

## Computer Audio Design

### Windows Software Modifications

#### V1.1 February 2013

I find the following software modifications improve the sound quality of Windows computers. I have based this document on Windows 7, but the principles will apply to other Windows Operating Systems.

I believe that a computer being used for audio should just be used just for that - not email, not web surfing, etc. You need to think that your computer is an "audio component" and you want to strip everything off of it that is not necessary for audio use. This white paper is designed for people that use their computer just for audio use and nothing else. If you intend to use your computer for audio **and** email/surfing/etc. this paper is **not** designed for you.

I cannot over stress how important it is create a *System Image* and *System Repair Disk* and manually set a *restore point* before you make these modifications. In case something does go wrong it is relatively simple to get back to a know state. I have included instructions on how to do perform these operations.

Many of these ideas have come from different forums and in particular the team at JPLAY. I feel that to get the best sound quality out of a computer you should use audio specialist playback software and JPLAY is an excellent product.

These are by no means the only modifications available! There are certainly many things I know nothing about so please get in touch with your ideas.

I must state that you try these modifications **entirely at your own risk!** I hold no responsibility. I also make no guarantee that you will find they make a significant difference – I am simply writing down what I personally have found helps. I tried to list the software modifications from easy to more difficult.

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Updates from V1.0 to V1.1 - added instructions for creating a System Image, System Repair disk and how to set a Restore Point. Added new section on *Shutting down additional processes & drivers using the registry editor*.

## Section 1 - Hardware and setup ideas

### DIY CD Ripping

Very simple, use dBpoweramp. I have tried everything and in my opinion it is easy to use, gives great rips and is cheap. The batch mode can save you a massive amount of time.

<http://www.dbpoweramp.com>

dBpoweramp is also extremely useful for changing the format of your entire music collection from one format to another using the "Batch Converter". You can also change the bit rate using what is known as "dither" and upsampled or downsample your music. Highly recommended.

### Music Format

Disk Storage is very inexpensive today. There is no reason to listen to your music even in a lossless compression such as FLAC. FLAC is similar to a Windows ZIP file. The music is compressed but you can uncompress it and no data is lost. That is great, but we want the computer doing as little as possible while playing music. The computer has to do more processing or "work" playing a FLAC than it does with an AIFF or WAV. I can hear a difference between FLAC and WAV or AIFF. I cannot hear a difference between AIFF and WAV. AIFF is basically the same as WAV but has built in metadata storage. You can metadata storage to work with WAV, but AIFF is just easier. For that reason I recommend AIFF.

### Hard Drive Technology

If your current operating system hard drive uses a standard spindle HDD, then replacing it with a SATAIII Solid State Drive will improve the sound quality. Unfortunately this is a reasonably difficult procedure and is beyond what many people would be willing to do. But if you are up for it you will find a big sound quality improvement! I feel this is due to the read rates of the new SATAIII SSDs being so much higher than any HDD. My current favourite is the Intel 520 series. Since this drive is only for your operating system and playback software and **not** for storing your music collection a 120GB is plenty big enough.

**NEVER** store your music on the same drive as your operating system. Your operating system drive is continually being accessed by the operating system. If you put your music collection on the same drive then your computer will be accessing the drive for two key processes simultaneously and I believe the sound quality suffers.

Does a SSD for music storage sound better than standard spindle hard drives? The simple answer is yes. If cost is no object go for it. But until just very recently the cost versus sound quality gain did not make sense to me. You can now get 250GB SSD for about £150 in the UK. At that price point it is just starting to make sense.

If you are using a 7200rpm HDD for your music collection storage here is a tip that will cost you next to nothing and will improve sound quality quite a bit. Place your hard drive on a hard surface like glass or stone and listen to your favourite track. Now find something soft, like a new sponge or even a pile of clothes. Place the hard drive on that and listen again. A HDD that is spinning around at 7200 rpm is like a turntable. It will vibrate. Trying to reduce or absorb that vibration improves sound quality.

### **Interface to external Drive(s)**

If you are using a USB DAC it is generally best to not use a USB connected hard drive for your music collection. It is best to try to limit the activity on the USB bus to only your DAC. I have found that many of the laptops now days have both a USB2.0 and USB3.0 connections. In that case you can sometimes use the USB2.0 for your DAC and the USB3.0 for your external hard drive and they will be on different controllers - but unfortunately not always...

Or get a computer with an eSata, Firewire 800 or Thunderbolt connection along with a USB connection and use one of those for your external hard drive connections.

### **The computer itself**

Laptop versus desktop? Laptops are designed to cram as much stuff into a small space as possible. Because of that I feel a desktop arrangement is the best. It is also easier to modify and upgrade a desktop than a laptop. That is not to say you cannot get good sound quality from a laptop. I use laptops for demonstration work when I am travelling and am more than please with the sound quality I get.

I personally use an iPad for controlling my computer so I typically don't have a keyboard or monitor if using a desktop and keep the lid closed if using a laptop.

Many people feel you can get by with a low powered CPU and not much memory for an audio PC. I disagree. My recommendation is to try to get the latest Ivy Bridge i5 or i7 quad core CPU and 8GB of reasonably high speed / low latency RAM. If you are using a 32bit Operating System than there is no reason to get more than 4GB because that is all your computer can access. Generally as the speed of RAM increases the latency decreases. High speed RAM that has low latency will cost quite a bit more than high speed RAM with higher latency.

### **DC Power Supplies**

Most external drives use some type of power supply. The ones that come with hard drives are low cost "switch mode" wall mount power supplies. The wall adapter will tell you the output voltage and current. Try to find a "Linear" power supply with the same output voltage and at least as much current. The voltage needs to be exactly the same but the current output can be equal or greater. Switch mode power supplies have much more noise in the higher frequencies than linear power supplies.

There are companies now offering "linear" power supplies to replace the "switch mode" power supplies that come with small desktops and laptops. There is a great deal of discussion on the forums about this due to the fact that all motherboards use switch mode technology in them. The main questions being: "Why would a linear power supply make a difference if the motherboard is then using switch mode technology?" My limited experience

in this area has me to believe that it is a very positive upgrade, and I am currently doing more research in this area.

### **Store your music in the root directory:**

This one may seem a bit farfetched but I have played around with this enough that I *think* it does make a difference. What I mean by this is instead of storing your music like this:

E:/Scott/My Music/Jim White/Jim White - Transnormal Skiperoo/...

Store it at least like this:

E:/ Jim White/Jim White - Transnormal Skiperoo/....

Or like this:

E:/Jim White - Transnormal Skiperoo/....

This is still not the "root directory", you could actually just put all your individual songs directly in E:/ - but that is even a bit much for me! If your metadata is correct and you are using software such as JRiver it will not matter at all.

## **Section 2 Software Modifications**

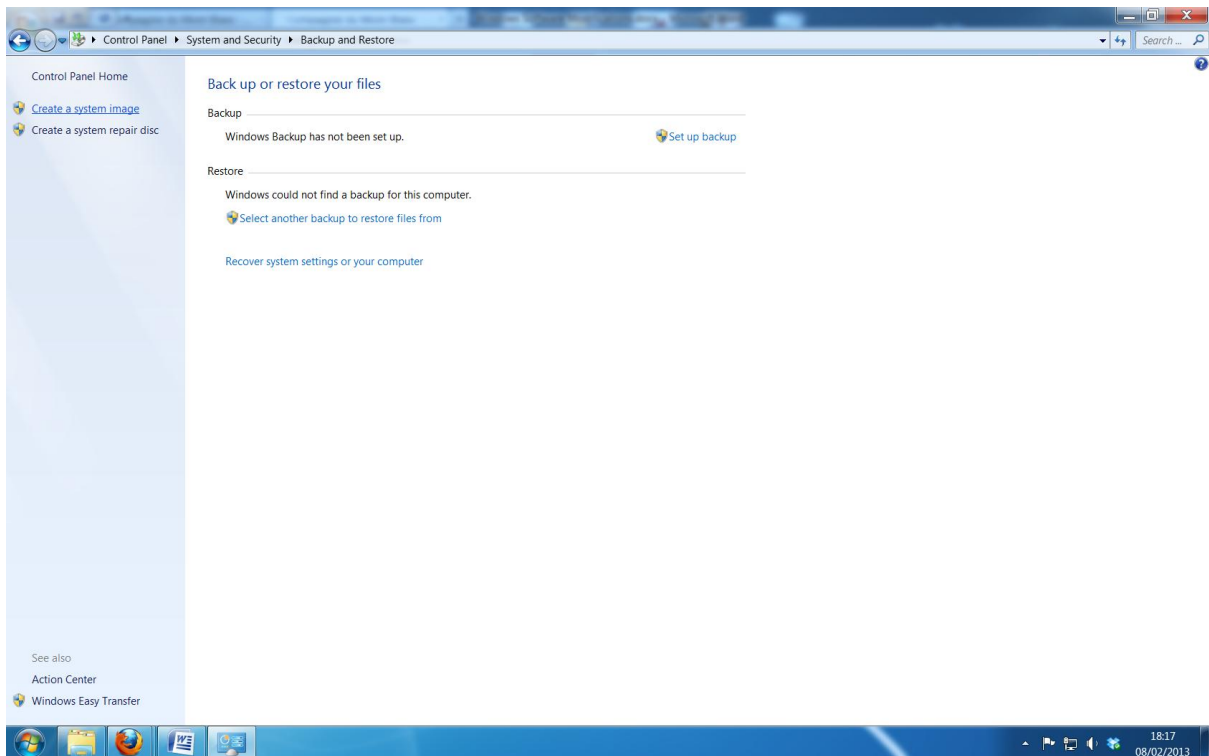
In what follows I do not go into any depth about each process; this is simply a list of things to try. I have personally tried all of these and feel they are worthwhile; however you will have to do your own research as to the functionality you give up in each case.

### **Backup**

Before you do any software modifications please make what is called a "System Image" of your computer and a "System Repair Disk". This is very easy and takes about 10 minutes. This is something you should do with any computer you own. It is best to use an external drive for your System Image and you will need a blank DVD to create your System Repair Disk. With these two backup tools you can always get your computer back to exactly the state it was in when you created the System Image.

Go to: Control Panel -- > System and security --> Backup and Restore

You should see this:



Attached an external drive to your computer and click on *Create a system image*

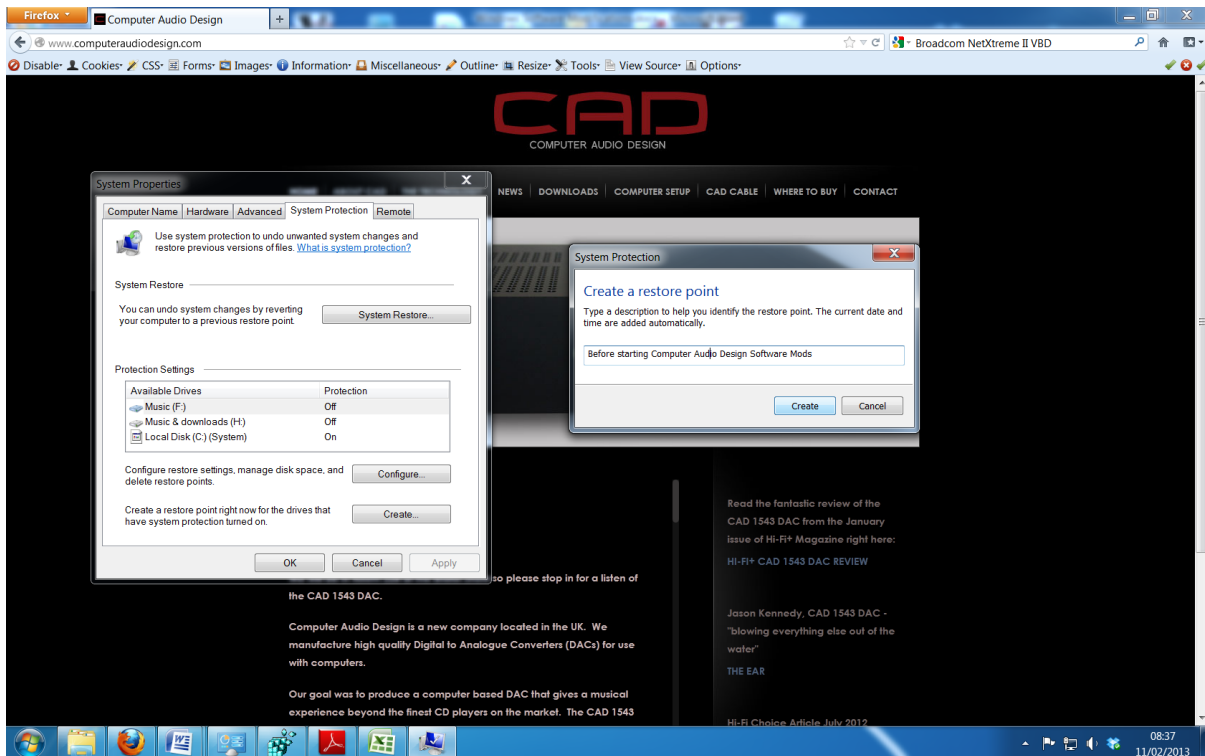
You will be asked where you want to store the *System Image*. I do not like the idea of network drive because that can be hard to access if you are having computer problems, so use a external hard drive or USB stick if possible. Then just follow the directions. At the end you will be asked if you would like to create a *System Repair Disk*. Say yes and you will have to install a blank unformatted DVD into your computer and then follow the directions.

Now make a manual *Restore Point* of your computer. This records the current settings of your computer which you can go back to if something goes wrong.

Go to: Start Menu --> Search programs and files --> type: *create a restore point*

Click on the command that appears. On the window that pops up look at the section that says *Protection Settings*. Make sure that your Operating System drive (usually C:) is set to ON.

In the bottom right hand corner of the window there is a button that says *Create*. Double click on that and you should see this:



You can type in any description you want and then click on *Create*. Now if you have an issue with your computer you can restore it to the settings that your computer currently has.

Now let's move on to making your computer sound better!

## Remove Anti Virus software

This is a personal choice and you need to understand the risks before you do this! To be reasonably safe with no antivirus you should not be connected to the internet nor your local area network. If you have your audio computer on your local network and another computer on the same network gets infected, your audio computer could get infected also. Your audio computer should not be used for "surfing" the net, for email or downloading things from questionable locations on the internet. Certain anti-virus programs can be what is called "resource hogs" - they use up large amounts of computer resources in the back ground.

Uninstall them by going to: Control Panel -- > "Programs / Uninstall a Program.

Obviously, if you intend to maintain a connection to the internet and do not have any antivirus protection, you are taking a large risk.

## Turn Firewall off

All the risks that I mention for removing antivirus software above apply to turning off your Firewall.

Go to Control Panel > Windows Firewall > Turn Windows Firewall off

Obviously, if you intend to maintain a connection to the internet and do not have a firewall, you are taking a large risk.

## Disable User Control

Go to Control Panel > User Accounts > Change User Account Control settings > Never Notify (that will disable User Account Control)

## Disable Data Execution Prevention (security):

This is a security measure that is intended to prevent an application or service from executing code (possible virus) from an area of memory that is called "non-executable memory region".

Go to Start Menu --> Search programs and files --> type: `cmd` Right-Click the cmd Icon and click *Run as Administrator*

In the DOS window type: `bcdedit.exe /set nx AlwaysOff` and press Enter (that will disable Data Execution Prevention)

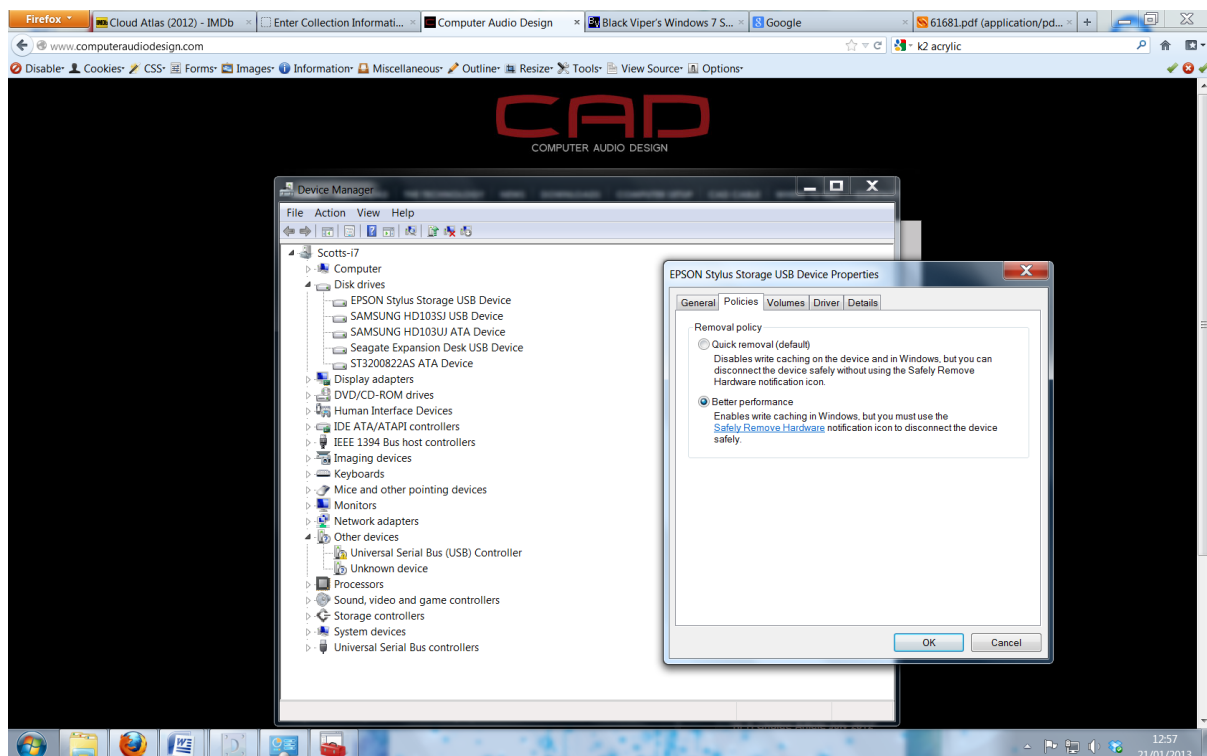
## Turn off write-cache buffer flushing:

This modification is to increase the data transfer speed of your Hard Drive. The only device that I have read you should not do this on is Intel SSDs. Intel recommends against disabling write-cache buffer flushing on its SSDs.

Go to control Panel --> Device manager --> disk drives --> Go to the Policies tab and check the boxes for *Better Performance*, *Enable write caching* and *Turn off Windows write-cache buffer flushing*

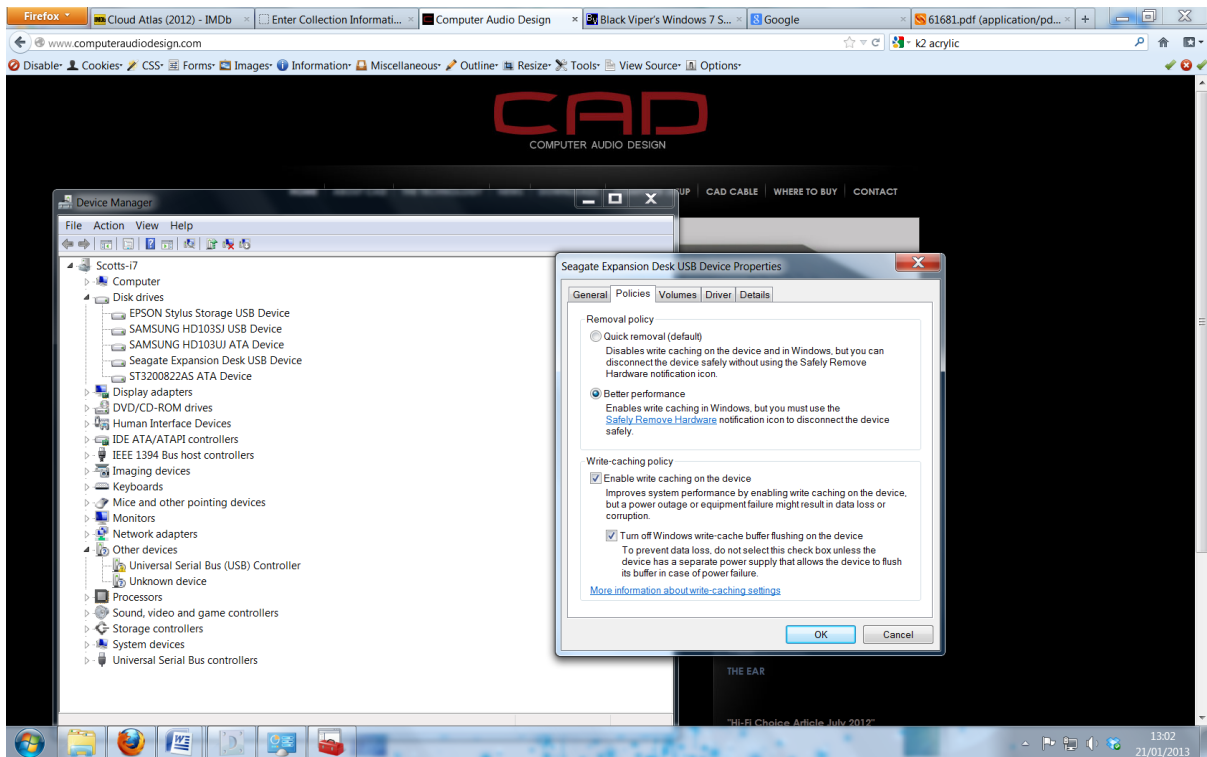
Depending on the Hard Drive interface you may only see two options:

- 1) Quick Removal (Default)
- 2) Better Performance



Choose “*Better Performance*”

But you may have these options:

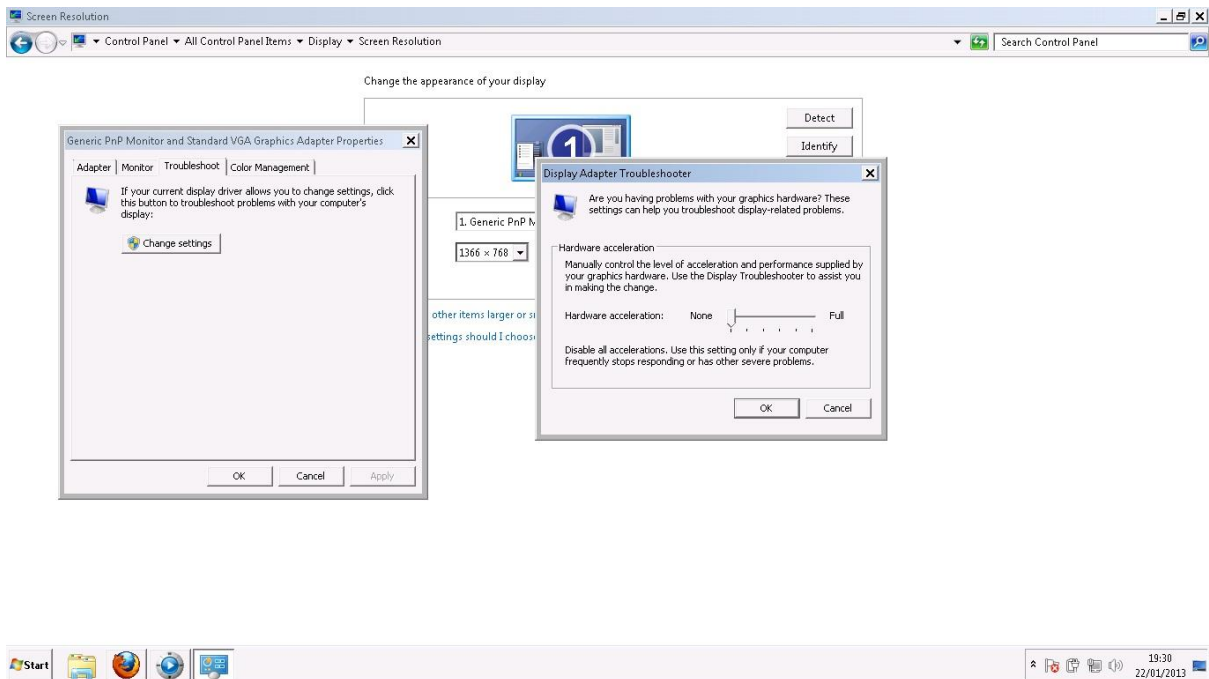


Once you do this you should no longer just unplug your hard drive when it is powered up. You must go into explorer and right click the hard drive and click on: *Eject* You will then get a message that pops up in the lower right corner of your desktop telling you it is now safe to unplug the hard drive.

### Minimise monitor hardware acceleration

The graphics hardware can use quite a bit of resources up. The processing power in the video hardware that helps accelerate graphics and improve performance can also slow down your computer.

If you can live with a bit less quality on your screen you can reduce the load on the computer by doing this: Go to: Control Panel --> Display --> Adjust resolution --> Advance settings and you should see this:



Move the slider down to "None" and hit OK until you are all the way back out. You may have to reboot the computer.

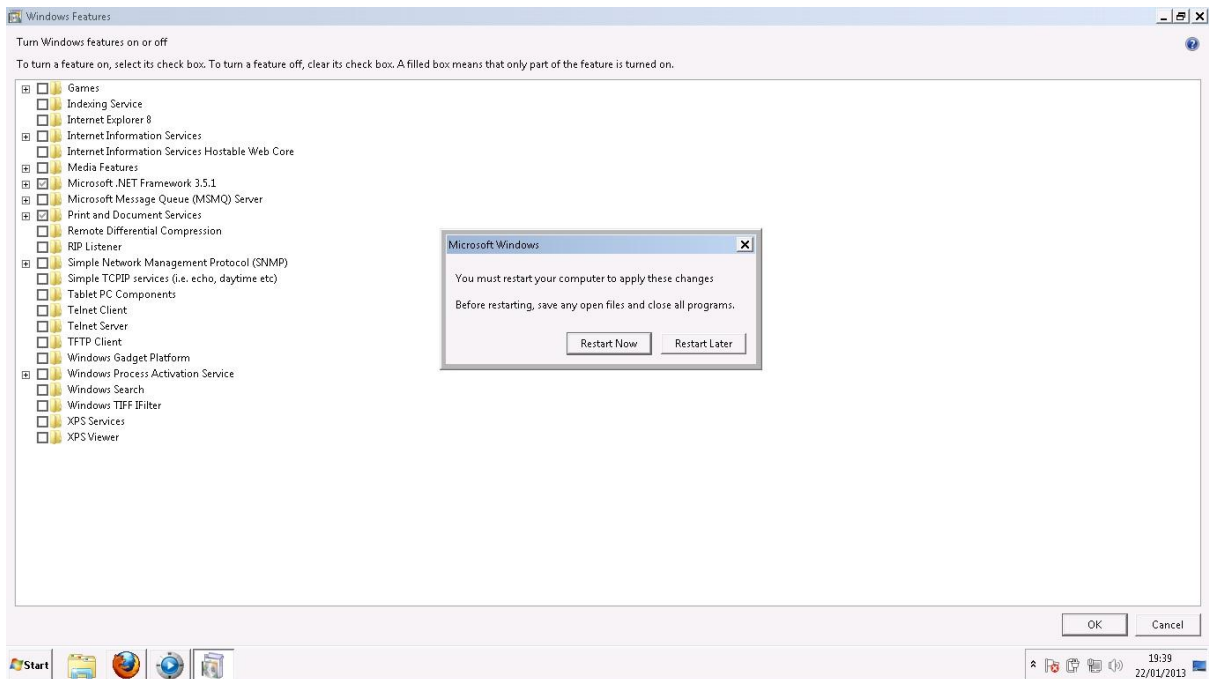
This modification does not work on all graphics hardware. If you get to the "troubleshoot" window and "Change settings" is greyed out you have to skip this modification.

## Turn Windows Features Off

Windows has several built in "features" that you cannot remove from "uninstall programs". None of these features are needed so here is how to delete them from your computer:

Go to Start Menu > Search programs and files > type: *Turn Windows Features* and hit enter.

You can uncheck everything EXCEPT Windows Search, you will need that. This will delete Windows Internet Explorer, so if you want that leave it checked. You have to restart the computer. It will take a few minutes to soft reboot.

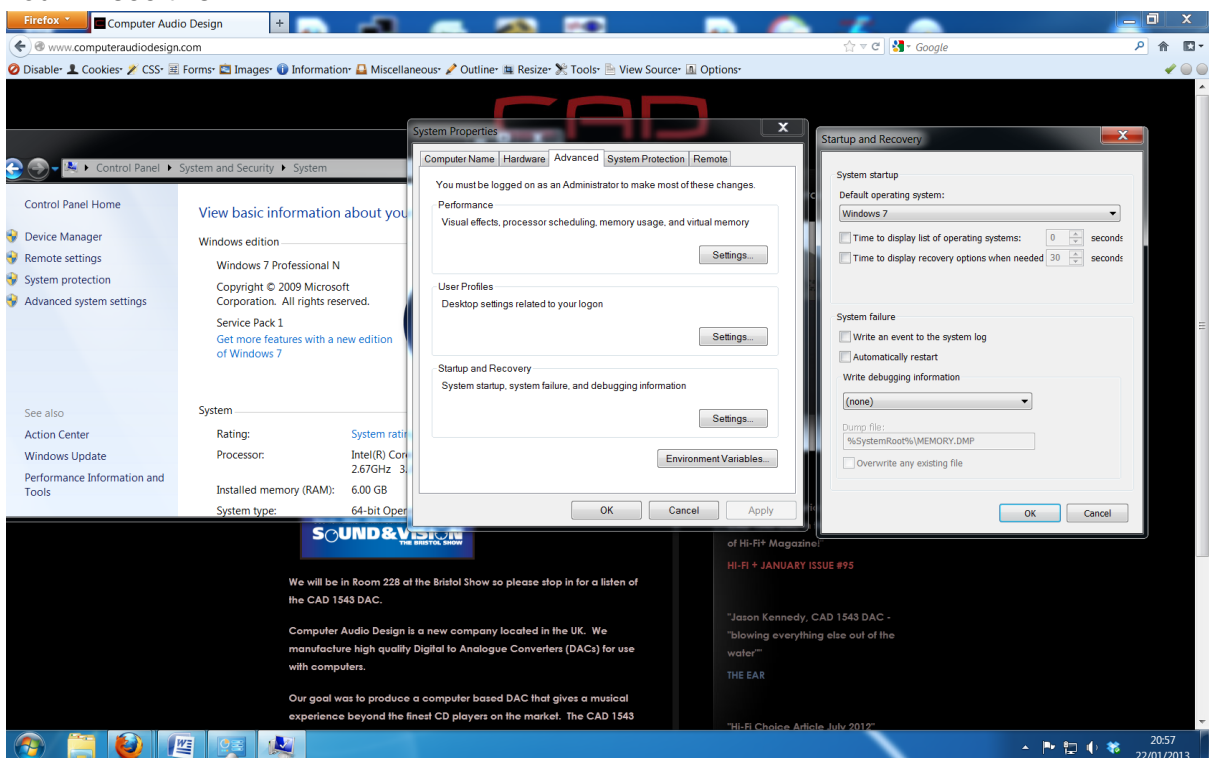


## Disable System Failure & Debugging options

This will stop any failure data being saved if an error occurs. If this is data that you want than skip this modification.

Go to: Control Panel --> System --> Advance system settings --> Advanced --> Startup and Recovery --> Settings

You will see this:



Under "Write debugging information" choose "(none)". Hit OK until you are out.

## Disable USB Power Management:

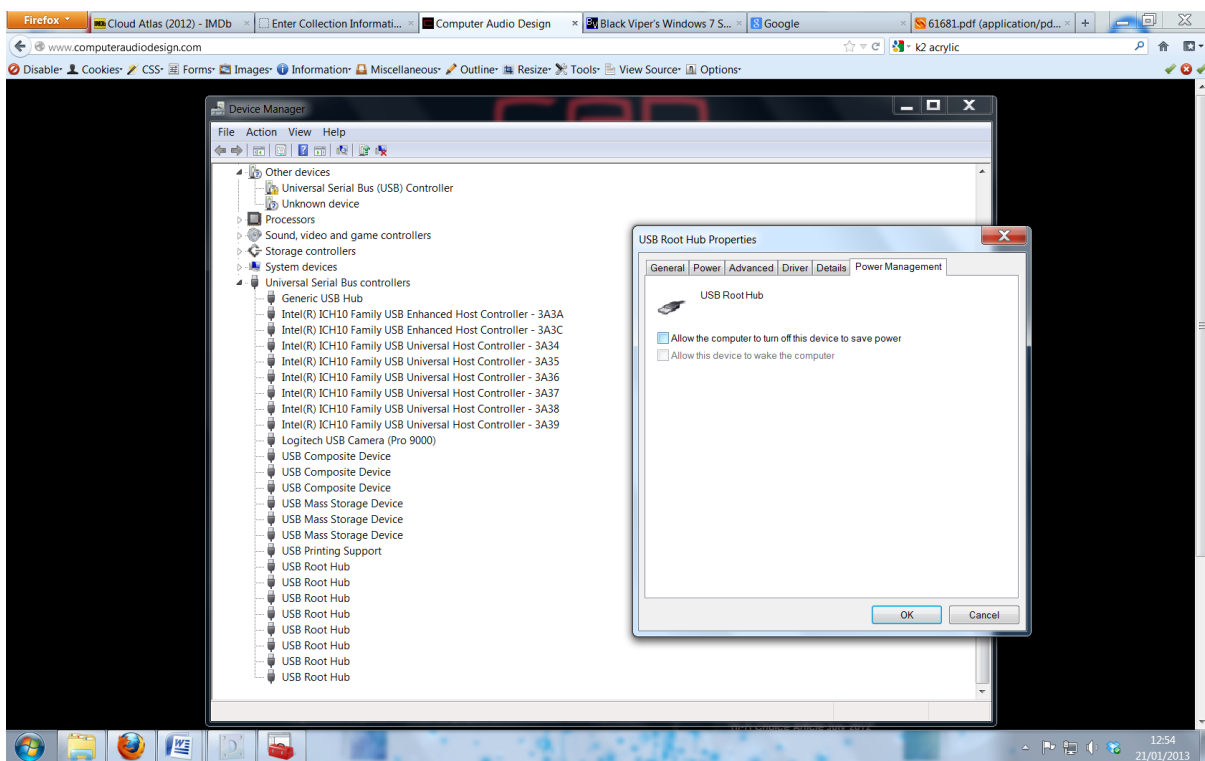
Go to Start Menu > Search programs and files > type: *Devmgmt.msc* then press "Enter."  
This loads the Device Manager.

Double-click on "Universal Serial Bus controllers".

Double-click on "USB Root Hub." You may have more than one "USB Root Hub" listed in the Device Manager.

Click on the "Power Management" tab.

Uncheck the box next to "Allow the computer to turn off this device to save power."

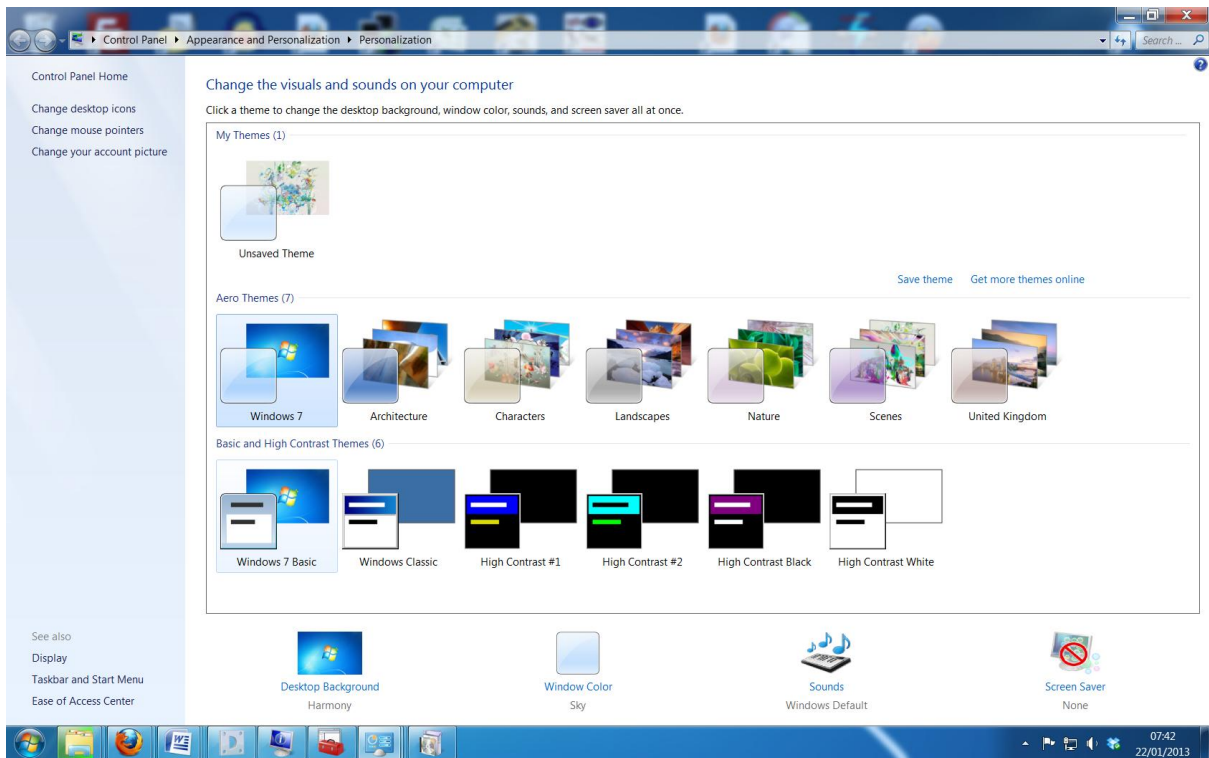


Push the "OK" button and close the "Device Manager."

Do this for each USB ROOT Hub you have.

## Turn Windows Aero Theme off

Right click on your desktop and click on: *Personalize* You should see this:



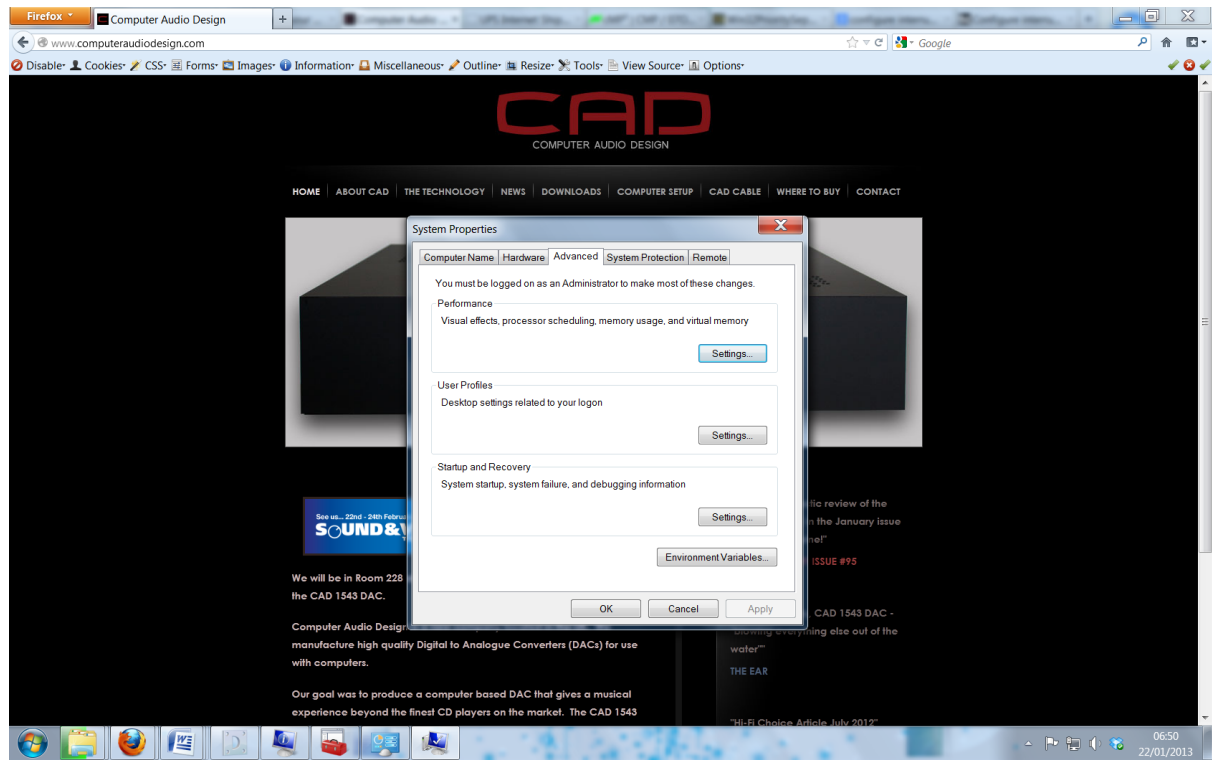
Double click on one of the Basic Themes

## Disable Paging file

This modification can possibly cause issues if your computer does not have very much RAM installed. With this modification your computer will crash if all the memory in your RAM is used. My suggestion is if you have less than 4GB of RAM to not do this modification.

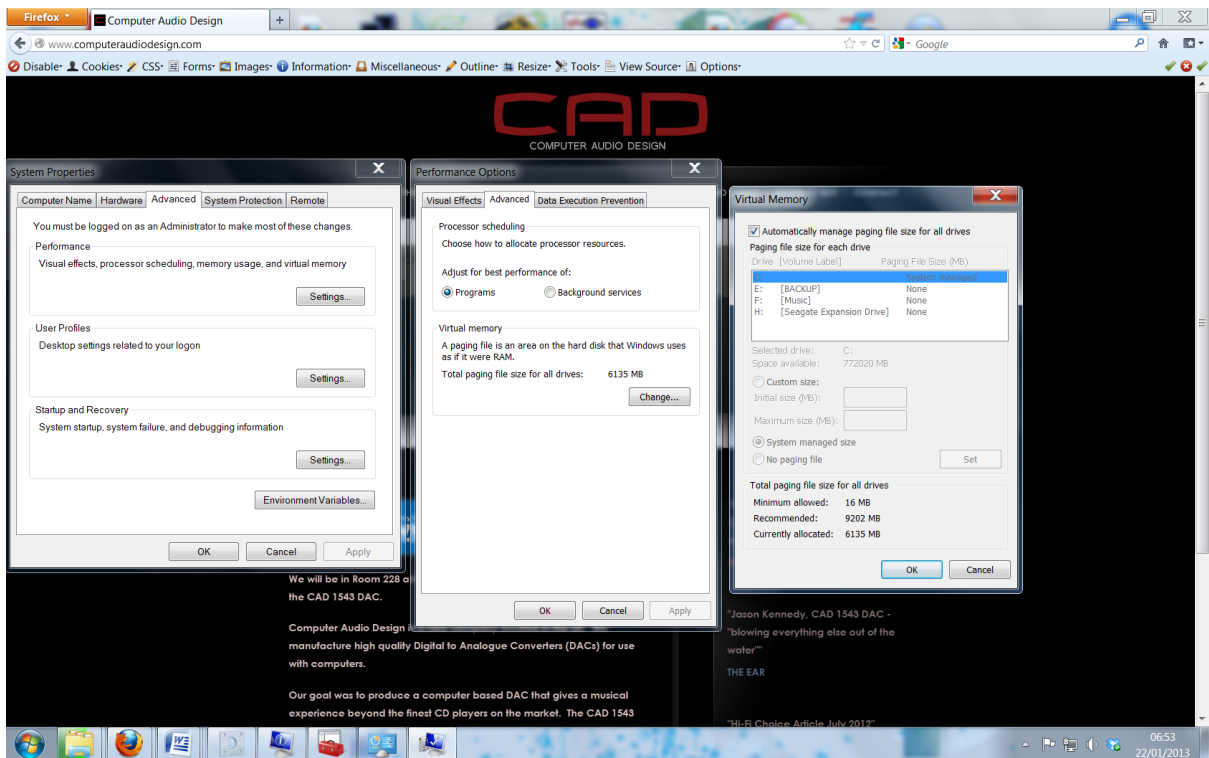
Go to: Control Panel --> Systems --> Advanced system settings --> Advanced tab

You should now see this:



Now go to: Performance --> Settings --> Performance Options --> Advanced tab --> Virtual Memory --> Change

You should now see this:



Now uncheck *Automatically manage paging file size for all drives* --> select system drive --> select *No paging File* You must then click on the *Set* button. You may get a warning that Windows will not be able to record errors. Hit OK. Do this for all drives.

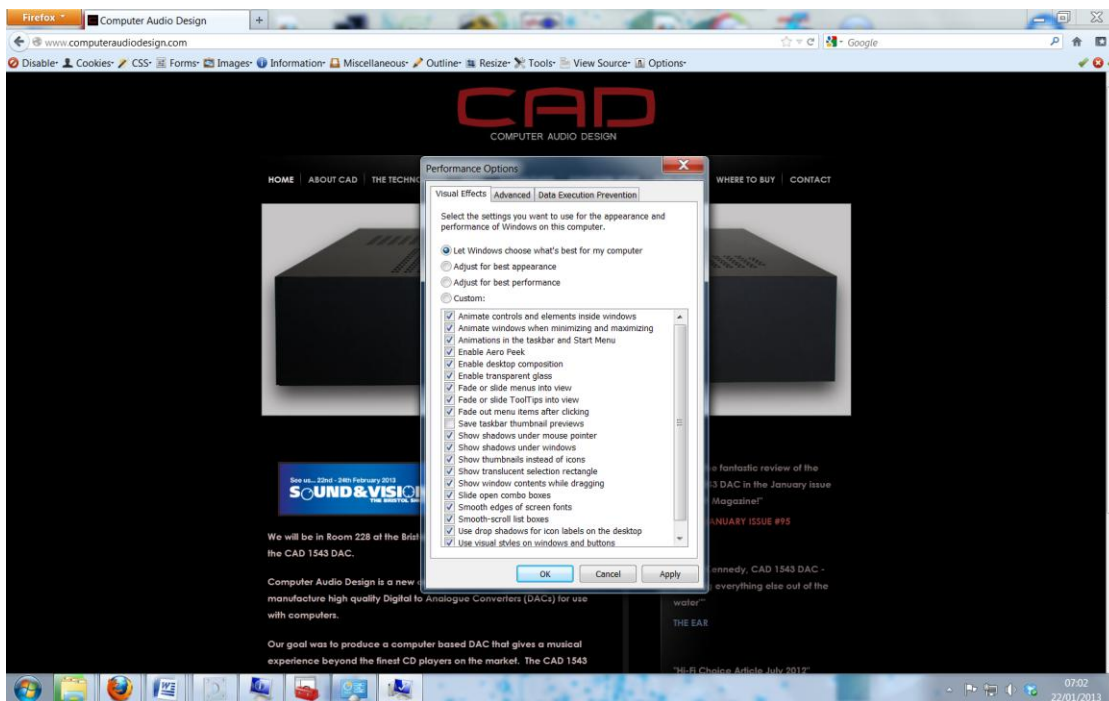
Click OK/Apply until you exit all windows. Restart computer.

If your computer starts to crash or has instability issues then I would enable the paging file once again. Using "Task Manger" check to see how much free memory you have.

## Disable Visual effects

Go to Start Menu > Search programs and files > type: *Adjust the appearance and Performance of Windows*

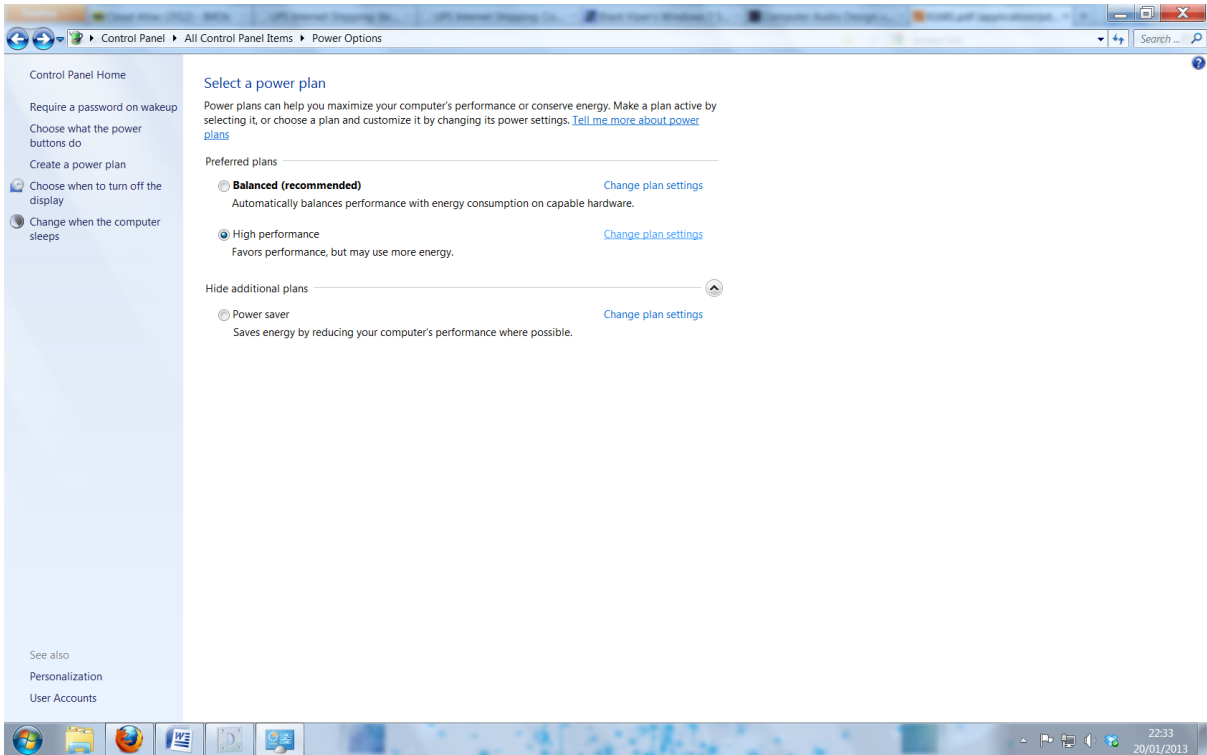
Open the *Visual Effects* window and you will see this:



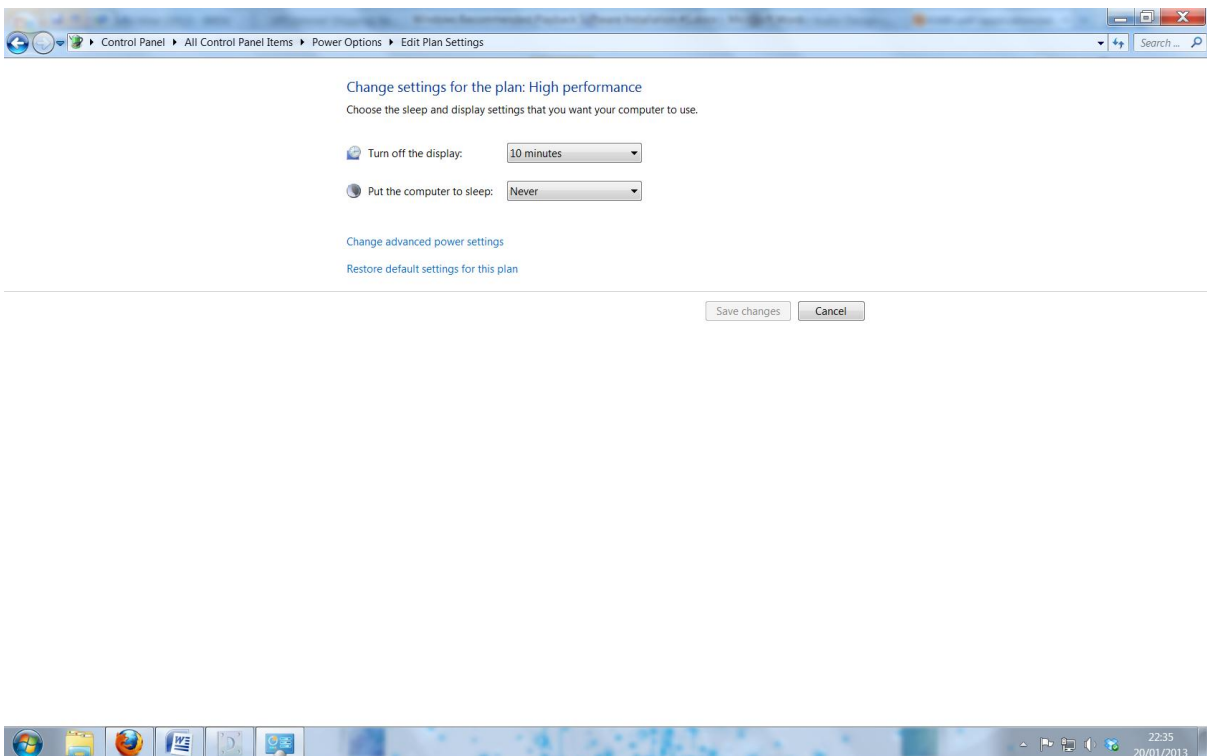
You can shut off visual effects here. Tick *Custom* and then uncheck all the boxes & hit OK.

## Power Options:

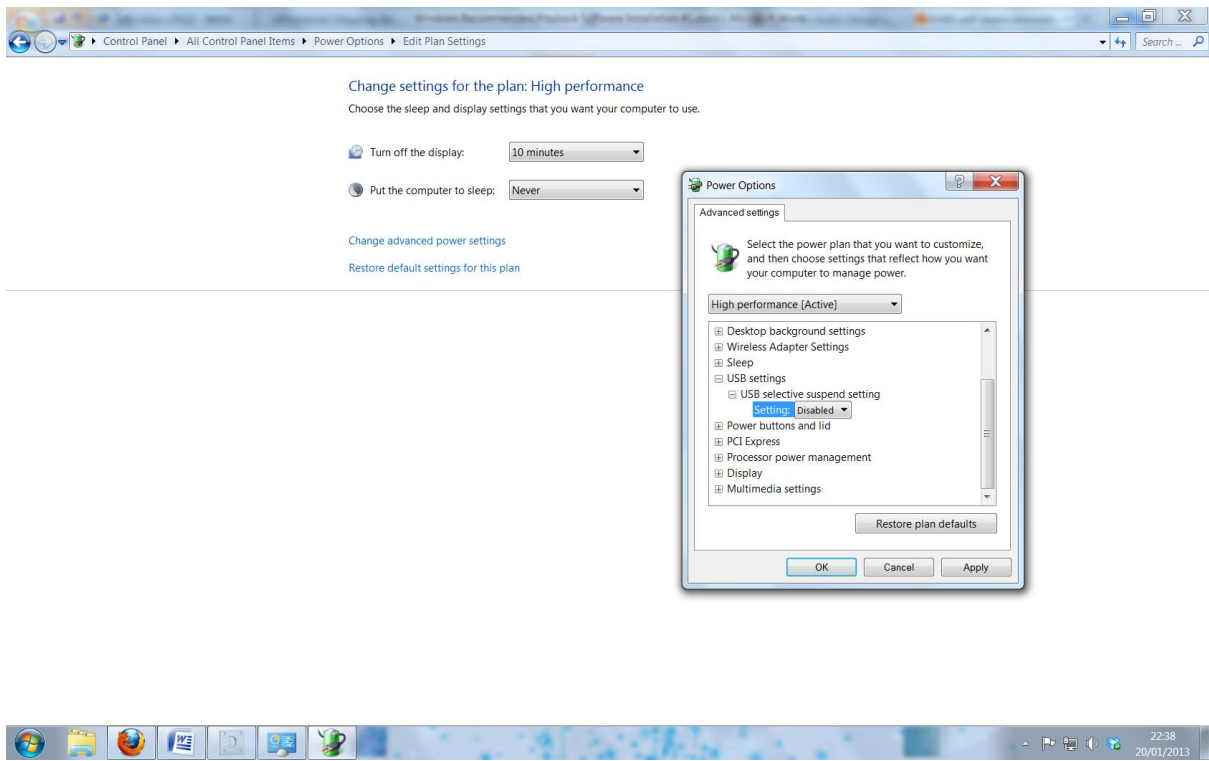
Go to Control panel --> Power Options :



Select "High performance" as your preferred plan."Now click on Change plan settings" to the right of "high performance" and you will see this:



Confirm that it says "High performance" and click on "Change advanced power settings":



There are quite a few options here but the 2 key ones are:

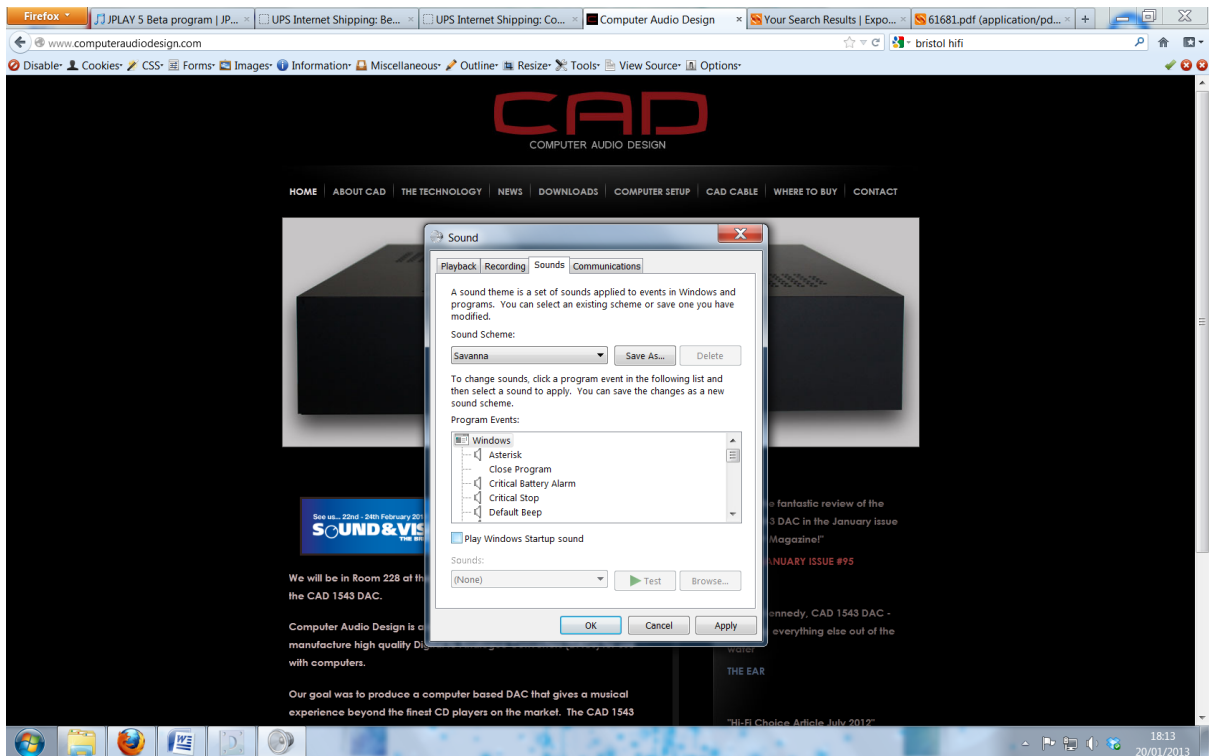
- 1) Disable USB selective suspend setting.
- 2) If you have a laptop you can also define the "Lid close Action" , i.e. what the computer will do when you shut the lid. I choose "nothing". This allows me to close the laptop and run it with my iPad.

### How to Shut off Windows Sounds:

OK, this does not improve sound quality. But don't you hate hearing all the Windows sounds coming out of your Hi-Fi? Here is how to stop that:

Go to Start Menu > Search programs and files > type *mmsys.cpl* and hit enter

Open "Sounds" window and you should see this:



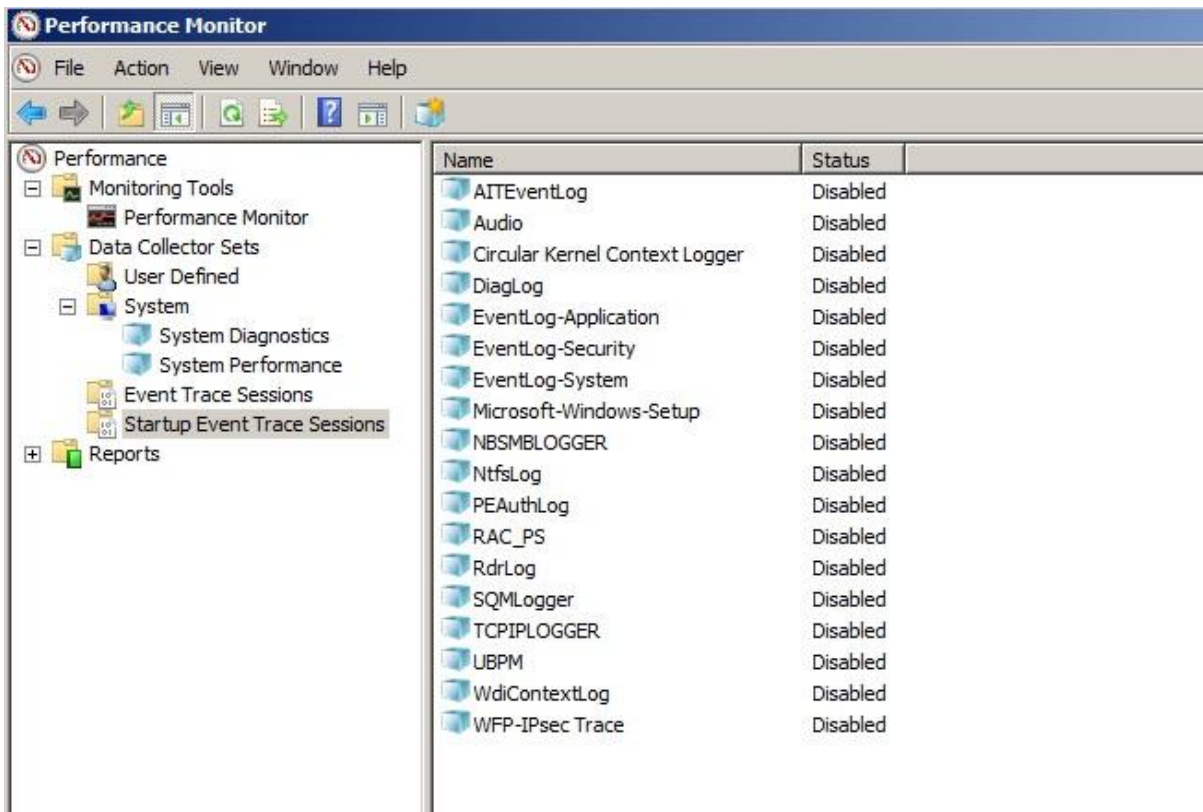
untick "play windows startup sound"

You can also go through the entire list. Just scroll through and hit the "Sounds" bar for each action and pick "none". You can shut off all sounds (which is what I do).

### Disable Trace Sessions:

Go to: Control Panel > Administrative Tools > Performance Monitor > Data Collector Sets > Startup Event Trace Sessions. Double click on every item on the list and go to Trace Session tab and untick 'Enabled' for each Trace Session on the list

This is how it should look when you are done:



## Enable DMA (Direct memory access) on each IDE channel

This is typically the default setting but it is a good idea to check.

Start Menu > Search programs and files > type: *Device Manager*

Expand the IDE ATA/ATAPI controllers category then double click on each one of the IDE channels.

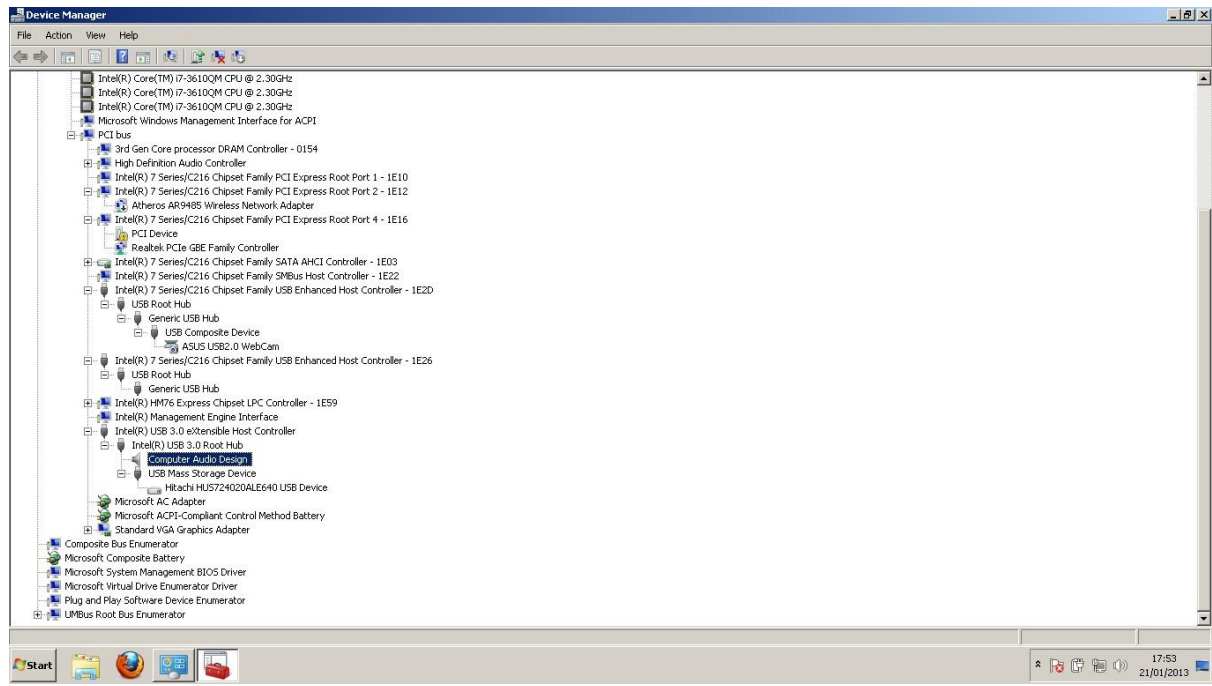
If there is an 'Advanced settings' tab, make sure the 'Enable DMA' box is ticked in device properties. Not all hardware has this option, so do not worry if it is not available.

## Which USB connector should I plug my DAC to?

You want to use the connector that has the minimum number of other devices on that bus - preferably none. To find this out plug in your USB DAC and go to:

Start Menu > Search programs and files > type: *Device Manager*

Double click on that and then go to: view --> devices by connection      You should see this:



Go through and open up ALL of the USB controllers under the *PCI BUS*. In this example you can see that the Computer Audio Design DAC is installed in the Intel(R) USB 3.0 eXtensible Host Controller. Unfortunately so is an Hitachi USB Device (an external hard drive).

But notice that 1st Intel(R) 7 Series USB Enhanced Controller has the Asus USB2.0 Webcam on it and the 2nd Intel(R) USB Enhanced Controller has nothing on it. By moving my DAC USB cable around I can *try* to use one of the other USB hosts. Unfortunately, with the computer in this example this was not possible.

If purchasing a computer to use with a USB DAC try to find one that also has a Thunderbolt or Firewire 800 connection to connect your external hard drive to.

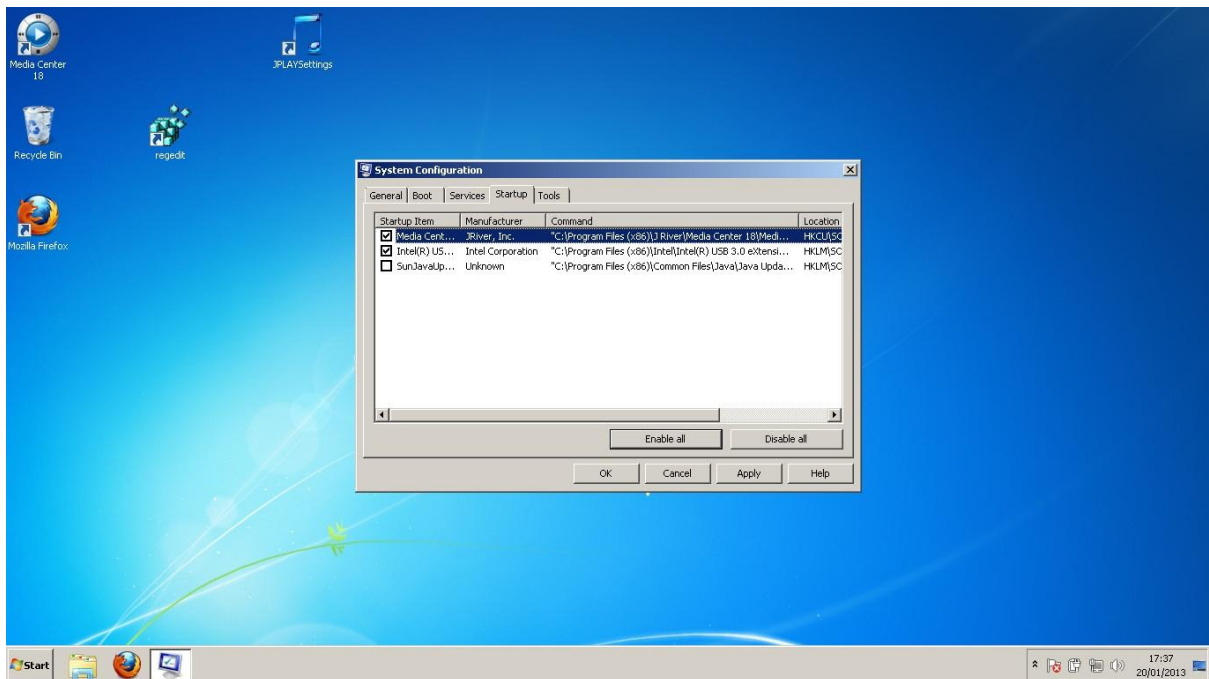
## Shutting down unnecessary software

Your computer has software that automatically starts up when it is turned on.

To stop these programs from running the best method is to uninstall them from your computer by going to Control Panel --> Programs / Uninstall a Program. This can be time consuming.

You can also go to Start Menu > Search programs and files > type: `msconfig`

This will launch System Configuration. Click on the "Startup" window and you will see something like this:



But I bet your computer has A LOT more programs showing than this! This is the "msconfig" results from one of our audio computers. The only 2 programs that run on startup are JRiver and a USB3.0 program. There is no check next to "SunJavaupdate" so it will not run on startup.

You can go through all your startup programs and uncheck the programs that are not necessary. You do this on your own responsibility! The good thing is that if you uncheck something and have a problem later on you can always come back and re-check it later. For an audio computer most programs on this list are typically not needed to run on startup.

### Shutting down unnecessary services

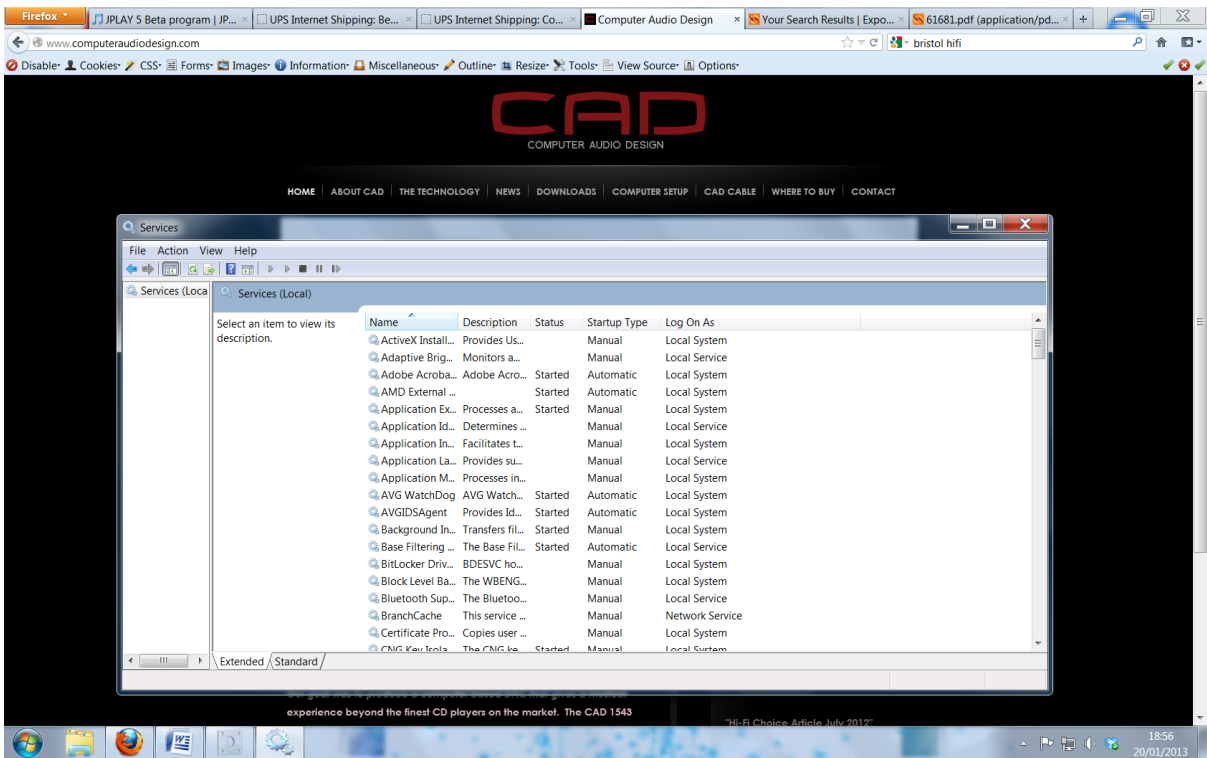
These are different than "programs" that startup automatically on boot up. Windows has a lot of processes running in the background that you probably know nothing about. Most of these are not needed for audio use and I (and many others) have found that stopping these unnecessary processes from running improves sound quality.

I have found this fellow who for calls himself Charles "Black Viper" Sparks... He has the best web site out there for understanding which processes can be shut off. There is a link on our website to Black Vipers website:

<http://www.computeraudiodesign.com/computer-setup>

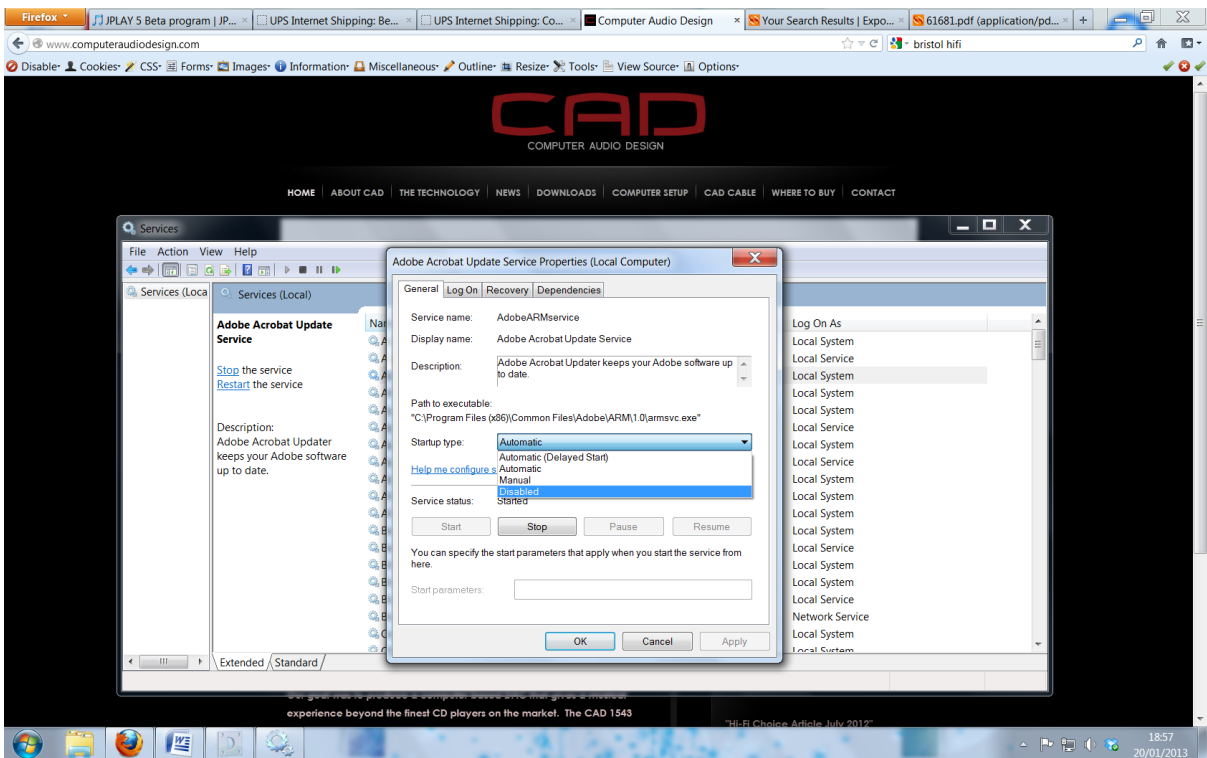
You do not use "msconfig" for this, you use the Services Management Snap-in

Go to : Start Menu > Search programs and files > type: *Services.msc* and you will see this:



Make sure you are on the "Extended" window.

In this next picture I have double clicked on Adobe Acrobat Update Service:



In the middle of the General tab you have "Startup Type". You can go into this and you have 4 options.

- 1) Automatic (delayed start)
- 2) Automatic
- 3) Manual
- 4) Disable

On the Black Viper web page he has gone through the most common processes and told you which ones to change and to what setting.

He has given you three different levels: Safe, Tweaked and Bare Bones. Bare bones shuts down all network and internet access - so beware!

He also gives "default" so if you change something you can always go check what it should be.

**PLEASE** before you do this set a restore point. If you have problems you can go back to your restore point and it will save you a great deal of time and frustration.

There are a lot of processes so this can take quite a bit of time.

One way to start the process is by only looking at the services where the status is: "Started".

I do not use wifi on my audio computer. I connect my computer to my wireless internet router with an Ethernet cable. All wifi connections are made through the router.

I wish to make my audio computer sound as good as possible, but I also want the following functions to work:

- Local Area Network connections
- Internet Access
- ability to save restore points
- ability to copy music to my audio computer over the local area network
- ability to use an iPad to control JRiver or any other playback software I wish

Here are the 15 processes that I leave "running" on my computer. These 15 processes allow the above functions to operate:

**COM+ Event System**

**DCOM Server Process Launcher**

**Desktop Window Manager Session Manager**

**Group Policy Client**

**JPLAY Audio Service**

**Media Center 18 Service**

## **Network Store Interface Service**

### **Plug and Play**

### **Power**

### **Remote Procedure Call (RPC)**

### **RPC Endpoint Mapper**

### **Shell Hardware Detection**

### **TCP/IP NetBIOS Helper**

### **User Profile Server**

### **Workstation**

On my computers these are the only services I have running. This may or may not be possible for you, but it is a starting point.

Now if you do not need internet and LAN connections you can disable a few more. But this setup gives most people what they need and a great sounding Hi Fi.

There are many other processes that that you will need to go into the registry editor to shut down. I will go into that in another section.

### **Win32Priority Separation parameter:**

Windows gives the illusion that it's doing things simultaneously, in real time. In reality, the CPUs are rapidly skipping from task to task using various time-slicing algorithms, making one think the processes are running in parallel. The choice of scheduling algorithm can be very important, especially for such time-critical operation as the audio playback.

The CPUs are allowed to spend finite chunks of time per process/thread. Adjusting the processor scheduling option has great impact on sound quality.

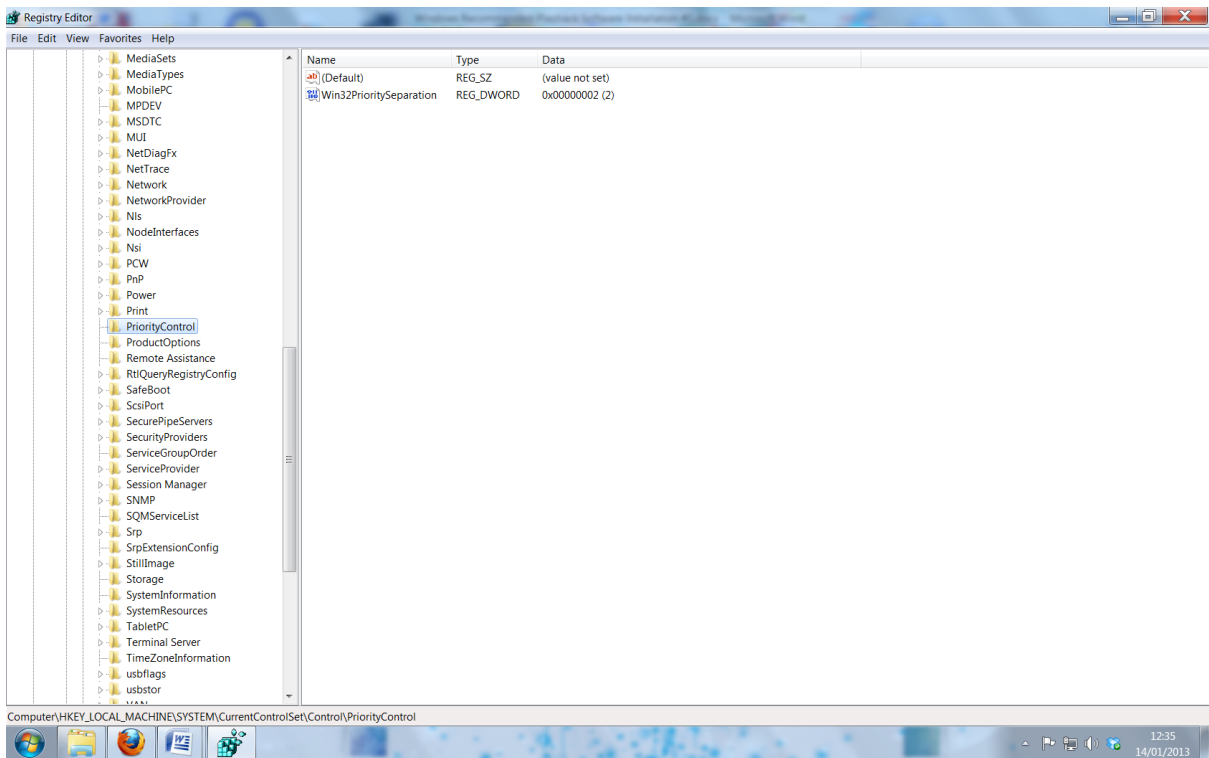
The people at JPLAY have tried many combinations and found that setting the Win32PrioritySeparation parameter to 0x14 (hexadecimal) gives optimal results. I have tried many different values and agree. You can of course try for yourself. You can change the value in registry by doing the following:

Go to Start Menu > Search programs and files > type: *regedit* then press "Enter." This loads the Registry Editor.

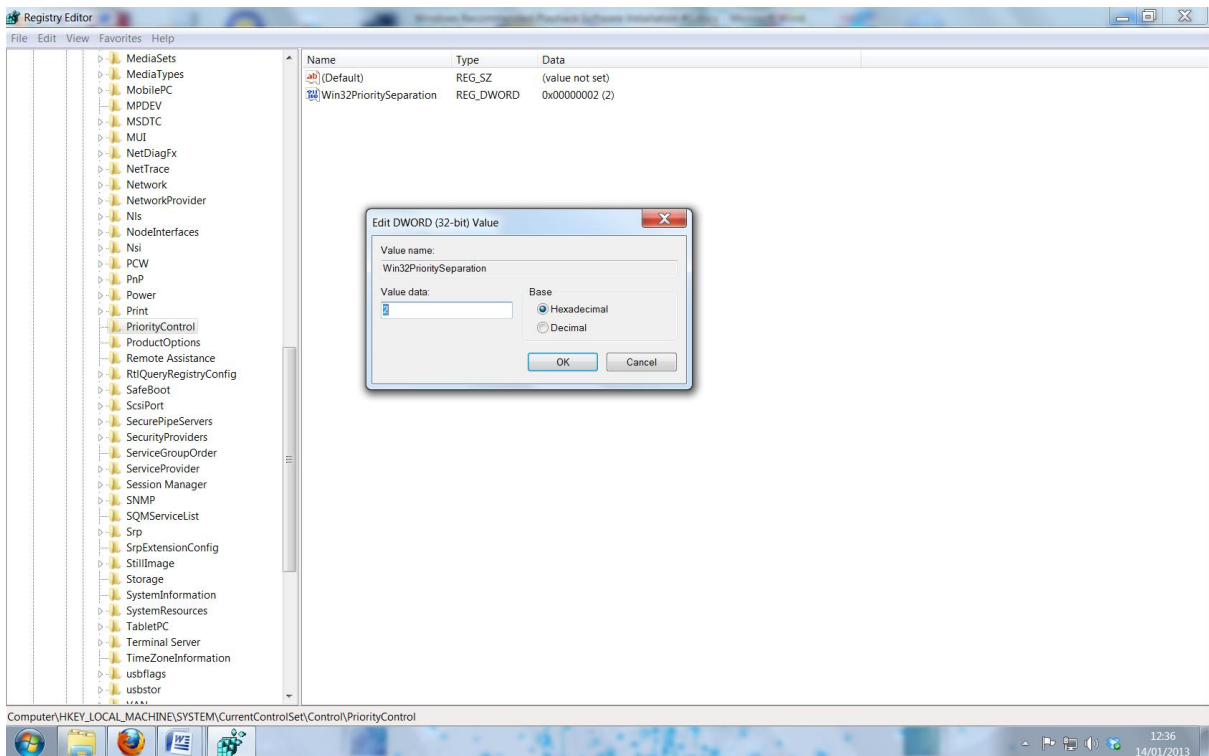
Go to:

HKEY\_LOCAL\_MACHINE\System\CurrentControlSet\Control\PriorityControl

It should look like this:

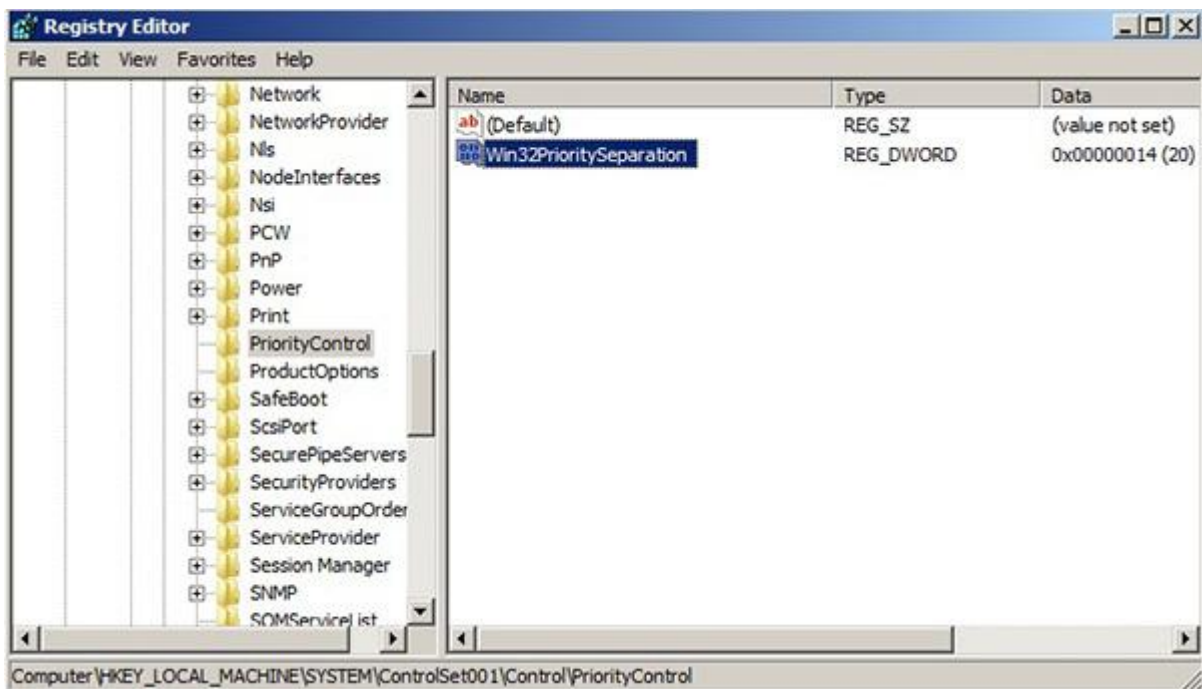


Now double click "Win32PrioritySeparation":



Now change the 2 to 14 and hit "OK". You of course can try can try other numbers.

It should now look like this:



Reboot the computer and give it a listen.

## IRQ Priority Settings

This is something that I first read about on the JPLAY forums. This is quite exotic so again **please** set a restore point before doing this!

IRQ stands for "Interrupt Request". Many of the processes on the Windows machines have different "priorities" for interrupt requests.

Microsoft determined which processes should have higher priorities than others. When they made these decisions I believe audio quality was not a consideration. :)

Well we can increase or decrease the priority of certain process by adding code to the registry.

The standard IRQs are (From Wikipedia):

- IRQ 0 — system timer
- IRQ 1 — [keyboard controller](#)
- IRQ 2 — cascaded signals from IRQs 8–15
- IRQ 3 — [serial port controller](#)
- IRQ 4 — serial port controller
- IRQ 5 — [LPT port 2](#) or [sound card](#);
- IRQ 6 — [floppy disk controller](#);
- IRQ 7 — [LPT port 1](#) or It is used for printers
- IRQ 8 — CMOS/Real Time Clock
- IRQ 9 — The Interrupt is left open for the use of peripherals
- IRQ 10 — The Interrupt is left open for the use of peripherals
- IRQ 11 — The Interrupt is left open for the use of peripherals
- IRQ 12 — [mouse](#) on [PS/2 connector](#)

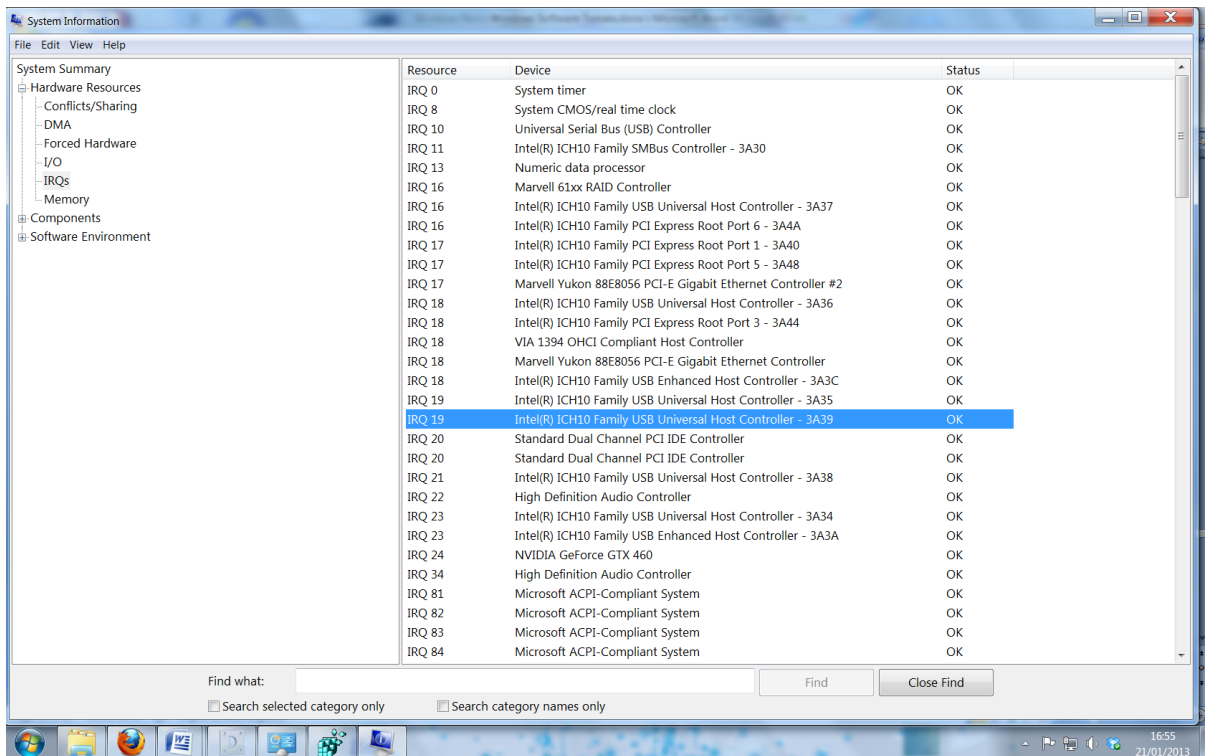
- IRQ 13 — CPU [co-processor](#) or integrated [floating point unit](#) or [inter-processor interrupt](#)
- IRQ 14 — primary [ATA](#) channel
- IRQ 15 — secondary [ATA](#) channel

If you are using a USB DAC I found it helps to increase the priority of the IRQ of your DAC. I also feel it helps to increase the priority of the System CMOS/real time clock. I also *think* that decreasing the priority of devices like the System Timer, Keyboard, Mouse & Numeric Data Processor help improve sound quality.

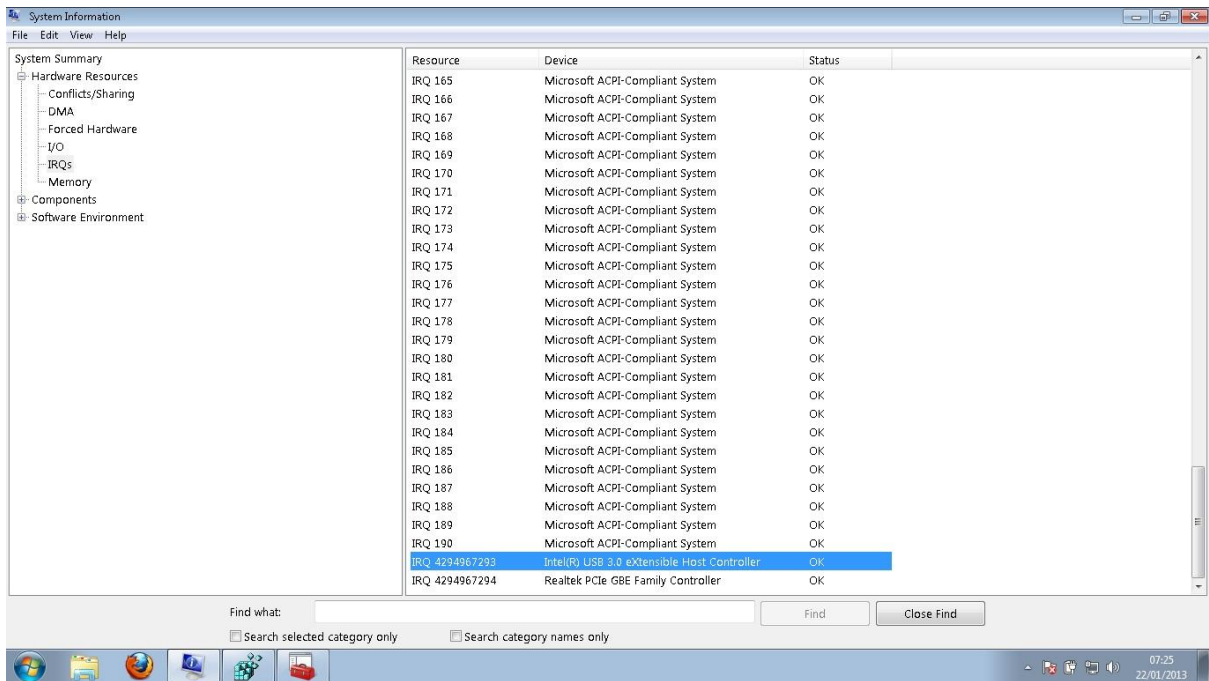
To find out what the IRQ of your USB DAC is you need to do exactly what you did for "Which USB connector should I plug my DAC to?" If you look at the screen shot in that section you will see the name of the controller that the "Computer Audio Design" driver is associated with. It is the "Intel(R) USB 3.0 eXtensible Host Controller".

To find out what that IRQ number for that is do the following:

Go to : Start Menu > Search programs and files > type: *System Information* Hit enter and go to Hardware Resources --> IRQs and you will see this:



If I scroll down to the bottom I see:



Second to the bottom I see my "Intel(R) USB 3.0 eXtensible Host Controller" with an IRQ of 4294967293. I want to make that IRQ number top priority. Your IRQ number will be something completely different, but if you follow this process you should be able to find it.

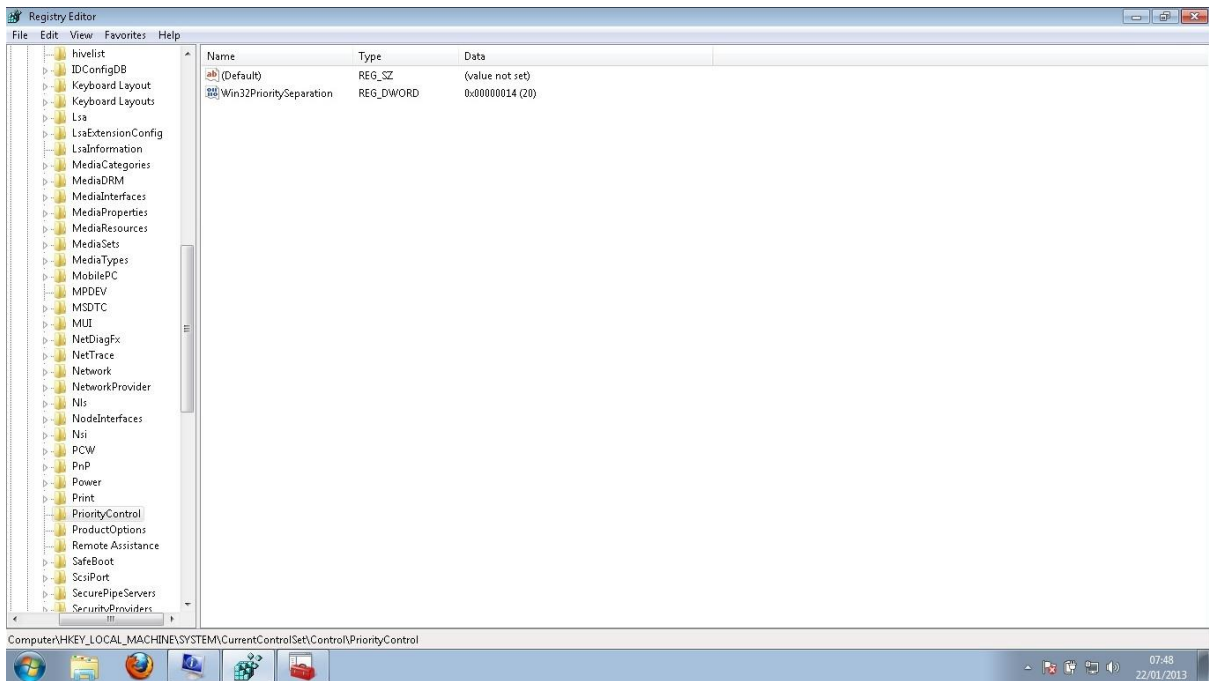
To increase or decrease the priorities of IRQs I must go to the exact same location in the registry as I did for "Win32Priority Separation parameter" in the last section.

Go to Start Menu > Search programs and files > type: *regedit* then press "Enter." This loads the Registry Editor.

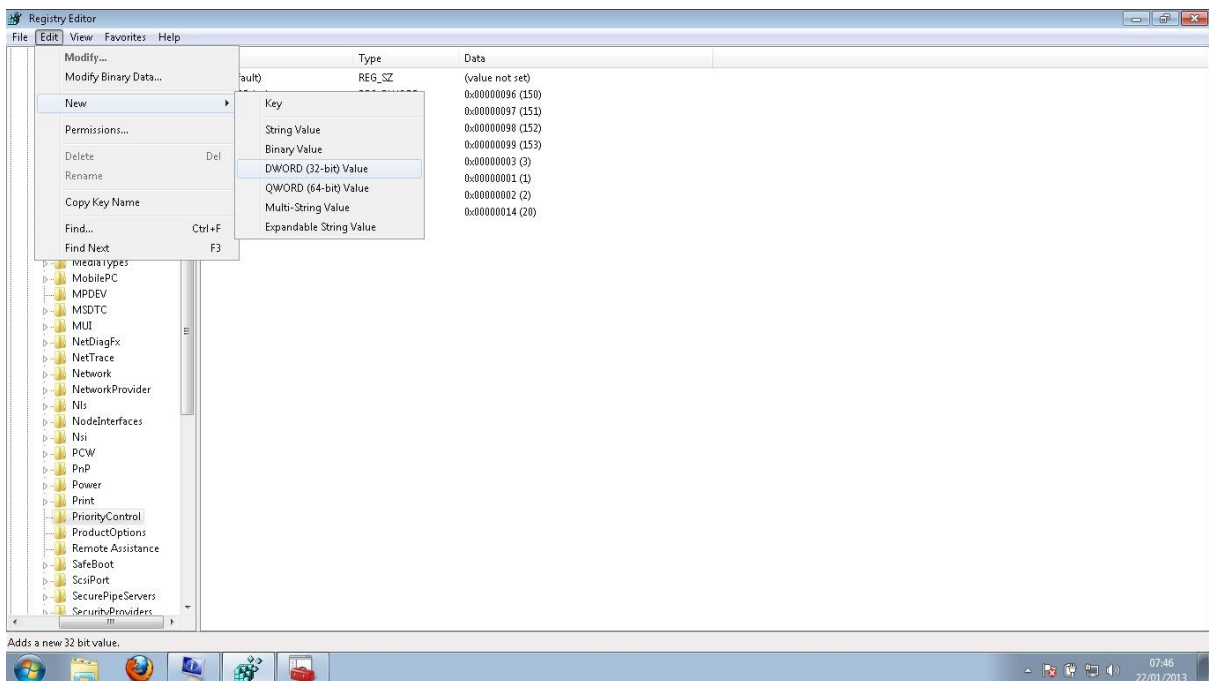
Go to:

HKEY\_LOCAL\_MACHINE\System\CurrentControlSet\Control\PriorityControl

It should look like this:



Now we need to add the IRQs to the registry. To do that click on: Edit --> New --> *DWORD (32-bit) Value*

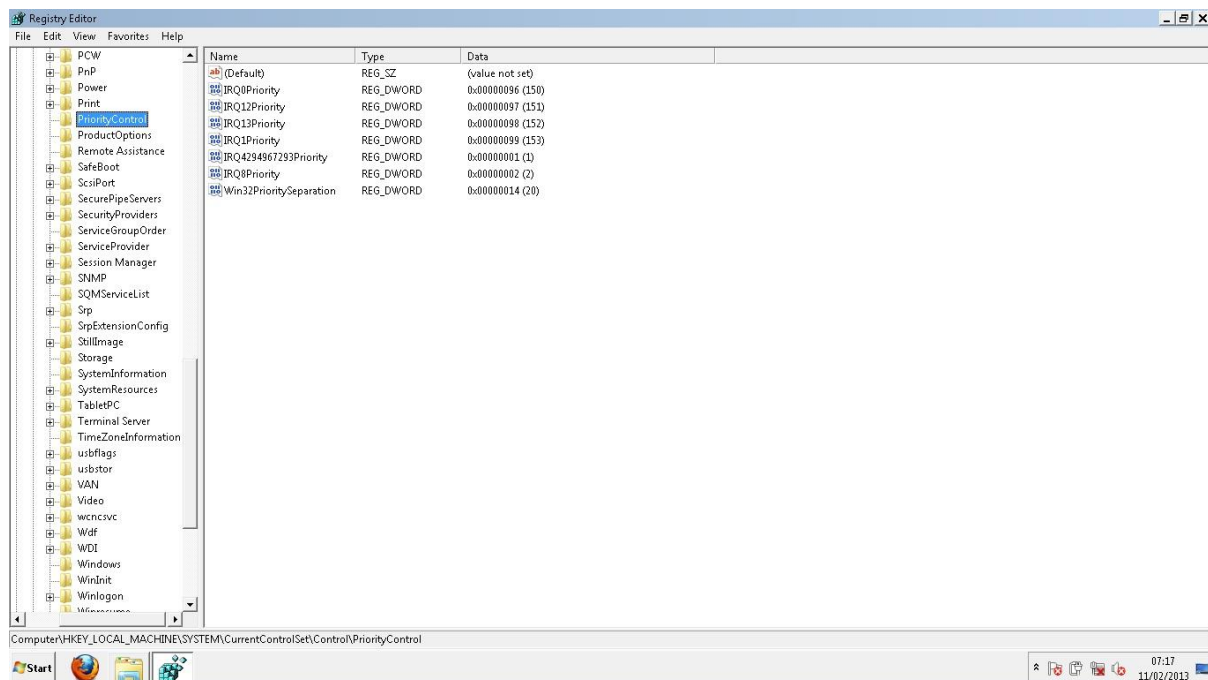


You then type in the following: IRQ#####Priority

Where ##### is the IRQ number you are working on. Once that is done you can double click and change the Priority level just as you changed the level in "Win32Priority Separation parameter" in the last section.

You are not suppose to use the same Priority level twice. 1 being the highest and 99 being the lowest. I have set my IRQ for the CAD 1543 DAC to Priority 1 and System CMOS/Real Time clock to Priority 2. I have set System Timer to Priority level 96, Mouse to Priority Level 97, Numeric Data Processor to Priority level 98 and Keyboard to Priority level 99.

It now looks like this:



You can go in and Edit --> Delete the new additions at any time.

Reboot and listen!

## Shutting down additional processes & drivers using the registry editor

There are many additional processes running in the background that can also be shut off, but we need to edit what is called the *registry* for that.

This section is not for the faint hearted! It is long! (19 pages...) My guess is that most of you out there will skip this section. But for those of you who really like to tweak....

As many things in this paper this is not without its risks! But if you follow my advice you can reduce the risks to quite a low level. In this section I recommend a list of process to shut down that I have verified do not cause the dreaded "Blue Screen of Death" (BSOD) in my computers. You will see many processes in your registry that I do not mention. Every computer has different processes depending on the hardware of the computer. I have tried to mention the ones that are the most common. A note of warning - you will see processes in your registry that I do not mention and you may be tempted to disable them. **Never ever** do this without knowing EXACTLY what the process is. You can get your computer into a state that it will not boot up....

Because of this I recommend creating a system image of your computer and a restore disk as mentioned at the beginning.

I have disabled the background services so that the following is possible:

- Local Area Network connections
- Internet Access

- ability to save restore points
- ability to copy music to my audio computer over the local area network
- ability to use an iPad to control JRiver or any other playback software I wish

I do not use wi-fi on my computers so I have shut that down. I use an Ethernet connection to my wireless router which communicates with my iPad. I also do not print from my audio computer so I have shut that down.

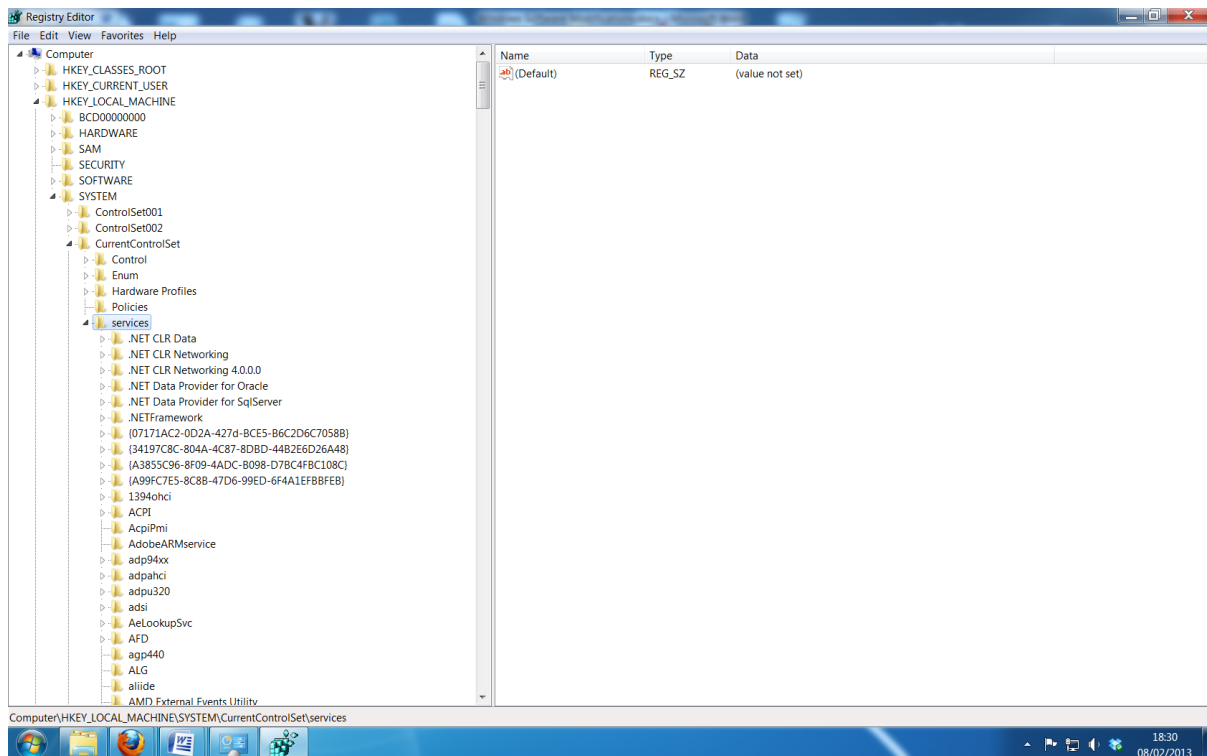
If you want something different than the above you will have to make different choices on which services can be disabled.

To shut background services down you must run the registry editor:

Go to : Start Menu > Search programs and files > type: *regedit.exe*

Now go to: HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services

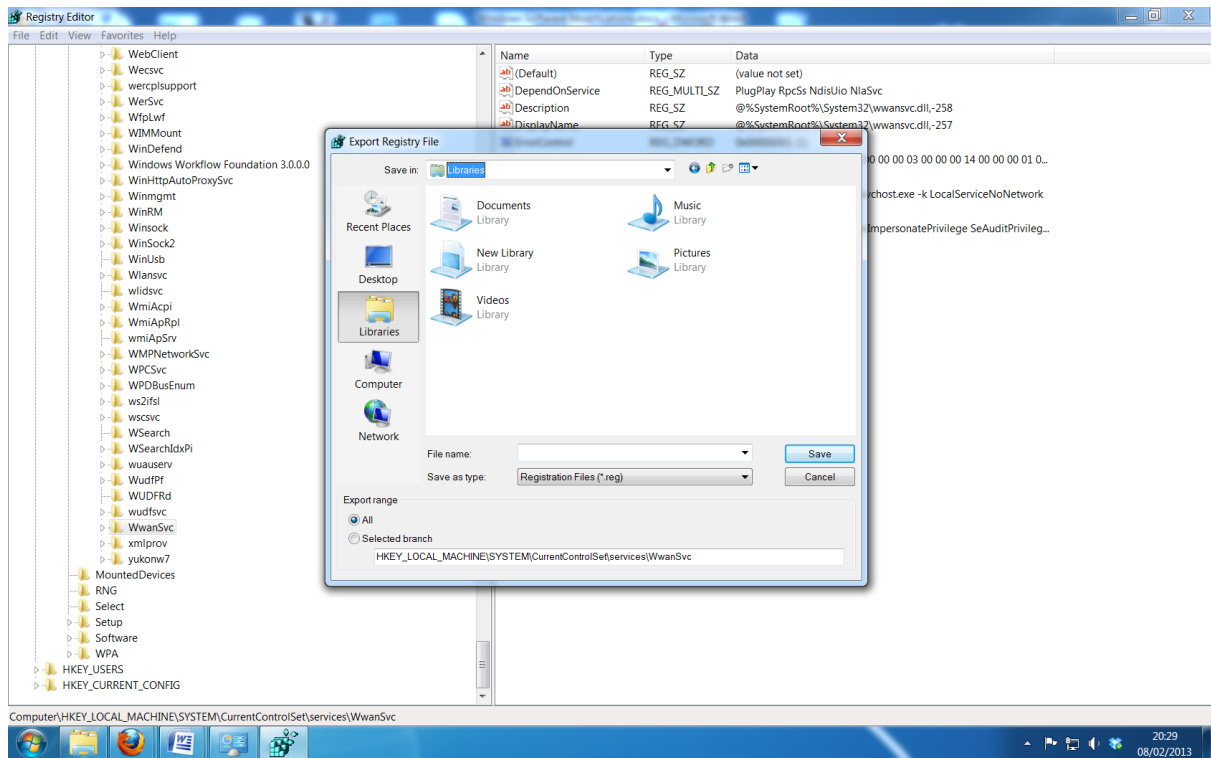
It should look something like this:



The first thing you want to do is make a copy of your current registry. You can do this by going to:

File --> Export...

You should see this:

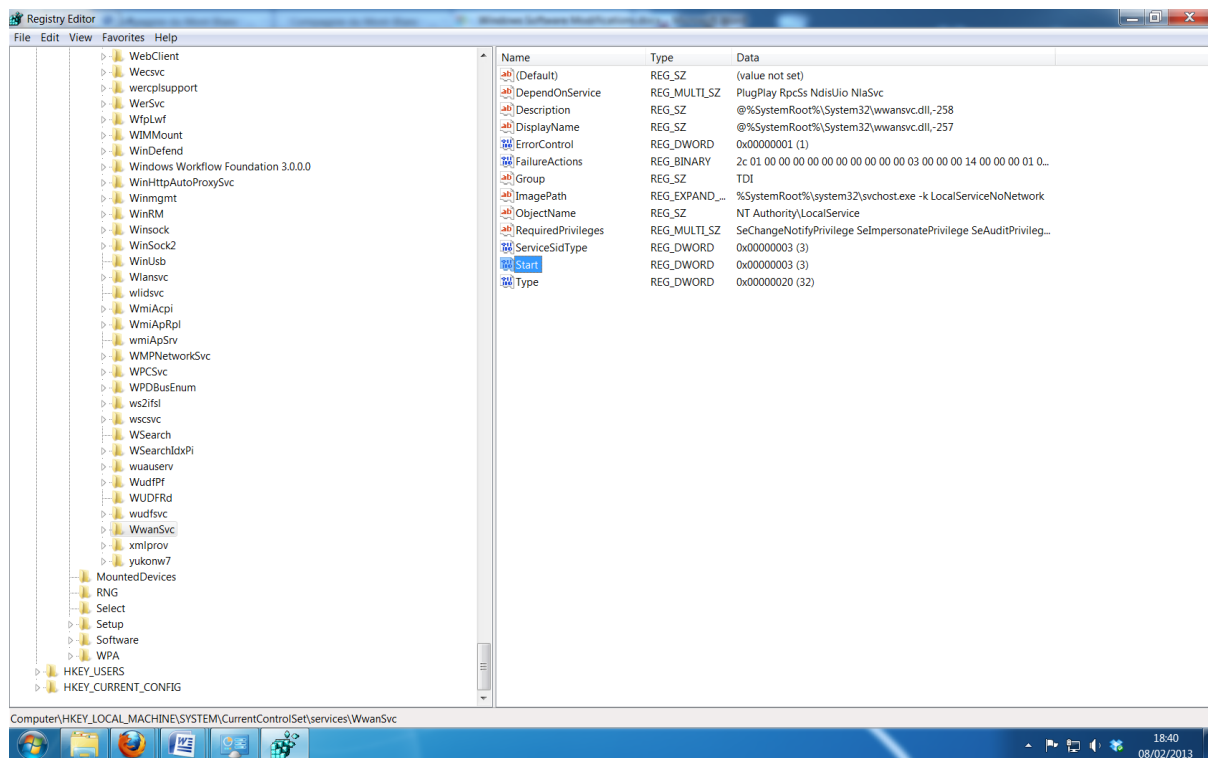


It is **CRUCIAL** that at the bottom under *Export Range* you highlight *All*. *Selected Branch* will only save the line you are on! Save this to an external drive and keep it safe. In case anything happens you can always *Import* the saved file and get your registry back to what you started with.

Now scroll down to the bottom of the *services* to:

HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\WwanSvc

You should see this:



If you look in the right hand side you will see a list of various commands.

The second one from the bottom (highlighted in blue) is called:

**Start      REG\_DWORD 0x00000003 (3)**

This line describes the process by which this service will start.

Services are labelled in the registry with five **Start** numbers: 0, 1, 2, 3 and 4

Numbers 0, 1, 2 mean that the service will start automatically on boot up.

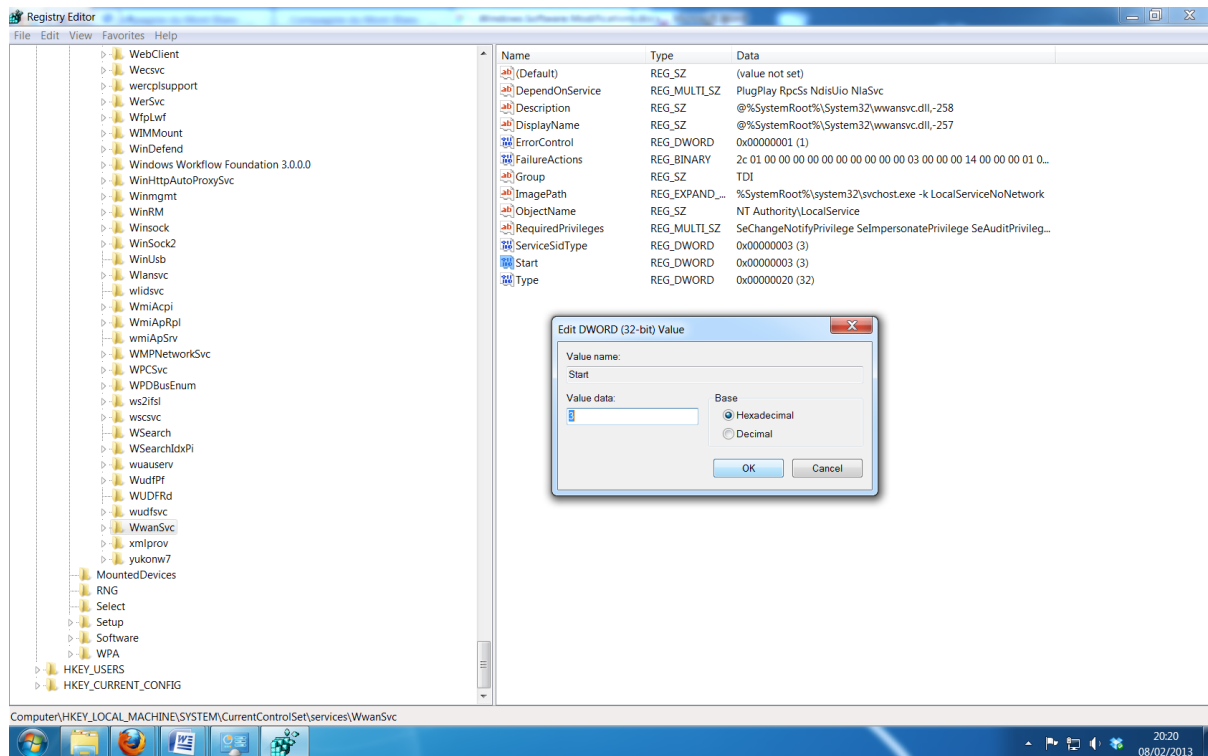
The number 3 means that the service is available, but needs to be started by some other manual input from the user and/or other processes.

The number 4 means that the service is disabled and can never be started.

You can read more about this at:

<http://support.microsoft.com/kb/103000>

We can change this **Start** number to 4 by double clicking on the line, you will see this:



You can then change the number 3 to 4 and click OK.

This now means that the *WwanSvc* service will no longer be able to run - it has been disabled.

We can go through all the services we wish and change the **Start** value to 4 to disable the service. I have found that reducing the services that you do not require for audio use helps improve sound quality.

I will now go through services that I have found can be disabled, (by changing the **Start** value to 4) and still give the functionality described above.

You have just disabled

HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\WwanSvc

This service manages mobile broadband (GSM & CDMA) data card/embedded module adapters and connections by auto-configuring the networks. We do not need this so let's leave it disabled.

In all the following services the **Start** mode is equal to 3 unless I say otherwise.

Now go to:

HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\wudfsvc]

This is part of the Windows Driver Foundation - User-mode Driver Framework Service. I have had no problems disabling it.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\WUDFRd]

This is also part of the Windows Driver Foundation - User-mode Driver Framework Service. I have had no problems disabling it.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\WudfPf]

This is a User-Mode Driver Framework (UMDF) for Windows XP.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\WIMMount]

A tool to mount *wim* images.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Wanarpv6]

This has a Start = dword:00000001

Related with Wanarp.sys driver which is related to the MS Remote Access and Routing ARP Driver.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\WANARP]

MS Remote Access and Routing ARP Driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\vwifibus]

Intel Wireless LAN Driver

HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\ VWiFiflt]

This has a Start = dword:00000001

Intel Wireless LAN Driver

HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\ VWifimp]

Wifi Driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\vhdmf]

Virtual Hard Disk driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\vdrvroot]

"Start"=dword:00000000

Microsoft Virtual Drive Enumerator Driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\usbprint]

Microsoft USB PRINTER driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\usbcir]

Infrared Receiver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\UmPass]

Microsoft UMPass Driver. This is the Microsoft Universal Machine Pass-Through (UMPass) driver.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\umbus]

Related with UmPass above...

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\uliagpkx]

Uli AGP Bus Filter. This is the Uli Accelerated Graphics Port (AGP) Bus Filter driver.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\uagp35]

Microsoft AGPv3.5 Filter. The Universal Accelerated Graphics Port driver.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\tssecsrv]

This is the Terminal services Security Filter driver. Filters are optional driver components.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\TermDD]

"Start"=dword:00000001

Terminal Device Driver. This is responsible for component Remote Desktop Server Driver.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\TDTCP]

This Driver is related with the Terminal Device Driver above.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\tcpipreg]

TCP/IP Registry Compatibility

"Start"=dword:00000002

This provides compatibility for legacy applications which interact with TCP/IP through the registry.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\TCPIP6]

The driver for (IPv6). IPv6 is short for "Internet Protocol Version 6". IPv6 is the "next generation" protocol designed by the [IETF](#) to replace the current version Internet Protocol, IP Version 4 ("IPv4"). 99% of us are still just using IPv4.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Tcpip\ServiceProvider]

This is a bit different. We cannot change the Start value but here are the standard settings:

"Class"=dword:00000008

"DnsPriority"=dword:000007d0

"HostsPriority"=dword:000001f4

"LocalPriority"=dword:000001f3

"Name"="TCP/IP"

"NetbtPriority"=dword:000007d1

Lots of information on internet about this and I set mine to:

"Class"=dword:00000008

"DnsPriority"=dword:00008000  
"HostsPriority"=dword:00008000  
"LocalPriority"=dword:00008000  
"NetbtPriority"=dword:00008000

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\stexstor]

SCSI Storport driver

This is storage port driver that is especially suitable for use with high-performance buses, such as fibre channel buses, and RAID adapters. If you are using a Raid adaptor you may not want to disable this.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Spooler]

"Start"=dword:00000002  
Print Spooler

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\SiSRaid4]

A Raid driver, if not using raid do not need.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\SiSRaid2]

A Raid driver, if not using raid do not need

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\sfloppy]

High-Capacity Floppy Disk Drive Driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\sffp\_sd]

SFF Storage Protocol Driver for SDBus

SD Card Driver, so if you are not have a SD card reader that you want to use...

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\sffp\_mmc]

SFF Storage Protocol Driver for MMC

Multimedia Card Driver, so if you are not have a multimedia card reader that you want to use...

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\sffdisk]

SFF Storage Class Driver

Small Form Factor Disk Driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\sermouse]

Serial Mouse Driver

If you have a USB mouse or track pad you do not need it

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Serial]

Serial Port Driver

In modern personal computers the serial port has largely been replaced by USB, Firewire, eSata & Thunderbolt for connections to peripheral devices. Serial connections are very rare now a days.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Serenum]

Serenum Filter Driver

Serenum is a Plug and Play upper-level device filter from February 28, 1995

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\secdrv]

Security Driver

"Start"=dword:00000002

This driver is used by games which use Macrovision SafeDisc. The driver validates the authenticity of games that are protected with SafeDisc and prohibits unauthorized copies of such games to play on Windows.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\scfilter]

A driver for Smart card readers

HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\Schedule

"Start"=dword:00000002

This is the Task Manager

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RDPWD]

Remote Desktop Services

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RDPPREFMP]

"Start"=dword:00000001

Remote Desktop Services

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RDPPDR]

Remote Desktop Services

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RDPPENCDD]

"Start"=dword:00000001

Remote Desktop Services

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RDPPCDD]

"Start"=dword:00000001

Remote Desktop Services

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\rdpbus]

Remote Desktop Device Redirector Bus Driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RasSstp]

RAS Sstp Miniport Call Manager

Rassstp is the Remote Access Service (RAS) Secure Socket Tunnelling Protocol miniport call manager. It deals with remote networks and VNC networks.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RasPppoe]

Is part of the Remote Access Connection protocol.

By using PPPoE, users can virtually "dial" from one machine to another over an Ethernet network, establish a point to point connection between them and then securely transport data packets over the connection.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RasMan]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RasAuto]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Rasl2tp]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RasAgileVpn]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\RasAcad]

These five *Ras* processes are all for supporting Routing and Remote Access. You can disable all five of them.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\QWAVE]

For streaming multimedia and real-time content

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\QWAVEdrv]

For streaming multimedia and real-time content

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\ql2300]

Accelerates Oracle and Microsoft SQL Server Performance

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\ql40xx]

Accelerates Oracle and Microsoft SQL Server Performance

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\PptpMiniport]

For VPN`s.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\PEAUTH]

"Start"=dword:00000002

Needed for windows media player, to play Digital Rights management (DRM) protected content.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\pcmcia]

The PCMCIA (Personal Computer Memory Card International Association) slot is a special expansion slot that is rarely used today.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Parport]

Related with the parallel ports.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\nvstor]

This is a video storage driver. Be careful with this one. I think it is for NVIDIA cards. So check this before disabling.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Null]

"Start"=dword:00000001

Null Device Driver. The Null Device Driver component works in the Unix environment by accepting I/O request packets and returning them to the caller.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\nfrd960]

This is a IBM ServeRAID Controller Driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\NdisTapi]

NdisTapi is a Remote Access NDIS WAN Driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Ndisuio]

This is a driver for wireless things such as wi-fi and bluetooth.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\NdisWan]

NdisWan allows Windows' Dial-Up Networking to connect to an Internet service provider over ISDN. Moreover, Microsoft Remote Access Services (RAS) can be used with all its integrated features, including PPP Multilink (channel bundling), data compression, call-back, PAP and CHAP.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\NDProxy]

If you use Windows Internet Explorer shutting down this process can cause issues. So best not to! I use Firefox so I shut it down.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\NativeWifiP]

The Native Wifi automatic configuration component configures, connects to, and disconnects from wireless networks. As I mentioned I do not use wi-fi.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\MSTEE]

Was required for the Microsoft® Windows 98® platform to enable the connection of two drivers that each supported only incoming IRPs.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\MSPQM]

This is part of the for the Microsoft Streaming Quality Manager Proxy driver component.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\MSKSSRV]

This is part of the for the Microsoft Streaming Quality Manager Proxy driver component

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\MSPCLOCK]

This is part of the for the Microsoft Streaming Quality Manager Proxy driver component

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\mshidkmdf]

This driver supports the Touch and multi-touch features in Windows 7.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\msdsm]

Microsoft Device Specific Module used for connecting to a Storage Network

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\MRxDAV]

WebDAV Mini-Redirector allows computer-users to edit and manage files collaboratively on remote web servers.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Modem]

I use my Ethernet connection to a router, so I did not need this

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\MegaSR]

For high speed connection to internal server storage arrays

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\luafv]

"Start"=dword:00000002

Redirects file operations from protected locations to locations in the user's path.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\LSI\_FC]

LSI Fusion-MPT FC Miniport Driver meets the Microsoft specification for miniport drivers. These drivers allow connection of Fibre Channel including disk drives, CD-ROMs, and tape drives.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\LSI\_SAS]

Related to LSI\_FC

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\LSI\_SAS2]

Related to LSI\_FC

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\LSI\_SCSI]

Related to LSI\_FC

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\lldio]

"Start"=dword:00000002

Link Layer Topology Discovery (LLTD) protocol.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\iScsiPrt]

iScsiPort Driver The iSCSI Initiator

This is the Internet Small Computer System Interface, an Internet Protocol (IP)-based storage networking standard for linking data storage facilities. By carrying SCSI commands over IP networks, iSCSI is used to facilitate data transfers over intranets and to manage storage over long distances.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\IRENUM]

Deals with the Infra-Red.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\IpFilterDriver]

I was able to disable it without any problems

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\IPMIDRV]

This driver enables you to control and diagnose remote server hardware through BMCs when the operating system is not running or deployed.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\iirsp]

Intel RAID support Driver. I am not using Raid so I disabled this. If you have a Raid setup do not disable this.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\intelide]

Driver for early Intel Processors. If you have an older Intel processor check to see if this is driver is needed before disabling it.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\hcv85cir]

Hauppauge Consumer Infrared Receiver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\HidBatt]

HID UPS Battery Driver. I do not have this so I disabled it.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\HidBth]

Microsoft Bluetooth HID Miniport. I do not use bluetooth.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\HidIr]

Microsoft Infrared HID Driver. I do not use Infrared.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\gagp30kx]

Microsoft Generic AGPv3.0 Filter for K8 Processor Platforms. I do not need it.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\fdc]

Floppy Disk Controller Driver. I do not need it.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Filetrace]

Responsible for component File Trace Filter Driver in Windows systems like Windows 7 Professional Edition 64-bit. I do not need it.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\flpydisk]

Floppy Disk Driver.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\FsDepends]

Needed when you try to create a virtual machine in Hyper-V Manager in Windows

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\elxstor]

A driver file from company Emulex belonging to product Emulex LightPulse Storport Miniport Driver.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\ErrDev]

Microsoft Hardware Error Device Driver Allows the Device Manager to reported an error code.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\DfsC]

Distributed File System (DFS) Namespace Client Driver. Allows the administrator to select shared folders to present in the namespace, designs the hierarchy in which those folders appear, and determines the names that the shared folders show in the namespace. Used in large organisations.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\drmkaud]

Microsoft Trusted Audio Drivers. I use the CAD 1543 Driver so I do not need this.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\DXGKrn]

Longhorn Display Driver Model .Controls the underlying video driver stacks to provide fully-featured display capabilities. You may need this, I did not.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\circlass]

Consumer IR Devices

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\BrFiltLo]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\BrFiltUp]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Brserid]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\BrSerWdm]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\BrUsbMdm]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\BrUsbSer]

These six drivers are for Brother devices. I do not need them.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\BTHMODEM]

Bluetooth Serial Communications Driver.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\b57nd60a]

Broadcom NetXtreme Gigabit Ethernet Driver. I have another Ethernet driver so I did not need this.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\b06bdrv]

Broadcom NetXtreme II VBD Ethernet card driver. I have another Ethernet driver so I did not need this.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\AcpiPmi]

The ACPI PMI is provided by using the ACPI 4.0 Power Metering objects. These ACPI objects provide an abstraction layer to the underlying technology, such as the Intelligent Platform Management Interface (IPMI), which is used for power metering and budgeting by the hardware platform. I do not need this.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\adpu320]

Adaptec .NET Ultra320 Driver. I do not need this.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\AmdK8]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\AmdPPM]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\amdsata]

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\amdsbs]

These four AMD drivers are for computers that use a AMD processor. My computer shall have Intel processors.

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\AsyncMac]

MS Remote Access serial network driver

[HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\services\Beep

"Start"=dword:00000002

I do not need sounds coming out of my computer.

Whew! Now after all that hard work save a copy of your "tweaked" registry.

Repeat the process you did at the beginning of this section. In the registry editor choose File --> Export..., etc.

Reboot and listen!