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1. PC, heat, and noise

As you could experience (and may be this is the reason why you're reading this text ...), working on a noisy PC does not really let you efficient and comfortable.

More, if you use your PC as a Fax and/or a BBS, and if you have to let it switched on all day, moving components (fan and disk) get worn, you use a lot of power, and you probably have to store your PC in a dedicated room ...

Various hardware and software techniques may help you solving this problem. This document aims to presenting a list of such techniques, along with addresses on where to buy the hardware, where hardware is involved.

2. Overall view

Basically, the components in the noise and heat problem are :

- The boards and circuitry, that produce heat but no noise
- The disk, that produces heat and noise
- The fan, that cools the PC, but produces noise

Let's see what can be done on these components to reduce both heat and noise (and power consumption):

3. Hardware side

3.1 Regulating the fans

Various solutions may be proposed :

- **Use a specifically designed PC cabinet**. Decock Electronique (4 rue Colbert, 59800 Lille - France, Tel: +33 2012-8888, Fax: +33 2012-8899) proposes a Medium-tower PC cabinet for this. Here's a descriptive : "Medium tower cabinet, 230 W, Silent DCK PC 907 TM. Entirely metallic cabinet with 3 digits (999) digital display, 220V 50Hz integrated power supply, new temperature/electronic regulation system with two fans, making the cabinet totally silent, when the temperature is normal...". Price : FF 899. Note : This product won't work for our US friends because of the difference in AC power supplies, but I guess similar products will be easily found in the US ...

- **Use regulated power supplies**. I could see regulated power supplies (brand : Antec) on the MicroWare House catalog (1720 Oak Street, PO Box 3014, Lakewood, NJ 08701-3014, USA, CompuServe: 70007,1340, GO MCW, Fax : +1 (908) 370 8198). Here's a descriptive : "The Electronic Climate Control (ECC) Circuit thermostatically regulates the speed of the fan, and keeps the computer up to 40% cooler at peak performance ...". Price : between $ 66,95 and $ 149,95 depending on the model. Notes : 1 - for owners of "brand" PC's : their power supplies are not standard, and the only solution remains the one at the following paragraph. 2 - I could not see the product on the last MicroWare House catalog ...

- **Use a kit that plugs into any power supplies**. NTMI, from Gap, France (Tel : +33 9252-6770, Fax : +33 9253-2188), proposes a kit to regulate the fan speed. This kit includes a small blue box that you plug between the fan and its supply (12V), and temperature sensors. The price is approximately FF 2000 ($ 400 US). I bought this product and I am very happy with it. My PC is now totally silent ... Besides this, I think NTMI is about to sell a software solution for processing IDE

drives, but I think that their solution will do the very same thing that GreenIDE does ...

- **Build your own regulation system**. This seems to be cheap and easy : you will find (for Instance, by RadioSpares, rue Norman King, BP 453, 60031 Beauvais Cedex - France, Tel: +33 7879-4555, Fax: +33 7879-4566) variable-speeded fans, Variofan Pabst: 80 x 80 mm, thickness: 25 mm, reference: 28-2896F, feeder 12V, price: FF 377,10. A CTN Murata 100K varistance is also required, reference: 90-20891G, price: FF 37,90 for 5. To quote Daniel Toussaint (Fidonet: 2:320/204.11) : "The connecting up is also simple, the fan black and red wires between the plus and the ground, the CTN between the green wire and the ground. I fixed the sensor between the pentium radiator and the small fan that surmounts it. The fan speed varies between 1150 turns/mn at 30 °C and 2300 turns/mn at 50°C. The fan noise goes from 22dB to 40dB. The difference is very audible."

3.2 Get the fan out of the PC

This method has been described by Cliff Brown, in the file xfan.txt, on the CompuServe Forum "PC Hardware" (GO IBMNET).

It consists in **isolating the fan from the PC cabinet**, by getting the fan out of the power supply, and inserting a flexible pipe the PC cabinet and the fan (see the text xfan.txt for a detailed description).

This method is <u>very efficient</u> at the vibration level, but does not cancel the wind noise that results from the fan activity. Other drawback : your PC resembles an elephant ...

You will find the required hardware in any do-it-yourself centre with a "bathroom and various fans" section... -> flexible pipe made of aluminium or rubber, plastic joint to tie fan and pipe together, paste, electric wire ... The cost is very low ...

As a variant, you could unplug the fan in the power supply and use an external fan using feeded on AC... This fan is more powerfull and turns more slowly. It is also more silent.

3.3. Cabinet

The choice of the cabinet is also important : the implementation of boards and peripherals must not be harmful to good convection and air circulation. The components must not be too close to each other, and the cabinet should not be too small ... It should not be too large either, as a big cabinet will have a tendency to resonate ... I recently exchanged my initial mini-tower for a medium-tower that allowed me to better space out the components (and which was much better suitable for a Pentium PCI motherboard).

4. Software side

4.1 IDE drives

The success of notebooks quickly led PC designers to search for techniques affording power savings : green processor (SL), and for what concerns us, IDE drives spinning down after a timer delay.

This feature, now present in near all IDE drives, is commonly used in notebooks BIOS, but desktop BIOSes generally don't use it.

Hence the usefulness of a Windows 3.1 program able to use this feature on IDE drives. That's what GreenIDE does. Compared to a BIOS solution, the advantage is that you can launch and stop the program as you want, to match your instant needs.

4.2 Using APM (Advanced Power Management)

A second technique came out of an Intel and Microsoft joint development effort : the APM - Advanced Power Management - (last version, V1.1, was specified in september, 1993). As its name stands for, the APM handles the PC power consumption. It concerns not only the IDE drives, but the other components of the PC as well : processor, motherboard, add-on boards.

Technically, the APM is a programmatic interface that comes between the BIOS and the operating system. Power savings are realized by the motherboard, in permanent negociation with the operating system. In this respect, Dos, Windows 3.1x, and Windows95 include functions for this management.

However, the APM is not implemented in all BIOSes (the specification is relatively recent), and, when it is implemented in the BIOS of desktop PCs, it is generally not activated. To activate it, proceed as follows :

- First, ckeck the availability of the APM in your BIOS ... For this, just search the option in the setup of your machine. If you can't find it, your BIOS and/or harware won't probably handle the APM. May be a more up-to-date version of your BIOS will fix the problem, but this is not sure ... The better will probably be to check with the reseller of your machine or motherboard.

- If you find the option, you only have to activate it ... As each motherboard has its own setup, I can't tell you much more ... One thing however : don't forget to specify the inactivity timer before entering power saving mode, else your PC will never enter power saving mode ... You will also probably have options to specify which components in your PC will use power saving mode (disks, display, ...).

- Then you have to activate the APM at the operating system level. For DOS 6.2 and higher, you just have to include the following line in your config.sys file : DEVICE=C:\DOS\POWER.EXE. For more details, please type HELP POWER at the DOS prompt level. However, if you use Windows exclusively, using the APM at the DOS level will make less sense ... as Windows includes its own APM functions for this and deactivates the DOS APM features when starting up.

4.3 Installing APM on a Windows system

- First, check if the APM is already installed on your system. If yes, a "Power" icon will be present in the Control Panel. If no, the simplest is probably to reinstall Windows, selecting "MS-DOS System with APM" as system type. For details, or for installing the APM without reinstalling Windows, refer to the file WIN31A.ZIP, that you can find on the CompuServe forum MS Windows SDK (GO WINSDK).

- After installation, a new icon "Power" appears in the Control Panel. You can then switch the APM on by double clicking this icon and choosing "Advanced" in the "Power Management" list. After this, you should observe that your system enters power saving mode after the specified timer delay -> the screen goes dark, the disk spins down. If you press a key, move the mouse, or if a call is received on your modem, the system returns to normal mode ...