Intel Core i5-11400 2.6 GHz 6-Core Processor	$263.11	https://a.co/d/7UtwFxH
CPU Cooler	Vetroo V240 52 CFM Liquid CPU Cooler	$89.99	https://a.co/d/gXXQbse
Motherboard	MSI B560M PRO-E Micro ATX LGA1200 Motherboard	$240.99	https://a.co/d/9P4iAor
RAM Memory	Corsair Vengeance LPX 16 GB (2 x 8 GB) DDR4-3200 CL16 Memory	$54.99	https://a.co/d/h2ZGdzZ
SSD	Kingston NV2 2 TB M.2-2280 PCIe 4.0 X4 NVME Solid State Drive	$134.99	https://tinyurl.com/5a8f32cm
GPU	MSI D6 VENTUS XS OCV3 GeForce GTX 1650 G6 4 GB Video Card	$204.16	https://a.co/d/erM7c1Q
Case	Lian Li LANCOOL 215 ATX Mid Tower Case	$109.99	https://tinyurl.com/5y4re49n
Power Supply	Corsair CX (2023)	$79.99	https://tinyurl.com/25

	550 W 80+ Bronze Certified ATX Power Supply		afuz5c
Operating System	Microsoft Windows 11 Home OEM - DVD 64-bit	$179.99	https://tinyurl.com/yun7n6aw
Monitor	KOORUI S01 21.4" 1920 x 1080 100 Hz Monitor	$99.99	https://a.co/d/7CdmyvD
Headphones	Audio-Technica ATH-M20X Headphones	$59.99	https://a.co/d/dJW9d6d
Digital Optical Audio Toslink Cable	AmazonBasics Digital Optical Audio Toslink Cable	$11.39	https://a.co/d/1y3pODb
Sound Card	STARTECH 7.1 Channel Sound Card, PCI Express, 24-bit, 192KHz, SPDIF Digital Optical and 3.5mm Analog Audio	$106.99	https://a.co/d/bGeAojE
Ethernet Cable	Cat8 Ethernet Cable 6FT (1.83 Meters), High Speed Network Cable, Short Ethernet Cable, Shielded Ethernet Cable Cat 8, LAN Cable 6ft, 40Gbps 2000Mhz RJ45 Cable	$11.99	https://a.co/d/dUHkSEW

It was a pleasure working with you,

Frances Resma