Before describing the two system specifications, the requirements for both clients must be examined. The main requirement is cost, followed by the utility of the system for the client’s profession. In addition to this, both systems need to have ample cooling and power. This will increase the overall reliability and upgradeability of the system, meaning the system will cost less and be more useful in the long-term. Overstretched power supplies will fail more frequently, because the power requirements of the system will fluctuate depending on use. For example, when a USB device is plugged into the system, it may draw power for its own operation, temporarily increasing the demand on the PSU. This means the power supply unit (PSU) must have more than enough capacity to run the system.

[Fluctuations](http://smallbusiness.chron.com/effect-insufficient-power-supply-pc-66723.html)

Both systems must be upgradeable because the system requirements for software are likely to increase in the future. For example, the Windows XP Home Edition operating system, released in 2001, required a 0.3GHz processor, 128MB of RAM, and 1.5GB of hard disk space. Windows 8.1, released in 2013, required a 1.0GHz processor, 2048MB of RAM and 16GB of hard disk space. This increase holds true for almost every other piece of software in use today, from browsers to computer games. For this reason, hardware capacity must be greater than currently necessary to allow for future hardware and software upgrades. Greater capacity is particularly needed for the power supply unit (PSU), main memory (RAM), and hard disk.

[Windows XP spec](http://support.microsoft.com/kb/314865)

[Windows 8.1 spec](http://windows.microsoft.com/en-GB/windows-8/system-requirements)

Sole Trader PC

The first specification is for a system to support a small businessman such as a plumber or electrician – a Sole Trader. The budget for this system is to be between £500 and £750. The system will be used to monitor accounts and stock levels. Additionally, the system will be used for entertainment purposes.

The specifications of accounting and inventory management software for a small business are negligible against the specs for running a modern operating system – this requirement will be easy to meet as long as there is additional RAM and hard drive space alongside the OS.

[POS Maid requirements](http://inventory-management.findthebest.com/l/14/POS-Maid)

[InFlow requirements](http://inventory-software-review.toptenreviews.com/inflow-details.html)

Running entertainment software will create the following requirements:

* a high-definition monitor for watching films.
* sufficient RAM and processing power to decode DVDs and other video codecs – this requirement is handled by most modern processors.
* graphics processing that allows basic video games to be played – again, browser games and other 2D games will be covered by using a modern processor.

|  |  |  |  |
| --- | --- | --- | --- |
| Supplier | Type | Description | Price (£) |
| eBuyer | Operating System | Windows 8.1 | 80.03 |
| Scan | Processor | Intel i3-4130 () | 79.98 |
| Scan | Motherboard | Gigabyte GA-H87-HD3 | 70.64 |
| Scan | RAM | Corsair 4GB DDR3 | 31.68 |
| Scan | Hard Drive | Seagate 500GB Barracuda | 35.98 |
| Scan | PSU | 500W Corsair CX500 | 46.20 |
| Scan | Case | Corsair 200R | 47.04 |
| Scan | Monitor | iiyama 22” | 117.86 |
| Scan | Keyboard | LMS Data K9020M | 4.98 |
| Scan | Mouse | Zalman ZM-M100 | 4.55 |
| Scan | Optical Drive | LiteOn IHAS124-14 | 11.98 |
|  |  | Shipping (£) | 10.98 |
|  |  | Total (£) | 541.90 |

*Fig. 1: Sole Trader Specification – prices correct as of 13/03/2014*

Processor: Intel i3-4130

The processor performs the mathematical calculations necessary for the software running on the system to do work for the user. Thus the processor is the most important part of the specification, as it has the greatest impact on system performance. Almost all modern processors will satisfy the needs of the Sole Trader specification, but the i3 processor selected has sufficient processor speed to make it reasonably useful for software written in five to ten years’ time. Power consumption is a worthwhile consideration for a budget system, and at this price point the Intel i3-4130 is more suitable than the equivalent AMD system (the AMD A10-6800K), consuming 54W instead of the AMD chip which consumes 100W.

A dedicated graphics card is not included as this would increase the cost and power consumption of the system. Chip makers now often include integrated graphics processing on their processors. These integrated graphics are actually quite powerful, and will allow the user to play reasonably resource-light games, such as browser games and small-scale 3D adventure games, without taxing the CPU, and without needing a dedicated graphics card. Integrated graphics also help when playing DVDs, or media streamed from the internet.

Reason: lower power consumption (54W) than the AMD A10-6800K (100W)

Also integrated graphics will be sufficient for watching HD videos and [basic gaming](http://www.tomshardware.com/reviews/gaming-cpu-review-overclock,3106-2.html).

Intel: [link](http://ark.intel.com/products/77480/Intel-Core-i3-4130-Processor-3M-Cache-3_40-GHz)

AMD: [link](http://shop.amd.com/uk/All/Detail/Processor/AD680KWOHLBOX?SearchFacets=category%3AProcessor)

Comparison: [link](http://www.hardware-revolution.com/best-cpu-processor-apu-january-2014-intel-amd/)

Price: £79.98 - Scan ([link](http://www.scan.co.uk/products/intel-core-i3-4130-s-1150-haswell-dual-core-34ghz-1150mhz-gpu-34x-ratio-54w-retail)) – 13/03/2014

Motherboard: [Gigabyte GA-H87-HD3](http://www.gigabyte.us/products/product-page.aspx?pid=4516#sp)

The motherboard connects the other system components together. On a system without a dedicated graphics card, the motherboard provides all connectivity between the system and external peripherals. The key factor for selection is upgradability, because once a motherboard is installed in a system it is inconvenient to upgrade: usually all the other components must be removed beforehand. Other important factors include the provision of a variety of video ports to connect a monitor, and support for additional connectivity like USB3. USB3 is useful for connecting external peripherals such as hard disks, mice, keyboards, printers etc. The faster transfer rate versus USB2 makes transferring large files to an external hard disk take less time.

Reason: wide variety of graphics connectors (VGA, HDMI, DVI), plenty of space a processor upgrade and RAM or graphics card expansion.

Main factors: price, expansion, video output

Price: £70.64 - [link](http://www.scan.co.uk/products/gigabyte-ga-h87-hd3-intel-h87-s-1150-ddr3-sata-iii-sata-raid-pcie-30-%28x16%29-d-sub-dvi-d-hdmi-atx)

RAM: Corsair 4GB DDR3

Main memory temporarily stores data needed by the CPU to perform its tasks. It acts as a faster memory cache of the memory on the hard disk. All data in main memory is lost when the machine is powered off. For the Sole Trader spec, 4GB of memory is required, to keep the system fast and upgradeable. While Windows 8.1 requires only 2GB of main memory, it is important to leave room for applications to operate and memory optimisations such as virtual memory. One memory module is provided now, rather than two smaller modules. This leaves the other slots on the motherboard free so that the system is more cost effective to upgrade in the future.

Reason: room for OS and for applications, including HD videos and basic games.

Price: £31.68 - [link](http://www.scan.co.uk/products/4gb-corsair-ddr3-desktop-pc3-12800-%281600%29-non-ecc-unbuffered-cas-11-11-11-30-15v)

Hard Disk Drive: Seagate 500GB Barracuda

The hard drive contains a backup of data needed by the CPU. This data is not lost when the system is powered off. 500GB should be sufficient for the following reasons: Windows 8.1 requires 16GB of memory to operate. For the Sole Trader, accounting and stock-taking applications take up a very small percentage of the space available on modern disks. The main consideration here is the computer’s use for home entertainment, where storage of a large music library or video collection may be required. In the case of media files, the more available the better, but the 400GB left after system use should be ample for a home user’s needs. A compressed movie generally takes up about 0.5GB of memory; meaning upwards of 700 videos could be stored on this disk.

Reason: price, plenty of room for OS, applications, music and video

Price: £35.98 - [link](http://www.scan.co.uk/products/500gb-seagate-st500dm002-barracuda-720014-sata-6gb-s-7200rpm-16mb-cache-85ms-ncq)

PSU: 500W Corsair CX500

Reason: reliable, plenty of room for expansion

Selecting a power supply that is reliable and easy to fit is important when building a system, as this will increase the life of the system and is the main factor behind general system reliability besides cooling. This PSU also has bronze 80PLUS certification, meaning it is designed to operate at about 80% efficiency even when usage is low. This will reduce heat output and overall power consumption.

[80PLUS](http://www.plugloadsolutions.com/80pluspowersupplies.aspx)

Price: £46.20 - [link](http://www.scan.co.uk/products/500w-corsair-builder-series-cx-cp-9020047-uk-80-plus-bronze-sli-crossfire-eps-12v-quiet-fan-atx-psu)

Case: Corsair 200R

Reason: two fans, space for expansion and air flow, slots for cables to be secured and organised

When constructing a PC a good case helps immensely. The Corsair case has slots to store internal cables so they do not become tangled, and two built-in fans. These fans, along with the CPU fan provided by Intel, satisfy all cooling requirements for the system. Good air circulation ensures the system remains cool while operating, increasing the lifetime and reliability of the computer.

Price: £47.04 - [link](http://www.scan.co.uk/products/corsair-carbide-series-200r-compact-mid-tower-performance-case-with-usb-30-w-o-psu)

The peripherals selected are kept fairly basic for the Sole Trader, to keep the price low. The optical drive must have the ability to read DVDs for home entertainment purposes. The monitor is connectable to the main computer via VGA or DVI ports, and is large enough for watching video. The monitor also includes two built-in speakers so dedicated speakers are not necessary.

Total: £483.88

Optical Drive: LiteOn IHAS124-14

Reason: price, DVD capability

Price: £11.98 - [link](http://www.scan.co.uk/products/liteon-ihas124-14-24x-dvdr-8x-dvddl-dvdplusrw-x8-rw-x6-dvd-ram-x12-sata-black-oem)

Monitor: iiyama 22”

Reason: widescreen dimensions ideal for watching films, resolution also crisp enough for this

Price: £117.86 - [link](http://www.scan.co.uk/products/22-iiyama-xu2290hs-b1-ips-led-monitor-ultra-slim-bezel-hdmi-dvi-vga-1920x1080-250cd-m2-5m1-5ms-speak)

Keyboard: LMS Data K9020M

Reason: multimedia keys

Price: £4.98 - [link](http://www.scan.co.uk/products/lms-data-k9020m-black-multimedia-keyboard-with-9-hot-keys-usb)

Mouse: Zalman ZM-M100

Reason: it’s a mouse

Price: £4.55 - [link](http://www.scan.co.uk/products/zalman-zm-m100-usb-optical-mouse-3-button-with-scroll-wheel-1000dpi-usb)

Web Development PC

The specification is broadly similar to the first: this is because many of the requirements overlap.

Same:

Motherboard

Case

Monitor

Keyboard

Mouse

PSU

Optical Drive

Different:

Processor

RAM – 8GB

Hard Disk – 1TB

Video Card