



# Unit 14C – Installing and Maintaining Technology Systems Report

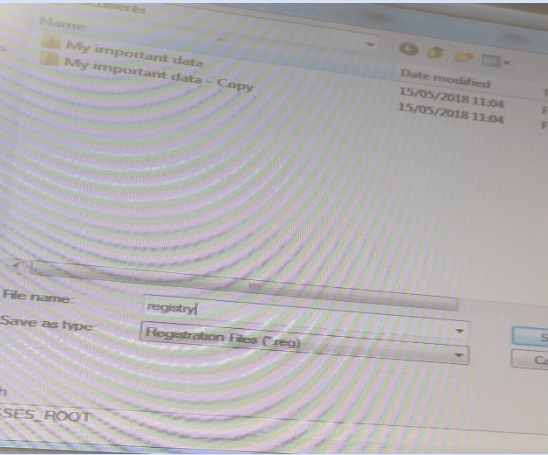
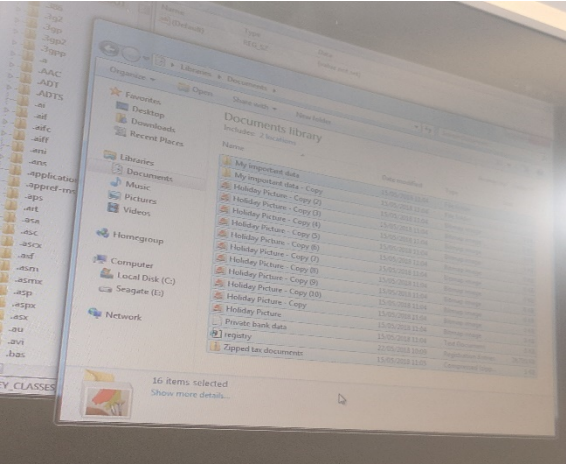

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# Preparing the System

Image Evidence	Description	What I did
 A screenshot of a Windows Explorer window. The address bar shows a path to an external drive. The main pane shows a file named 'registry' with a date modified of 15/05/2018 11:04. Below the file list, the 'File name' field contains 'registry' and the 'Save as type' dropdown is set to 'Registration Files (*.reg)'. The 'Save' button is visible on the right.	Registry Back-up	<p>I created a registry back-up to protect the system settings before I installed or repaired any components or devices.</p> <p>To begin I typed in “regedit” in the run command application. Then I opened the registry file and exported and saved the registry files to an external drive under the name “registry”.</p>
 A screenshot of a Windows Explorer window showing a 'Documents library'. The main pane displays a list of files and folders, including 'My important data', 'Holiday Pictures - Copy (D)', 'Private bank data', and 'registry'. The 'registry' folder is highlighted.	Back-up User Data	Here I created a back-up file of the user data in an external drive and imported the data into the back-up file.
 A photograph of a computer monitor. A dialog box is displayed on the screen, titled 'Remove Hardware and Safely Remove Hardware'. The dialog box contains the text: 'The hardware you are removing may be damaged if you do not use the Remove Hardware icon. Do you want to remove the hardware safely?' There are 'Yes' and 'No' buttons at the bottom.	Ejecting the External Drive	Here I ejected the external drive safely, to prevent file corruption.
	Anti-Static Wrist Strap	Wearing an anti-static wrist strap will protect myself and the hardware from any static build up. The strap goes

around your right wrist and plugs into the mains socket.

### Testing the RCD Breaker

Here I am testing the RCD breaker, this cuts the power from the mains in the event of any surge of electricity this prevents me from being electrocuted.

I have plugged the RCD into the mains and plugged the printer into the RCD breaker. I have then switched on the mains socket and pressed the test button to make sure the RCD breaker is working as it is supposed to.





# Protecting User Data and System Settings

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Before upgrading, installing, repairing or removing any hardware or software, it is essential that the user's data and system settings are safely backed-up, this is done to make sure that if anything goes wrong, the user's data and settings are protected in the form of a back-up. To do this I created a back-up file on an external drive which holds the user's data and system settings, this includes the registry, files, documents and images. To carry out the installation and maintenance activities I used an RCD breaker, anti-static wrist strap and an external storage drive.

As stated above, the anti-static wrist strap was used to protect myself and the components from static build-up and it will safely remove any unwanted static charge. The RCD breaker was used as a precaution against electrocution, in which case the RCD breaker will cut off the connection to the mains socket and prevent electrocution. Finally, I used an external storage drive to back-up the user's data and system settings onto as a spare copy in case anything went wrong during the installation and maintenance of the system.

## Repairing and Upgrading the System

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Image Evidence	Description	What I did
	Fault – Power Supply cable was not connected to the motherboard.	I discovered the power supply cable was not connected to the motherboard at all.



Fix - I connected the power supply cable into motherboard.

I re-connected the power supply cable into the motherboard.



Fault – The RAM was not connected to the motherboard.

I identified that the RAM was not connected to the motherboard.



Fix – I connected the RAM to the motherboard.

I inserted the RAM into two of the available slots on the motherboard, firmly pushing them in by the corners to make sure they were securely fitted into the motherboard.



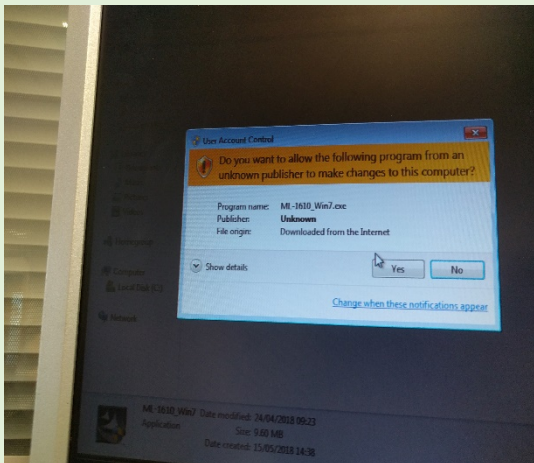
Fault – The cable connecting the hard disk drive (SATA cable) to the motherboard was not connected.

I found that the cable connecting the HDD to the motherboard was not connected.



Fix – I connected the cable to the motherboard.

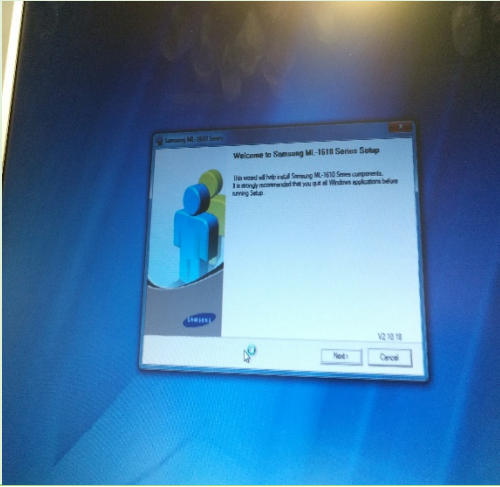
I plugged the cable into the available SATA slot on the motherboard and pushed down firmly to make sure it was secure.



Installing an external hardware device

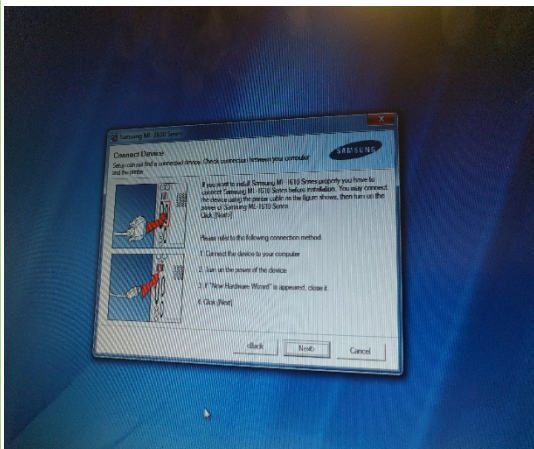
I ran the software required to install the printer and followed the setup instructions onscreen.





Installing an external hardware device

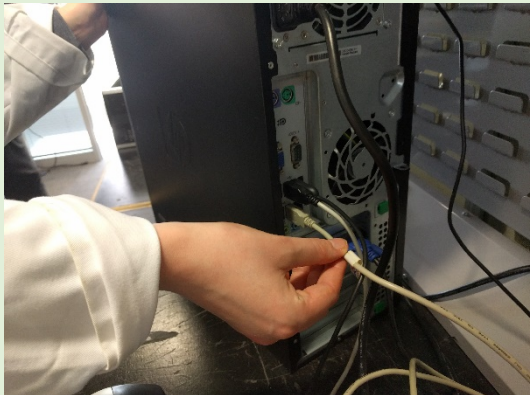
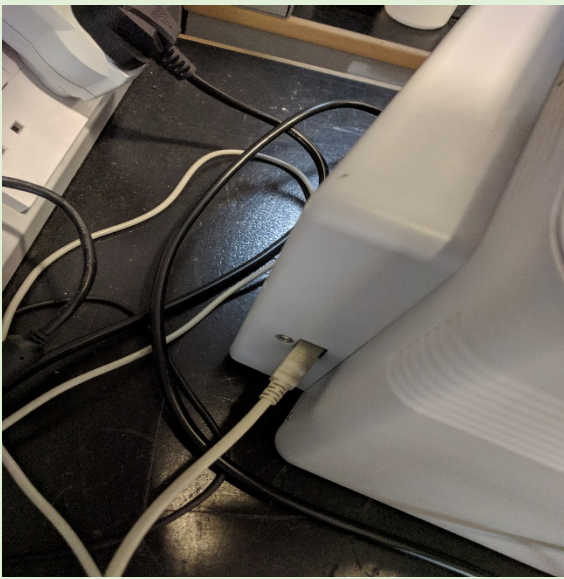
The software then asked me to connect the printer to the system, turn it on and click next on screen.

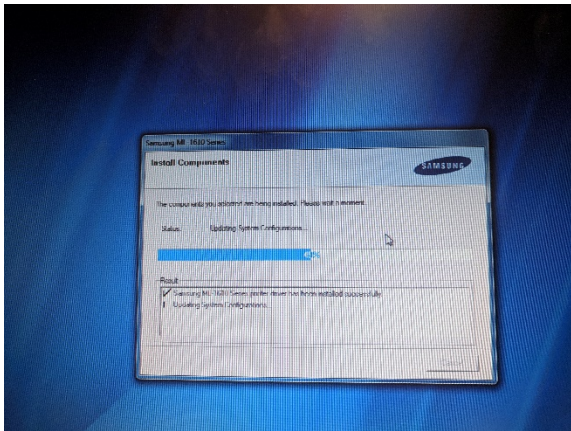




Installing an external hardware device

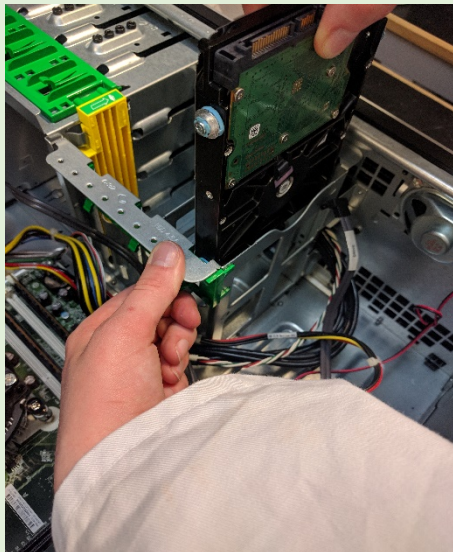
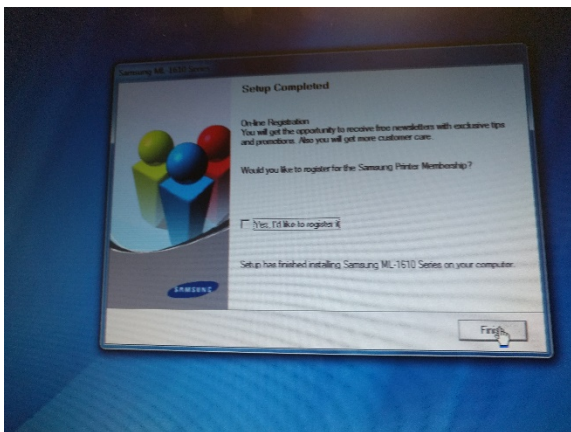
I plugged the printer in and turned it on and clicked next.





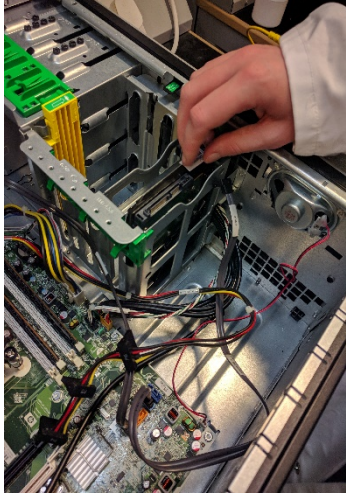
Installing an external hardware device

The printer installed and the setup was completed, I then pressed finish.



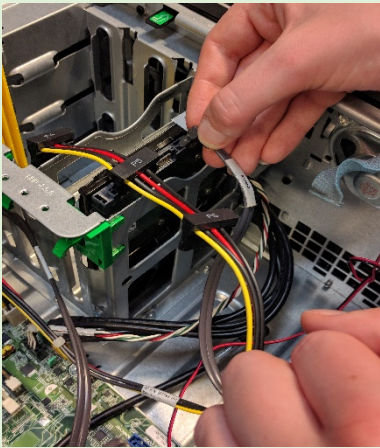
Upgrading a hard drive

First I removed the old hard drive by unfastening the green clips, disconnecting the hard drive and sliding it out of the tray.



Upgrading a hard drive

Then I placed the new hard drive into the tray and fastened the clips.



Upgrading a hard drive

Finally I connected the hard drive to the motherboard with SATA cables.



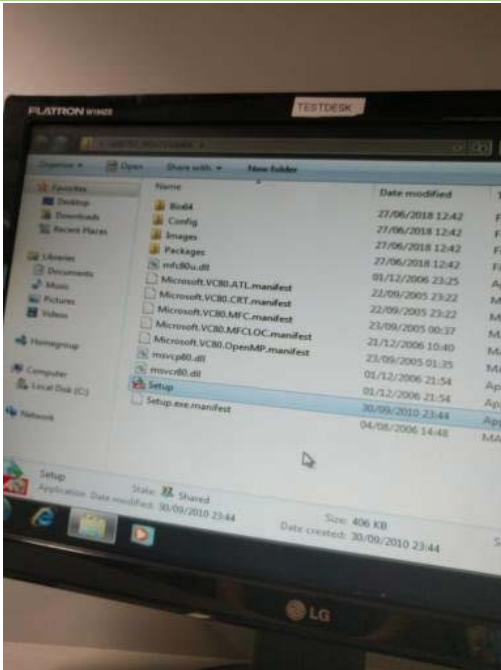
Upgrading a graphics card

I located the slot for the graphics card on the motherboard and released the green clips attached to the back of the computer case.



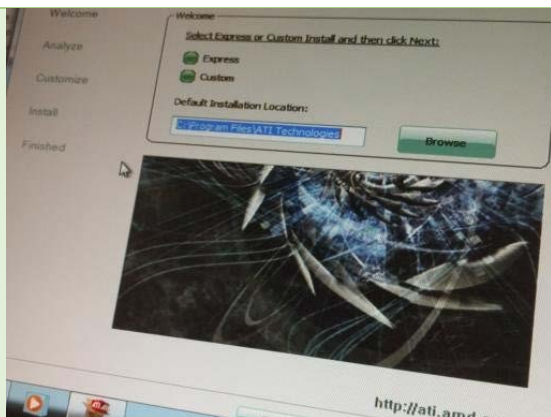
Upgrading a graphics card

I then inserted the graphics card into the available slot and pushed it in firmly to secure it in place, I then re-attached the clips to secure the card in place at the back of the case.



Updating the drivers for the graphics card.

Once I upgraded the graphics card, I began updating the drivers for the upgraded graphics card to ensure the screen resolution and settings are updated. To do this I opened the setup for the video drivers.



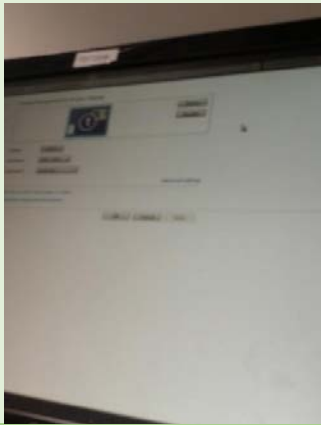
Updating the drivers for the graphics card.

I then followed the setup directions on screen and saved the file to the system hard drive and let the setup upgrade the drivers.



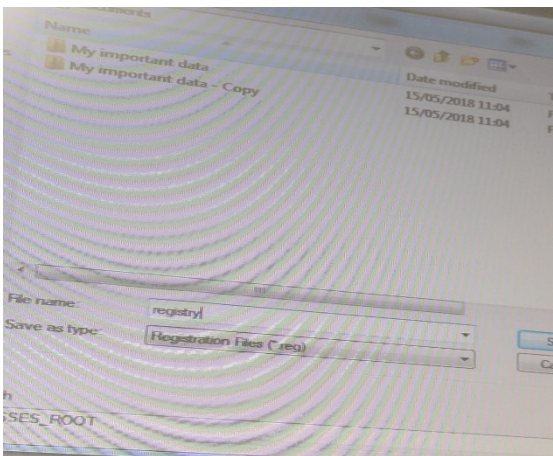
Updating the drivers for the graphics card.

The update was successful and I closed the setup.



Updating the drivers for the graphics card.

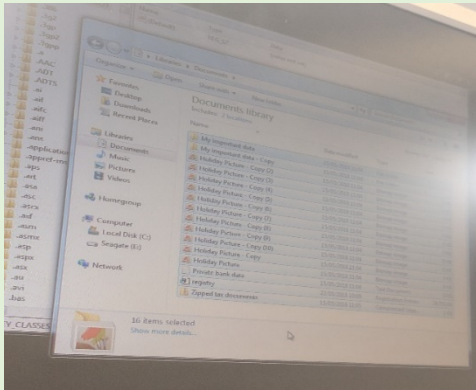
Then I configured the graphics card settings screen resolution setting it to a higher resolution for usability.



Restoring the registry and user data.

I restored the registry by running the run command application and typing in regedit.exe and pressing enter.

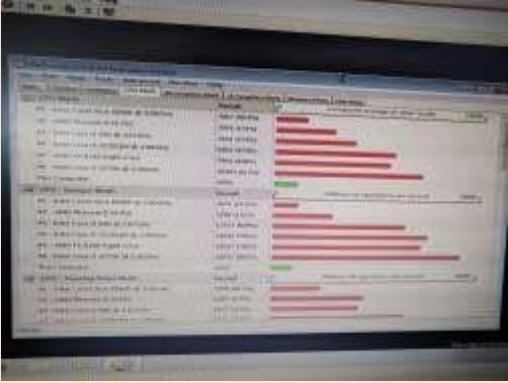

Once the registry editor popped up, I selected the file and imported the registry file, when the dialog box popped up, I then selected the location where I saved the backup file (external drive) and opened the file to restore the registry.





Restoring the registry and user data.



I then imported the user data back onto the system by opening the backup external drive and importing the user's data onto the system hard drive.

# Test Table

Test No.	Component Description	Test	Data	Expected Result	Actual Result	Evidence
1	CPU	Benchmarking (this compares how the CPU currently operates against the model's standard recorded test, which tells you how your device is operating compared to how it should be operating)	Maths	I expect that the CPU will be operating as close to the standard for the model, as possible.	The CPU is operating as it should be.	
2	Sound Card	Audio check	Ears/Listening	I expect that the sound will play and I will be able to hear it.	The sound works as it should.	

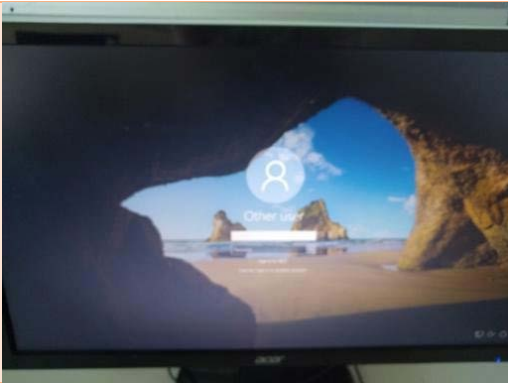
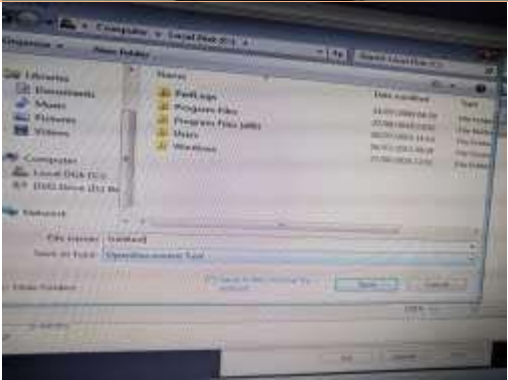


3	Graphics Card	<p>Benchmarking (this compares how the graphics card currently operates against the model's standard recorded test, which tells you how your device is operating compared to how it should be operating)</p>	Graphics/Ma ths	I expect that the graphics card will be operating as close to the standard for the model as possible.	The graphic card is operating as it should be.	
4	Motherboard	<p>POST (Power On Self-Test) test is performed when the computer is first turned on once the main components have been connected to the motherboard.</p> <p>This allows the built-in diagnostic program to check the hardware connected to the motherboard to make sure</p>	Electricity/po wer.	I expect the POST test to be successful, if an error is detected it will display in the BIOS screen and if no errors are detected the computer will continue	The POST test was successful, no errors were detected.	

		everything is present and functioning properly.		with the next stage of the boot and no errors will be displayed.		
5	RAM	Memory diagnostic test will detect any problems with the RAM.	Memory Data	I expect the test to run smoothly and that no issues will be detected.	The test ran smoothly and no errors were detected.	
6	Hard Drive	Performance check	Software diagnostic check	I expect the disk to be operating to a good standard.	The check went smoothly and hard drive is operating as it should be.	
7	Monitor	Does it turn on? picture	Pixels/graphics	I expect to see the monitor turn on and a start-	The monitor turns on as expected and displays start-up screen.	

up screen  
appears  
and that  
the picture  
is clear  
without  
dead pixels  
or colour  
distortion.



							
8	Hard Drive	Read/write function	Hard disk	I expect that the read/write function on the hard disk will work and allow me to read/write data to the hard disk drive.	The read/write function operated as I expected and I was able to write and save and retrieve a file on the hard disk drive.		

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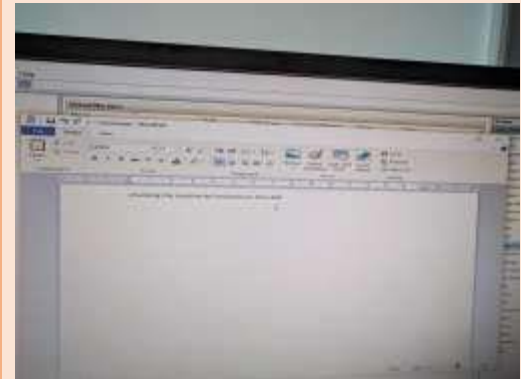
Keyboard/Mouse

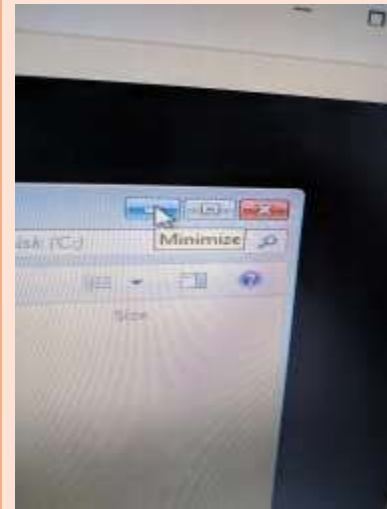
Does the keyboard and mouse work?

Move mouse.  
Type on keyboard.

I expect that the keyboard will allow me to type data into wordpad and mouse will allow me to move the cursor to minimise the open window on screen.

The keyboard and mouse function as expected.





10

PSU

Does it switch on?

Power

I expect that the PSU will switch on and power up the other hardware components.

As expected, the PSU switch worked and the power came on and the system loaded.



# The Upgraded System Specifications:

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**Operating System:** Windows 10 Pro (64 bit)

**Processor:** Intel Core i7-6700 Quad-Core Processor, 3.4 GHz/4.0 GHz with Turbo Boost, 8MB Cache

**Memory (RAM):** 32GB DDR3 Crucial (4x (2x 8GB), alongside existing RAM)

**Motherboard:** ASUS Z170-P D3 ATX LGA1151 (64GB maximum installable RAM)

**Graphics Card:** ASUS GeForce GTX 1060 6GB Dual Video Card

**Storage:** 2 x Seagate Barracuda 3.5" 2TB HDD, 7200RPM

**Ethernet:** 10/100 Ethernet

**Bluetooth:** Bluetooth 4.0

**Video Interface:** HDMI x 2, DVI-D x 2, Display Ports x 2

**Audio Interface:** 3.5mm jack

**Optical Disk Drive:** DVD/RW with double layer support

**Memory Card Reader:** SD Memory Card Reader

**Expansion Card Slot:** Yes

**Power Supply Unit:** Corsair Professional 1050W 80+ Gold Certified ATX Power Supply

## Feedback

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- Could have left old 1 TB drive in and increased HDD storage rather than just replacing
- Could have added more RAM to the existing 8Gb using all available slots, board can also take more per slot up to 4Gb per slot
- Could have upgraded boot HDD to a different drive as OS boots a relatively slowly
- The board has capacity for another 3 SATA devices/drives
- The graphics card is a cheap gaming card with only 2Gb of RAM
- There is a spare PCIe slot which could take another VGA card
- OS installed was Win 7 32 bit which is not the most up to date OS (and RAM limitations)
- PSU was 300 watt is it powerful enough?
- Printer is a USB connected printer that is quite old (could have a network printer to share)



# Review of Feedback

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We have left the old hard drives in and increased the HDD storage by adding an extra two 2TB hard drives for each system. We have also increased the RAM to 32GB while using the existing 8GB sticks of RAM to reduce costs. Furthermore, we have upgraded the video card to a 6GB graphics card, however, it is more of a gaming graphics card than a non-gaming graphics card and this could be improved, as per the client's request not to have a gaming video card.

We could have upgraded the HDD for the OS boot, but I felt that the client wanted to keep some of their current components, which allows the client to use the other two 2TB hard drives for the client's data, programs, images and other files. This will free up space of the other two hard drives as they won't be slowed down by the operating system.

There is an extra PCIe slot that could hold a VGA card to allow the system to connect to a VGA monitor however, this has not been specifically requested by the client and VGA monitors are not really widely used except on older systems, I feel the available HDMI and DVI-D slots are sufficient for the client's needs as a more updated monitor will usually come with the type of video connectors. This can be bypassed however, with HDMI/DVI-D TO VGA adapters or the systems could have VGA cards installed if necessary.

The operating system has been upgraded to windows 10 pro (64 bit) which is the most up to date windows operating system and allows for the system's RAM to be increased to 32GB which fulfils the user's request for a faster PC system. We have also upgraded the power supply unit to 1050 Watts for a more stable power supply to provide a more balanced supply of power to all components. The original 300 Watt power supply was simply not compatible with the upgraded system, and would have rendered its components powerless or unstable, due to the lack of power flowing to the components which simply wasn't powerful enough to comfortably power the system.

Finally the printer that we installed is very old printer which connects to a PC system via a USB cable, this only allows the connected PC system to print documents and images, and it may be worth upgrading to a printer on a network which will allow multiple systems to print which will increase the productivity of the printer.

## System Refinements

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One of the points raised in the feedback was the mention of a VGA card, we feel the inclusion of a VGA card will improve the functionality and usability of the systems, as the client can choose which type of monitor they would like to connect to the system.

We could also add an extra graphics card with VGA ports to run alongside the graphics card that we've picked out, but this would be at additional cost and it might just be cheaper to buy adapters or even new monitors with either HDMI ports or DVI-D ports.

To increase the operating system boot time, we could use a solid-state drive instead of a hard disk drive, which would speed up the boot time but at a greater expense than using the existing hard drive. We decided against

this due to the cost involved and the fact that we wanted to retain some of the original components as requested by the client.

One of the things that we could've done is instead of upgrading the motherboard and increasing the RAM to 32GB, we could've just increased the RAM to 16GB and this would massively reduce the cost of the system, the performance of the system would be increased at a fraction of the cost. The reason we chose to increase the RAM to 32GB, is because of the higher-level of performance which we felt was worth the cost.

We will refine the upgraded system to include an ATI Rage XL 8 MB PCI 3d VGA card to allow the user to connect the system to a VGA monitor, as we feel this gives the user extra flexibility and costs just under £10 per card. We have decided to refine the ASUS GeForce GTX 1060 6GB gaming graphics card for a Zotac GeForce GTX 980 Ti 6GB graphics card which is a CUDA supported graphics card and fits in better with the clients request for a non-gaming, high performance graphics card. We will also update the graphics card drivers to the latest update to improve the functionality and ensure compatibility.

Finally, we received feedback regarding the printer we installed into the system, the printer is USB connected which means that only one system can be connected at a time and does not allow for multiple systems to print at once. We feel this is inadequate for a growing business and have decided to upgrade the printer for a network connected printer to allow for several systems to communicate with the printer at once which will increase the productivity of the business.