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'Complete HW Check!'

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Now let's find out exactly what we've bought, how to shop a new system and how to speed up an existing PC!

This article is effective for Microsoft Windows XP, XP Pro, Windows 2000, NT, ME, 98, 98SE and all versions of Windows95.

The Purpose of this article is to find out firstly, what do I currently own and what does it mean! Secondly' how to spot performance bottlenecks and increase speed and finally in future, how do I select a high performance system?

This article is aimed at the home user and although it could also be extremely beneficial to a home office or small business user, the purpose is to identify the performance indicators of a home P.C.

Overview

Performance is an issue. In truth, more so than price! For $20 extra at wholesale cost, I bought you the faster hard disk drive. For $50 extra you got the better quality motherboard and RAM. For another $100 extra your sound system and video graphics have added to your happiness everyday and for $200 more you got the better monitor and the faster CPU… and 3 years later your PC still goes like a rocket!
– Or does it???

The main PC performance indicators are…

- ◊ **Motherboard Chipset throughput**
- ◊ **Type, quality and amount of RAM**
- ◊ **Hard Disk Drive Speed, Cache, Controller and Transfer**
- ◊ **Graphics Chipset**
- ◊ **Optical Device (CD-ROM/RW/DVD etc.)Transfer Rate**
- ◊ **CPU FSB, Cache and Speed**

Let's take a peek at what is in your existing system!

Questions relating to the above points…

What is a motherboard and chipset?

The motherboard is the platform into which everything plugs inside the computer and the chipset is the flavour of the brand of circuitry used. Intel, VIA, SiS, ATi and Nvidia are the major manufacturers.
To find out what type you have, either read the manual that came with the system or try… right clicking on 'my computer', left click on 'properties' then left click on 'device manager' or 'hardware' and then device manager if you have XP or 2000. If you take a peak under IDE controllers it may give a clue. Otherwise, look under system devices. Ali was another popular chipset manufacturer.
Traditionally, Intel is well known for stability, VIA have made some extraordinarily fast boards as have SiS and Nvidia are often considered the fastest for certain types of CPU.

What is RAM?

RAM or Random Access Memory, is what gives immediate storage area for the operating system to work and therefore has a huge impact on system speed, especially today, where Operating Systems require big chunks of RAM to work quickly!!!
Check this chart from http://www.buildorbuy.org/ramchart.html, which seems to show the evolution over recent years…

RAM Chart - **RAM Speed Memory Specs:**

	30 pin SIPPs (Single In-Line Pin Package).
	30 pin SIMMs (Single In-Line Memory Module).

DRAM	**72 pin** DRAM SIMMs		
		Clock Rate	**Peak Bandwidth**
(**FPM**) Fast Page Mode [60, 70ns]		25MHz	200 MBps
(**EDO**) Extended Data Out [50, 60, 70ns]		40MHz	320 MBps
EDO is 10% to 15% faster than FPM.			

	168 pin SDRAM DIMMs		
SDRAM DIMMs	**Data Rate**	**FSB**	**Peak Bandwidth**
PC66	=	66MHz	528 MBps
PC100	=	100MHz	800 MBps
PC133	=	133MHz	**1.1 GBps**

	184 pin RDRAM (RAMBUS) RIMM Modules		
RAMBUS RIMMs	**Data Rate**	Clock Rate = **FSB**	**Peak Bandwidth**
PC600	600MHz	300MHz	**1.2 GBps**
PC700	712MHz	356MHz	**1.4 GBps**
PC800 (**Single-Channel**) = RIMM 3200	800MHz	400MHz	**1.6 GBps/channel**
PC800 (**Dual-Channel**)			**3.2 GBps**
PC1066 (**Single-Channel**) = RIMM 4200	1066MHz	533MHz	**2.1 GBps/channel**
PC1066 (**Dual-Channel**)			**4.2 GBps**

	232 pin RDRAM (RAMBUS) RIMM Modules		
PC1200 (**Single-Channel**) = RIMM 4800	1200MHz	600MHz	**2.4 GBps**
PC1200 (**Dual-Channel**)			**4.8 GBps/channel**

		184 pin DDR SDRAM DIMMs		
DDR SDRAM **DIMMs**		**Data Rate**	**FSB**	**Peak Bandwidth**
PC1600	**= DDR200**	200MHz	100MHz	**1.6 GBps**
PC2100	**= DDR266**	266MHz	133MHz	**2.1 GBps**
PC2700	**= DDR333**	333MHz	166MHz	**2.7 GBps**
PC3200	**= DDR400**	400MHz	200MHz	**3.2 GBps**
PC3500	= **DDR433**	433MHz	217MHz	**3.5 GBps**

PC3700	**= DDR466**	466MHz	233MHz	**3.7 GBps**
PC4000	**= DDR500**	500MHz	250MHz	**4.0 GBps**
PC4200	**= DDR533**	533MHz	266MHz	**4.2 GBps**
RAMBUS **XDR** DRAM		**Data Rate**		**Peak Bandwidth**
		3.2GHz	**400MHz**	**6.4 GBps**

Quality and timings are everything with RAM – but are a specialized subject – so let's look at amounts!
Here are the guidelines I use with our own servicing centre. The following are minimum requirements, we build systems with double the quoted amounts and note that going further than this can slow the system down, due to time spent paging the large area – so eating 400 cupcakes is not necessarily better than 4!

Windows 95a and Second Edition **32MB** SD-RAM pref.
Windows NT 4.0 64MB SD-RAM pref.
Windows 98 and 98 Second Edition128MB
Windows ME 256MB
Windows 2000 Professional 512MB DDR pref.
Windows XP Home and Pro 512MB DDR pref.
To check how much RAM you have now… right click on 'my computer' and left click on 'properties'. It will tell you at the bottom left of that screen...
64MB or 1GB of RAM
(One Gigabyte is 2 to the 30th power (1,073,741,824) bytes.
One gigabyte is equal to 1,024 megabytes).

If you have less than this, I can tell you have a system running at less than it is capable of in terms of speed and power!

Hard Disk Drives

Hard Disk drives are performance keys also. Size does matter, but not in terms of speed. Me I like both!
SCSI, SATA and IDE are the three most popular interfaces. That is also the traditional speed order, although I can increase the speed of an IDE drive beyond that of a SATA if I change the FSB (Front Side Bus) speed in the motherboard! Anyway, keeping it simple, we want a fast speed (7200-15,000RPM), Big cache (8MB+), Fast transfer (133MB/sec+) and fast form factor (i.e. a notebook drive is smaller and therefore slower than a PC Hdd!). Bear this in mind next time, look for software on Google if you would like to assess your own system.
Try "Si-Soft Sandra" in the search engine! This should give an overall account of the contents of the PC.

Graphics Cards

Look for quality and speed here. Ati, Matrox and Nvidia are classic cards with a performance edge. Intel, SiS and Creative are also great performers.
Try researching at a site that is particularly interested in them, such as www.tomshardware.com or www.overclockers.com .
Find what you have by checking under 'display adaptors' in device manager!

Optical Devices

Don't forget the speed of your DVD/CD-ROM/Burner device.
Faster is always better! And remember to shop for fast blank disks next time you're out to buy blank CD's or DVD's.

CPU

CPU speed is relatively fixed and there are now 2 major players; Intel and AMD. Due to 64-Bit changes, I would like to cover these in a separate article!

Please support Murray Olds and 2UE for letting us give you this advice for *free*. Every time you ask for me back, I promise I will give you a free article.

Kind Regards,

Mike Bloomfield