Considerations When Buying a Computer for Trading

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Introduction

Disclaimer
      All trading involves substantial risk of loss and is not suitable for every investor. The material presented does not constitute any guarantee or other representation as to the accuracy or completeness of such information, nor that use of any such information will result in profits or prevent losses. Comments or materials presented do not constitute an endorsement of any products or services mentioned. In short, don't come crying to me if you lose your ass in the market.
Morgan Scott SPECUL8OR@SBCGLOBAL.NET
Electrical Engineering degree from Texas A&M due to love of math and computers
Haven't practiced engineering in over 25 years
Just bought a new computer for trading futures
Recommend finding what speaks to YOU—indicators, time frame, market traded, etc.
Develop your technique/ trading plan FIRST, THEN buy software, computer, etc.

Recommendations/ Thoughts/ Biases:

1) Buy a PC for trading, since 99% of the trading software is PC, not Apple based
2) Have a dedicated computer for only trading—this is your computer for business
3) Have another one (possibly a laptop) for surfing/ browsing and email (ideally an Apple)
4) DON'T use the trading computer for surfing and email (~99% of all viruses come in this way)

Trading computer systems cover a wide range:
Basic off-the-shelf Intel Core 2 Duos
Intel Pentium Dual Core
AMD Phenom or Athlon
Custom made Core 2 Quad Extreme
Xeon Workstation/ servers

PC vs. Workstation: A Workstation is one step up from a PC, but below a Server. Although they look like a PC, these are much more stable systems, using many of the components used in Servers. These systems are used in engineering, mathematical modeling, and trading applications.

Budget (not including monitors, peripherals and trading software):
>Bare bones PC, $500
>Typical $1,000-$1,500
>Power user $2,000 and up

Paper Trading Computer

What Traders Need

Fast and Powerful
>Traders run multiple programs at the same time, constantly scanning for trading setups
>Need fast computers, fast memory, fast hard drives and a fast internet connection

Multiple Monitor setups (lots of screen real estate)
>The average day trader tends to watch 3 or more monitors at one time
>Your computer must have multiple-monitor video card capability

STABLE systems (reliable, quality components)
>Frees you to concentrate on making money trading
>Downtime can be very costly, (e.g., open positions during a computer system crash)

Quiet
>A noisy computer is distracting
>Most noise issues come from fans and hard drives

Bells and whistles are unnecessary
>Traders are different from the typical Gamer
>Don't need lights, 3D graphics, etc.

Current State of Technology

Internet Connection

You just need a good, fast, stable connection.

Very local/ regional in nature; sometimes only one option is available. Different areas have more reliable connections than others. In my opinion, the following is best to least:
1) Verizon FIOS—latest technology (fiber optic cable); consistently has the best reviews on-line; only available in some Dallas suburbs, not in the city itself

2) DSL—nationwide, has the best reviews for stability
3) Cable—nationwide, has the next best reviews for stability due to long term outages
4) Satellite—many problems with connection in certain weather conditions
5) Cellular—slower than the above options, and more expensive
6) Dial up—don't even give it a consideration

The slowest wired connection is faster than the fastest wireless connection.
Recommend a hard wired connection over a wireless connection—it is faster and more reliable.

Processors

Intel is still the industry leader, but AMD does make some very good chips.

Dual core is mainstream
Quad core is found in mid to higher end systems.
Six core is cutting edge.

Stay away from systems with overclocked CPUs.
Unless you know what you're doing, they tend to introduce instability and heat issues into your system.

Buy toward the lower end of a family line so you can upgrade later on with the same socket.

Benchmark scores will compare processors.

Memory

Generally the more the better. RAM will allow you to multitask better and smoother between various trading applications.

The choice of operating system plays a crucial role:
32 bit OS's are not able to utilize more than about 3.5GB or so of RAM. However, 3.5GB of RAM is plenty for most situations and the normal day trader would normally not require more, but in terms of future scalability and running specialized database intensive scans of the market, it is better to go with a 64-bit OS and have the capability to add more than 4GB of RAM onto your motherboard. Of course, this assumes that all things are equal, such as the ability of your software programs to use a 64-bit OS.

DDR3 is the current performance state. Cheaper processors use DDR2.
Speed varies (e.g., 800, 1200, 1333, 1600), and will depend on the processor speed. You do not want a fast processor and have slow memory.

Memory also comes in error correcting (ECC) and non-error correcting. Error correcting memory has an extra check-sum bit. Workstations (generally) and servers use error correcting memory.

The Intel i7 processor family (and the related Xeon) require memory to be in "triplets," e.g., 3Gig, 6Gig, etc. The AMD family only requires memory to be in "pairs," e.g., 2Gig, 4Gig, etc.

Memory from the computer manufacturer is much more expensive than from direct resellers such as newegg.com. Better to buy a computer with less memory than needed and upgrade it yourself.

Storage Drives

IDE and SCSI have mostly been replaced with SATA.

Drives generally come in 2 types: 7200 RPM (most common), 10,000 RPM (expensive and generally with smaller capacity, but faster); and two sizes 2.5" (laptops, generally), and 3.5" (for desktops).

SSD (Solid State Drives) are all the rage, but are currently very expensive.

Unless you store large amounts of data, 1 Terabyte is sufficient and costs less than $100.

Better to have 2 drives that back each other up than 1 drive and risk losing everything.

Video Cards

For trading purposes, it is not required to get the latest & greatest 3D gaming graphics card costing almost thousands of dollars. What you need are 2D graphics cards made especially for the finance industry. If using more than one VGA card, the best approach would be to get VGA cards from the same manufacturer, unless you are sure the combination you chose is compatible.

Note: the better video cards are plugged into a PCIeX16 slot; if using more than 1 video card, need to ensure the right number and type of slots. Many computers only come with one of these slots. The other slots (PCI, PCIeX1, etc.) will not work as well for good video cards.

Board manufacturers abound, but the chips are manufactured by ATI, NVIDIA and Matrox.

On-line recommendations for 2D graphics cards include the NVIDIA 290 (2 monitors) and 420 (4 monitors). If you want 4 monitors, and space/ expansion slots are not an issue, 2-290 cards (air cooled) are cheaper and quieter than 1-420 cards (fan cooled). Not sure of ATI or Matrox recommendations.

Caution: cannot use a digital only output with analog monitors.

There are several connector types on the market today for connecting a graphics card to a monitor. The legacy connector is an analog connector known as the VGA connector, or also as a D-Sub or Sub-miniature. It is usually blue. The next generation was the DVI Connector, which could connect both in an analog fashion or a digital fashion. However, note that there are many versions available, some that can connect both digitally and analog. However, there is a version of DVI that can only connect digitally. This is important, because if you have a monitor that only has a VGA input, there is no way to convert a digital only signal to analog, without equipment costing hundreds of dollars. I have two older LCD monitors with only VGA input, and they cannot be used with my new computer. One digital signal however, can be converted to another type of digital signal with a very inexpensive add on costing around $20. The newest type of connectors are digital only, and are much smaller than the DVI connector. Dell has been

promoting the ==Display Port Connector==, but it has largely lost out to the ==HDMI Connector==, which is used in HDTV home theater applications as well as computer equipment.

==Monitors==

==More monitor space is better==... So, wide screen is a good choice as long as the price is agreeable.

==A few things to watch out for:==
1) ==Monitors whose size is larger than what the resolution warrants==. You normally expect
==1600x900 will be 20-21 inch==
==1920x1080 (or 1680x1050) will be 22-23 inch and==
==1920x1200 will be 24 inch or larger== (don't buy 1920x1080 [full HD] in this size unless you get a really good deal).
Any larger screen at those resolutions just wastes desk space.
==2)== Be very careful if you consider ==monitors with resolution higher than 1920x1200==. Not only these ==command a massive price premium== but it's such a small market that many leading brands haven't updated their lines for 3-4 years while the technology has evolved a lot.
==3)== It's ==easier to arrange 4 monitors of the same size and resolution== (it doesn't matter if they are different makes)
==4) Watch out for the width of the bezel== when using multiple monitors—if too wide, they will not "butt up" next to each other.
5) Make sure you have the connectors you require.

There are generally 3 types of LCD monitors, i.e. IPS, VA and TN. The easiest way to guesstimate the type of panel used is to look at the viewing angles; TN will have about 170 degrees and below, PVA is 176 and IPS is 178 degrees. Remember, this is not 100% accurate but it will give you an edge when researching what monitors to buy and enable you to make an informed choice.

Good brands include Acer, Asus, AOC, Dell, Hanns, HP, LG, NEC, and Samsung. Viewsonic used to be a very good brand, but has been slipping in quality lately.

==Disaster Prevention==

==What happens if...?:==

==The electricity fails.==
==The internet connection fails.==
==A video card dies.==
==A hard drive goes crazy.==
==Malicious software gets hold of my computer.==
==and so on.==

==Recommend a hardware "firewall" between your computer(s) and the internet.== Viruses and hackers are kept out. Most all routers include a hardware firewall. A modem alone does not provide this protection.

==The program Acronis makes a mirror image the hard disk== as often as you would like; it only takes half an hour and its well worth it. If your hard disk goes wrong, boot from the other.

A recommended 3rd party anti-malware program is Malwarebytes, which is invaluable for removing malware from your computer when it's already infected. Malwarebytes comes in a free and a paid version of the program, which includes the Real-Time Protection Module.

One of the best free AV programs is Avira Antivir. Avira offers a fully functional free basic anti-virus program so that you may consider upgrading to their paid premium versions. Some of the best fully commercial AV programs are the Kaspersky Anti-Virus Products from Kaspersky Labs.

Other recommended free programs are AVG for virus protection (avg.com), spybot and ad-aware (lavasoft.com)

Websites for Research

elitetrader.com

tomshardware.com

newegg.com

bannronn.com

pcmag.com

Other websites for research:

You can check your internet connection here:

speakeasy.net/speedtest

If you use a router be certain that it is capable of high throughput. You'd be surprised how easy it is to create a "bottleneck" by using a router that doesn't have the capability to manage high throughput speeds. See the following review:

smallnetbuilder.com/component/option,com_chart/Itemid,189

Download PingPlotter. Look at the very bottom of the PingPlotter page for the freeware version:

www.pingplotter.com

Try a utility like this one to scan the airwaves for interference.
xirrus.com/library/wifitools.php

Could be as simple as changing your channel.

Using NetCPS and/or Iperf, run several tests between two machines, one of which is wired (important). Then report the results.

netchain.com/NetCPS
noc.ucf.edu/Tools/Iperf

Check the following resources for the CPU performance ranking and wiki for more detail descriptions on what processors are available:

cpubenchmark.net/

en.wikipedia.org/wiki/Intel_Core_i7

en.wikipedia.org/wiki/Intel_Core_i5

en.wikipedia.org/wiki/AMD_Phenom

Brand Quality

Recent consumer survey gave Apple 86 points followed by Dell and HP, tied at 77.

Dell—two companies: consumer and business
Also have a good reputation with Outlet models (scratch and dent and refurbished)

Dell vs. HP vs. Lenovo workstations:
infoworld.com/d/hardware/nehalem-workstations-new-era-in-performance-600

Top Ten Business Computers:
computers.toptenreviews.com/business

Trading Computer builders:

Falcon Trading Systems: tradingcomputers.com
magicmicro.com
emcworkstations.com
visionman.com
cerise.com
cyberpower.com

Retail traders tend to be more cost sensitive, and will want to stick with IBM, HP or Dell, who make fine machines and offer next day on site support warranties and that kind of thing.

Building your own Trading Computer

Bolimomo's recommendation on building a trading computer (elitetrader.com):

#1. Pick your processor first. Because that determines everything: performance, motherboard, RAM, etc.

#2. Pick a motherboard. Each processor requires a different socket. You have to get the motherboard that has the right socket.

Other most important considerations on picking the motherboard:

How many open slots for expansion, and what type? (PCI, PCIeX1, PCIeX16, etc.).

#3. Pick your RAM (memory).

#4. Pick the chassis that will hold all your disk drives, Optical drive and other peripherals.

#5. Pick the power supply. Add up all the power ratings of your components. A 300W is minimal; 600W is probably good enough. 1000W is probably an overkill.

#6. Pick the hard drive.

#7. Pick an Optical drive (DVDROM/ CDROM).

#8. Pick your operating system (Windows or other OS of your choice).

Other resources:

Build your own PC:
pcmech.com/byopc

Algorithmic, hft, and other speed-sensitive pro traders may be interested in this build guide, probably the nicest "PC Build Guide," which is posted on the homepage of the Eureka website:

eureka123.com

Building your own trading computer:
elitetrader.com/vb/showthread.php?s=d33908c4741b9cb8b93329ee881cebf7&threadid=195662

CPU benchmarking:
cpubenchmark.net/cpu_list.php

Build articles:

tomshardware.com/reviews/best-motherboard-guide,2546-2.html

tomshardware.com/reviews/build-your-own-pc,2601.html

tomshardware.com/forum/273575-28-dual-quad-xeon-single-quad

What I Bought

Dell Precision T3500 Workstation

Intel Xeon W3520 CPU (2.67GHz, 4 core, 64-bit, 8MB cache, Nehalem series)

6 Gig Memory (1333 GHz, Error Correcting) – max memory 24 Gig
320 GB Hard Disk Drive (added 2nd 640 GB Drive after Purchase)
6X Rewritable Blu-Ray Disk
NVIDIA 420 Graphics Card (4 monitor support)
Energy Star Power Supply
MS Windows 7 Professional, 64 bit