

# Info on purchasing a notebook computer

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Notebook processors still lag behind desktop CPUs but they make up for that with their energy efficiency. To determine the right CPU to get, look at the purpose of the system. If it is meant to be a mobile web browser, email, word processing or even DVD player, any CPU above 1GHz should be sufficient. A desktop replacement should have a high-end processor rated at least 1.6GHz or higher for mobile specific processors or 2.8GHz for desktop processors.

## Understanding Processors

Notebook computer processors are very different from their desktop counterparts. The primary reason for this is the limited amount of power they have to run on when the notebook system is not plugged into an outlet. The less power that the notebook uses, the longer the system should be able to run off the battery. To do this, the processor manufacturers employ a large number of tricks such as CPU scaling where a processor scales its power usage (and thus performance) to the tasks at hand. This presents a major challenge in balanced performance and power consumption.

There are four distinct categories that I classify for notebook computers, each with its own distinct purpose for those using them. To match these systems to the computing tasks you also want to select the proper processor.

### Ultraportables

Ultraportables are systems that are designed to be as light and compact as possible yet powerful enough for most common business applications such as e-mail, word processing and presentation software.

These systems are geared towards those people who travel a lot (often called road warriors) who want a system that is not very cumbersome. They are willing to sacrifice computing power and peripherals for portability. There are few choices in this category, but it makes comparison very easy. Below are the processors found in ultraportables:

- Intel Pentium M LV and ULV Series
- Intel Celeron M Series
- Transmeta Efficeon 1GHz

### Budget Systems

Budget systems are those developed to provide a functional portable computer at low price points. There is a wide range of processors that can be found in this category because often value systems are based upon older processors that use to be found in higher end notebooks or the newer low cost processors. All of the processors listed here should be able to do all the basic computing tasks including web browsing, email, word

processing and presentation. They are also very capable at being used for DVD playback as well. About the only thing that value system processors will not be able to do well is gaming and high-end graphics applications. Here are some of the processors to look for in this range:

- AMD Mobile Athlon XP-M 3000+
- AMD Sempron 2600+ through 3200+
- Intel Celeron 2.2 GHz and Higher
- Intel Celeron M 350 and Higher

### **Thin and Light**

A thin and light notebook is one that is able to perform pretty much any computing task at least on some level. These systems can vary widely in terms of their price and performance. They tend to perform better than the counterparts in the value category but not as well as the desktop replacements. A game may run on these systems, but the performance would be very limited. Here are some of the processors that can be found in this category of notebooks:

- AMD Athlon 64 Mobile 3200+ and Higher
- AMD Turion 64
- Intel Pentium M 735 through 780

### **Desktop Replacements**

Desktop replacement systems are designed to be a complete system that has the equivalent processing power and capability to a desktop system, but in a mobile package. They tend to be larger and bulkier to fit all the components to allow the system perform at the same level as a desktop in all aspects of computing. In general a desktop replacement will perform exceptionally well in all aspects of computing and will even be able to run 3D games. Mobile gaming is getting close to desktop performance, but it still will only perform about as well as the low-end budget desktop video cards. Here are some of the processors that can be found in this category of machine:

- AMD Athlon 64 Mobile 3700+ and Higher
- Intel Pentium M 755 and Higher
- Intel Pentium 4 500 Series Processors

## **Selecting the Proper Amount of RAM for a Notebook PC**

Certainly the more memory in a notebook system the better, but there are other concerns regarding memory in notebooks. Notebooks are generally more restricted in the amount of memory that can be installed into a system. Sometimes access to that memory can also be a problem if you plan a future upgrade.

### **How Much is Enough?**

The rule of thumb that I use for all computer systems for determining if it has enough memory is to look at the requirements of the software you intend to run. Pick up the boxes for each of the applications and the OS that you intend to run and look at both the "minimum" and "recommended" requirements. Typically you want to have more RAM than the highest minimum and ideally at least as much as the highest listed recommended requirement. The following chart provides a general idea of how a system will run with various amounts of memory:

- Minimum RAM: 256MB
- Optimal: 512MB
- Best Performance: 1GB or Higher

The ranges provided are a generalization based upon most general computing tasks.

It is best to check the requirements of the intended software to make the final decisions. This is not accurate for all computer tasks because some operating systems use more memory than others.

### **Memory Restriction**

Notebook computers generally have two slots available for memory modules compared to three or four in desktop systems. This means that they are more limited in the amount of memory that have available. With current memory module technologies, this restriction generally comes to either one or two gigabytes of RAM in a notebook system based on either 512MB or 1GB modules. Some ultraportable systems are even fixed with one size of memory that cannot be changed at all. So what is important to know when you look at a notebook?

First, find out what the maximum amount of memory is. This is generally listed by most of the manufacturer's. This will let you know what upgrade potential the system has. Second, determine how the memory configuration is when you buy the system. For example, a notebook that has 512MB of memory can be configured as either a single 512MB module or two 256MB modules. The single memory module allows for better upgrade potential because by adding another module you are gaining more memory without sacrificing any current memory. Upgrading the two module situation with a 512MB upgrade would result in the loss of one 256MB module and a resulting memory total of 768MB.

### **Self-Install Possible?**

Most notebook systems today have a small door on the underside of the system with access to the memory module slots. If it does, then it is possible to just purchase a memory upgrade and install it yourself without much trouble. A system without an external door or panel for memory access will require installation by a service technician. This generally will add additional expense to the memory upgrade in the future or possibly even the requirement that the system be sent in to a service center which means the lack of a computer until the upgrade is completed.

# How to Choose a Notebook Based on Hard Drives, CD and DVD Drive Options

Notebooks can come with generally have a hard disk and optical drives. Floppies are pretty much non-existent in the portable market now. Sometimes when reading the specifications or ads for a notebook you may see a reference to spindles. Each drive in a notebook constitutes a spindle. Thus a system with a floppy, hard drive and CD-Rom drive would have 3 spindles. But what do you need to know when reading the specifications for a notebook computer?

## Hard Drives

The first factor is the speed of the hard drive. In most cases, notebook hard drives spin at a 4,200rpm speed. Some higher performance systems and desktop replacements will feature 5,400rpm drives. The high spin rate allows for better performance but also uses up more battery life when not plugged into an outlet.

Notebook drives are typically 2.5" in size and can range from 20 up to 160 GB in size.

Most systems will have between 40 and 80 GB of data size that is more than enough for the standard notebook system. If you are looking at a desktop replacement class notebook to be a primary system, look at getting a 60GB or larger hard drive with the computer. Some of the ultraportable systems use the newer 1.8" PC card style hard drives. These range in size from about 10 to 60 GB.

Drive accessibility matters in case you plan to upgrade your hard drive or to replace a damaged hard drive. Many notebooks available in the retail channels have the hard drives installed internally. This means that only an authorized technician will be able to open up the computer to either repair or replace a damaged hard drive. This generally isn't a problem for many people, but in a corporate environment it can cause increased down time for a worker. Notebooks that have drive bays that are accessible or swappable have the advantage of easy and quick access for upgrade or replacements.

## Optical Drives

The optical drives are the key drive choice to make when purchasing a notebook system. How the system is to be used is key to the selection of the proper optical drive for the system. It is pretty much a requirement to have an optical drive either in the computer or attached externally. Without an optical drive it will not be possible to install new software onto the system. So if you are looking at an ultraportable, make sure to get an external drive or docking station with an optical drive or you will run into problems.

But what type of drive should you get? Whatever type you do get, it really should be compatible with DVDs. One of the great advantages to notebook computers is their ability to be used as portable DVD players. Anyone who flies regularly has seen at least one person pull out a notebook and start watching a movie during the flight. A basic CD-ROM drive will be sufficient for loading applications and playing audio CDs, but why lose the functional of a movie player.

CD-RW drives are useful for some people who require high capacity removable storage for backing up applications and data or for the individual wanting to create custom mix music CDs. This is good for a desktop replacement or a heavily used notebook system. Once again, if you are looking at getting a CD-RW drive, try to get one that is a combo drive. Having the ability to playback DVD movies on the go is a must.

What about a DVD writer drive? These are great multifunctional drives that can be used to read and write CDs as well as play or record DVDs. Be warned that even that fastest notebook burners are far slower than a desktop burner. Dual or Double Layer drives are also starting to show up in systems for those requiring support for the 8.5GB storage discs. Any DVD burner in a notebook should be compatible with both the +R/RW and -R/RW media.

Here is a quick chart detailing the Optical Drive Options and the tasks they are best suited for:

- Basic Computing: CD-ROM
- CD Recording/Storage: CD-RW
- Basic computing w/DVD Playback: DVD-ROM
- CD Recording w/DVD Playback: CD-RW/DVD Combo
- DVD Recording: DVD writer

## **How to Choose the Proper Display on a Notebook**

When looking at the video specifications for a notebook there are three items to look over: the screen size, resolution and the graphics processor. For most people only the screen size and resolution are all that will really matter. The graphics processor really only tends to make a difference in the desktop replacements. Pretty much all notebooks use some form of backlit active matrix display to allow for bright fast displays capable of video playback.

### **Screen Size**

Notebook screens have a wide range and sizes depending upon the type of notebook system that you are looking at. Larger screens provide an easier to view screen. This is particular true for desktop replacement systems that will be used extensively. Ultraportables tend to have smaller screens to allow for a reduced size for increased portability.

Many systems now offer a wide aspect ratio screen either for a more cinematic display or to reduce the size of the screen in the depth dimension for a reduced system size.

All screens sizes are given in a diagonal measurement. This is the measurement from the lower screen corner to the opposite upper corner of the screen. This will be the actual visible display area unlike CRT monitors. Here is a chart of the average screen sizes for different style notebooks:

- Ultraportable: 13.3" or Less

- Budget: 14 to 17"
- Thin and Light: 14" to 15.4"
- Desktop Replacement: 15" and Higher

## **Resolution**

Screen resolution or native resolution is the number of pixels on the display listed in the number across the screen by the number down the screen. Notebook displays look best when the display is run at this native resolution. While it is possible to run at a lower resolution, doing so creates either a reduced image on the screen with a black border or an extrapolated display. An extrapolated display tends to cause reduced image clarity as the system has to use multiple pixels to try and display how a single pixel normally appear.

Higher native resolutions allow for a greater detail in the image and increased work space on the display. The drawback to high resolution displays is that fonts tend to be smaller and more difficult to read. This can be a particular drawback for people who have poor eyesight. It can be compensated by changing the font size in the operating system, but this can have unintended results in programs. Below is a chart of the various video acronyms that refer to resolutions:

- SVGA: 800x600
- XGA: 1024x768
- WXGA: 1280x800
- SXGA: 1280x1024
- SXGA+: 1400x1050
- WXGA+: 1440x900
- UXGA: 1600x1200
- WUXGA: 1920x1200

## **Graphics Processor**

For most laptop display purposes the brand and model of graphics processor does not matter as long as it can display true 32-bit color at the native resolution of the screen. Beyond this there is no need for 3D graphics acceleration or additional graphics processing power. Desktop replacements are a different story. Since they are designed to provide the same functionality as a desktop, support for accelerated 3D graphics is a bit more important. The problem with laptops is their power restrictions. It is not possible to place a full size desktop video processor inside of a laptop. The amount of power and heat generated from these processor would quickly drain any laptop batteries.

The two major suppliers of graphics processors for the desktop replacement laptops are ATI and NVIDIA. ATI has been supplying graphics processors for laptop systems for many years and they have a proven track record when it comes to supply powerful yet energy efficient graphics chips. NVIDIA is the desktop graphics powerhouse when it comes to 3D graphics acceleration and they were the first to bring many of these same features to the laptop realm.

The following chart lists the current crop of graphics processors for laptop systems from the two companies. They are listed in the approximate order of performance from highest to lowest. Portables that will be used for gaming should have at least a minimum of 128MB of dedicated graphics memory but preferably higher.

- NVIDIA GeForce Go 7800GTX
- NVIDIA GeForce Go 6800 Ultra
- ATI Mobility Radeon X800
- ATI Mobility Radeon 9800
- ATI Mobility Radeon X700
- NVIDIA GeForce Go 6600
- ATI Mobility Radeon 9700
- ATI Mobility Radeon X600
- NVIDIA GeForceFX 5700 Go
- ATI Mobility Radeon 9600
- NVIDIA GeForceFX 5650 Go
- NVIDIA GeForceFX 5600 Go
- ATI Mobility Radeon X300
- NVIDIA GeForce Go 6200
- ATI Mobility Radeon 9000/9200
- NVIDIA GeForceFX 5200 Go