**Graphics Cards**

Graphics cards are added to many current computer systems to allow for improved graphics performance. Most computer users that game heavily or work with rendering/producing high quality video will purchase a graphics card to speed up their computer and allow for maximum visual performance.

**Video Card Purchasing Decisions**

**Dedicated vs. Integrated Graphics**

1. Integrated graphics
	1. Motherboard graphics
		1. The task of drawing graphics is performed either on the motherboard
		2. Video handled by the motherboard is often called "on-board video".
		3. On-board video can be disabled in BIOS.
		4. On-board video causes more stress to the motherboard because it must take resources away from the CPU to provide to the drawing of graphics.
	2. CPU graphics
		1. CPU has an APU (Accelerated Processing Unit) which is dedicated to the task of graphics.
		2. Preferred over motherboard graphics since the APU is located within the CPU so processing is much faster than graphics controlled by the motherboard.
		3. The future of low to mid-priced computer systems is here. AMD and Intel are both heavily researching this technology.
		4. Today's top CPUs have the graphics capability as many mid-range dedicated graphics cards.
		5. Most current laptops use CPU integrated graphics.
2. Dedicated graphics
	1. Hard core gamers will build computer systems with dedicated graphics cards.
	2. Dedicated graphics cards have their own RAM, power, cooling and GPU (graphics processing unit).
	3. Dedicated graphics cards offload the graphics work from the CPU and system RAM.

**SLI/Crossfire**

1. Nvidia offers a technology called SLI that allows a computer to utilize more than one video card.
2. AMD offers a similar technology called CrossfireX.
3. It is recommended that two identical cards are used in these configurations as the system will use the specs of the lesser of the cards inserted.
4. You must be certain to purchase a motherboard that supports SLI or CrossfireX.

**Power Supply**

1. When buying a dedicated graphics card, you have to plan for the extra power that will be consumed.
2. High-end graphics cards require more electricity than any other component.
3. A 500 watt power supply is the minimum with mid-range graphics cards.
4. For higher-end graphics cards, a 750 watt power supplied is recommended.

**Memory**

1. Current cards have their own RAM in the range of 128MB to 8GB.
2. Memory clock rates range from 1GHz to 7GHz.
3. Like system RAM, your graphics card has a DDR version attached to it.
	1. DDR
		1. Same as System RAM - Double Data Rate
		2. Currently 4 different generations with each being faster than the previous (DDR4 is best)
	2. GDDR
		1. Memory designed for use in graphics cards.
		2. Currently 5 GDDR versions. (GDDR5 is best)
		3. GDDR has higher data transfer rate that DDR. GDDR5 has data transfer rate up to 230 GBps!

**Motherboard Slot Types**

1. PCI - Oldest
2. AGP - 5-8 years old
3. PCI-Express (PCIE)
	1. Three different version (PCIE1 to PCIE3)
	2. Cards are backward compatible with older motherboard PCIE slots, but the performance will be capped.
4. Single Slot vs. Dual Slot
	1. Some graphics cards will use two side by side PCIE slots on the motherboard.

**Output Ports**

1. There are three main types of output ports on graphics cards:
	1. VGA
	2. DVI
	3. HDMI

**Overclocking**

Since graphics cards have their own GPU and RAM, they can be overclocked like a CPU and/or RAM.