

How To Perform a BIOS Upgrade

Gabriel Torres
(Hardware Secrets)

Introduction

Sometimes, especially when upgrading your PC, you may need to perform a BIOS upgrade in order to update your system to accept a new hardware part or to fix a bug. For the average Joe, this procedure is quite obscure. In this tutorial we will give step-by-step procedures on how to upgrade your system BIOS.

What is BIOS anyway? BIOS is a program stored inside the ROM memory of your motherboard. There are three programs stored there: BIOS, setup and POST. As they are physically stored in the same memory chip, the majority of users call setup and POST as "BIOS", even though this is wrong, as they are three distinct programs. BIOS (Basic Input/Output System) teaches the system processor on how to deal with basic things, like how to access the hard disk drive and how to write text on screen. POST (Power On Self Test) is executed whenever you turn your PC on in order to test your system. It is in charge of that memory counting that happens every time you turn your PC on. And setup is that program that you call by pressing Del during POST (i.e. during memory counting) that is used to configure your motherboard.

So "BIOS upgrade" really means an upgrade on the programs stored on the motherboard ROM memory. Even though the procedure name is "BIOS upgrade", you actually upgrade all three programs (BIOS, POST and setup).

The way to update the motherboard ROM depends on the type of memory chip used in your PC. There are two types of ROM chips used in PCs, Mask-ROM (only on very old motherboards and that cannot be updated by software) and Flash-ROM (on almost all motherboards, which is able to be updated by software). In this tutorial we will cover Flash-ROM.

If you have a very old motherboard (manufactured more than 10 years ago) that uses a Mask-ROM chip BIOS upgrade is only possible by replacing the chip with a new one containing the latest BIOS version. This chip can be bought on the motherboard manufacturer's web site or at <http://www.unicore.com>.

On Figures 1 and 2 you see the most common physical aspect of the motherboard ROM chip, where BIOS is stored. The packaging found on Figure 1 is called DIP (Dual In-Line Package) and is used on older motherboards, while the packaging found on Figure 2 is called PLCC (Plastic Leaded Chip Carrier) and is used by current motherboards.

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Figure 1: The BIOS chip. This kind of chip is called DIP (Dual In-Line Package)

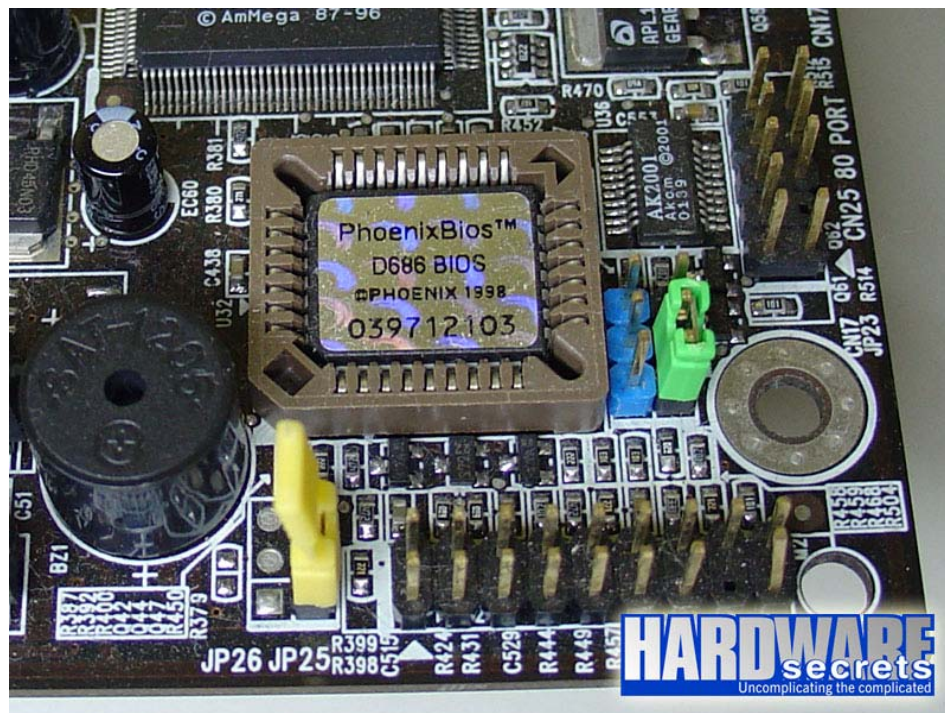


Figure 2: Another kind of BIOS chip, used by current motherboards. This kind of chip is called PLCC (Plastic Leaded Chip Carrier)

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In order to upgrade your computer BIOS, you need to know three basic things about your PC: the motherboard manufacturer, the motherboard model and the BIOS manufacturer.

If you don't know what is your motherboard manufacturer and model, please follow the procedures describe in our How to Find Out Your Motherboard Manufacturer and Model tutorial.

Knowing your motherboard manufacturer and model, you need to go to the download section of the manufacturer website in order to download the BIOS file. Click here to see a complete list of motherboard manufacturers and links to their BIOS download page.

Two files are usually needed. The BIOS contents – usually a .bin or .rom file – and the program to record the BIOS contents inside the ROM chip, i.e. the programmer (if your motherboard has a built-in programmer you won't need it. More on this later). Both are available on the BIOS download section of the motherboard manufacturer website.

You will also need to know the BIOS manufacturer, i.e. which company wrote the BIOS code. There are three major players: AMI (American Megatrends, Inc), Phoenix and Award. This information is important to know, as you need to use programming software compatible with your BIOS. An AMI programmer won't work with Phoenix BIOS and vice-versa. As Phoenix has bought Award, programmers for Phoenix BIOS will work with Award BIOS.

One way to know the BIOS manufacturer is taking a look on the ROM chip; usually the BIOS manufacturer puts a sticker on it. Take a look on Figure 2 and you will see that Phoenix was the company that wrote the BIOS code for that motherboard.

Another way is paying attention when you turn on your PC, as the BIOS manufacturer name appears every time you turn it on. If you can't see it, press the Pause key right after turning your PC on. On Figure 3 we give an example, where the BIOS was manufactured by Phoenix.

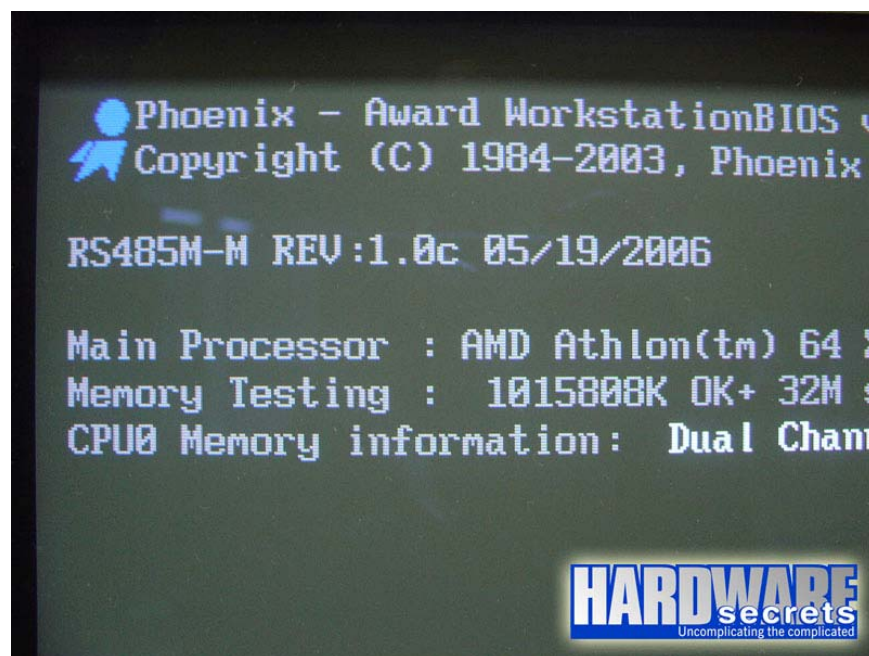


Figure 3: Manufacturer logo and name during POST

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Entering setup by pressing Del during memory counting is another option as the BIOS manufacturer name appears on the screen header or on its footer. On Figure 4 you see an example, where the BIOS was manufactured by Award (as mentioned before, Phoenix programming software will work just fine here).

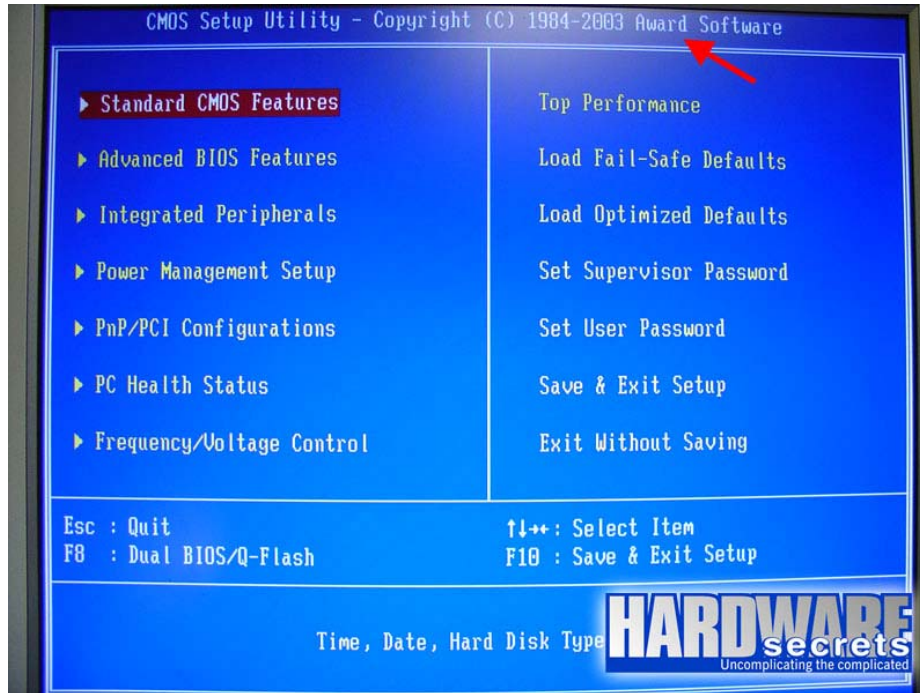


Figure 4: Manufacturer name inside setup

Now that you have already downloaded the BIOS file and the corresponding programmer from the motherboard manufacturer download page, it is time to upgrade your system BIOS. Don't forget to uncompress (unzip) the files you've downloaded.

There are four ways to perform a BIOS upgrade:

- Replacing the ROM chip with a new chip containing the update software (the most complicated one for the regular user, so we won't cover this option).
- Upgrading the BIOS using a program embedded on your motherboard (easiest and thus preferred way). Not all motherboards provide this option.
- Upgrading the BIOS using a Windows-based programmer.
- Upgrading the BIOS using a DOS-based programmer.

As mentioned above, the easiest way is to use the programmer embedded on the motherboard. Not all motherboards provide this feature. If yours have it, you won't need to run any extra program, as the programmer is called by pressing a key during POST (i.e. right after you turn your PC on). On next page we will show you how to detect if your motherboard has this feature and how to use it to upgrade your BIOS.

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Motherboard Embedded BIOS Programmer

Now that you know the basics, it is time to check whether your motherboard has an embedded BIOS programmer or not. If it does you should use it, as it is the easiest and quickest way to upgrade your system BIOS.

During POST (i.e. memory counting right after you turn on your PC), press the Pause key. See if there is a message telling you to press a key to enter the BIOS programmer. The problem here is that the BIOS programmer name varies a lot, depending on the motherboard manufacturer. AWFLASH, QBIOS, QFLASH, EZFLASH and FLASH UTILITY are some of the names you may find.

As you can see on Figure 5, this motherboard has this feature, and you can load the BIOS programmer by pressing ALT F2 (a very common keystroke for this feature).



Figure 5: Motherboard with an embedded BIOS programmer

The motherboard on Figure 6 has also this feature, however it is called inside setup.



Figure 6: Motherboard with an embedded BIOS programmer

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You may also look for this feature inside setup, which you can enter by pressing Del during memory counting. On Figure 7 you see the same motherboard from Figure 6 and, as you can see, the BIOS programmer is called by pressing F8 inside setup. On high-end motherboard from ASUS the embedded BIOS programmer (called ASUS EZ Flash) can be found under Tools menu, as you can see on Figure 8.

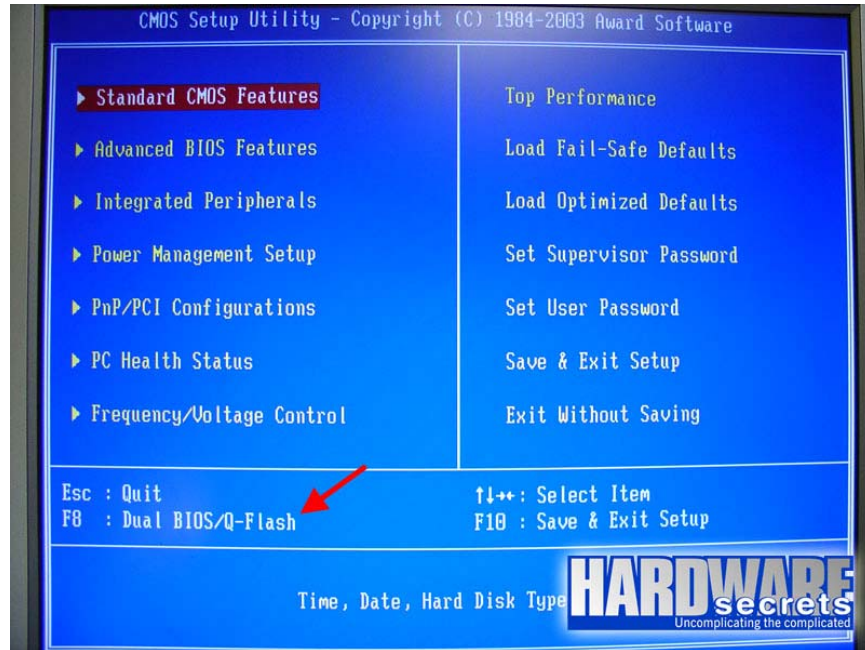


Figure 7: BIOS programmer inside setup

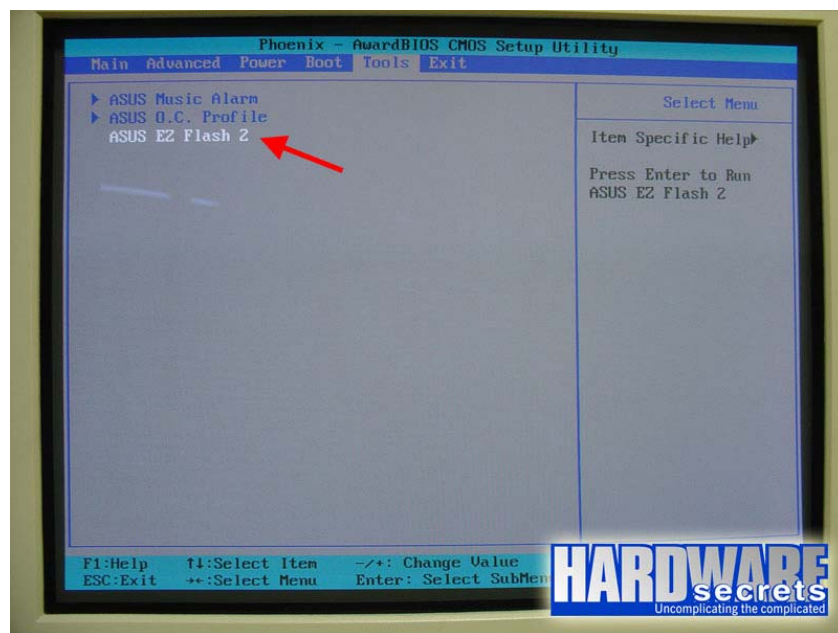


Figure 8: BIOS programmer inside setup

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If your motherboard has this feature, you need to copy the BIOS contents file (the .bin or .rom file that you downloaded from the motherboard manufacturer website and decompressed) to a blank floppy disk. The procedure is quite simple, enter the BIOS programmer, backup your old BIOS, upgrade the BIOS and reset your computer. We will show in details how this can be done on next page.

The step-by-step guide is:

1. Save your uncompressed BIOS file (usually a .rom or .bin file) to a blank floppy disk.
2. Reset your computer and enter the embedded BIOS programmer (see previous page).
3. Backup the current BIOS file used by your motherboard into a floppy disk.
4. Load the new BIOS file from floppy disk.
5. Upgrade your motherboard BIOS.
6. Reset your computer.

On Figure 9 you can see the main menu of the embedded BIOS programmer from the motherboard pictured on Figures 6 and 7 (Gigabyte GA-7VXP Ultra). This motherboard (as all high-end motherboards from Gigabyte) has two BIOS chips, a feature called “Dual BIOS”. Some motherboards from Albatron also have this feature. This feature allows you to recover your BIOS file if you program the wrong file on your BIOS chip by mistake. If your motherboard has this feature, first upgrade only the main BIOS chip. After upgrading it and making sure that your system is working fine, you will need to perform a second upgrade, this time updating the backup BIOS chip. You can simply use the “Copy Main ROM Data to Backup” function to do this. If your BIOS upgrade fails (which is very unlikely to happen if you downloaded the correct file for your motherboard), your system will be able to use the backup BIOS (which still has a copy of the old BIOS), allowing you to enter the programmer and restore the contents of the main BIOS chip.

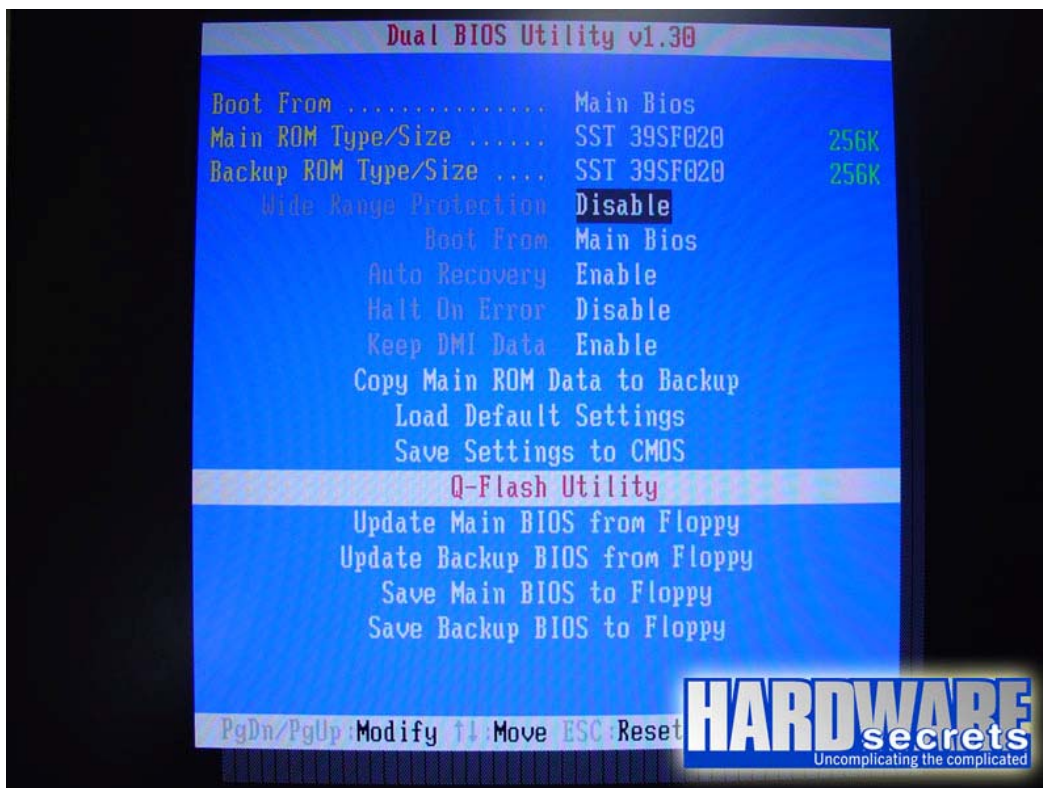


Figure 9: Motherboard embedded BIOS programmer

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The first thing to do is to backup the current BIOS used by your motherboard, in this example this would be done by selecting "Save Main BIOS to Floppy". Do this and name your backup BIOS file as something like "old_bios.bin".

Then load the BIOS file located on the floppy disk, in this example using the "Update Main BIOS From Floppy" option, see Figure 10. In our case we were loading the 7VAXPU.F7 file.

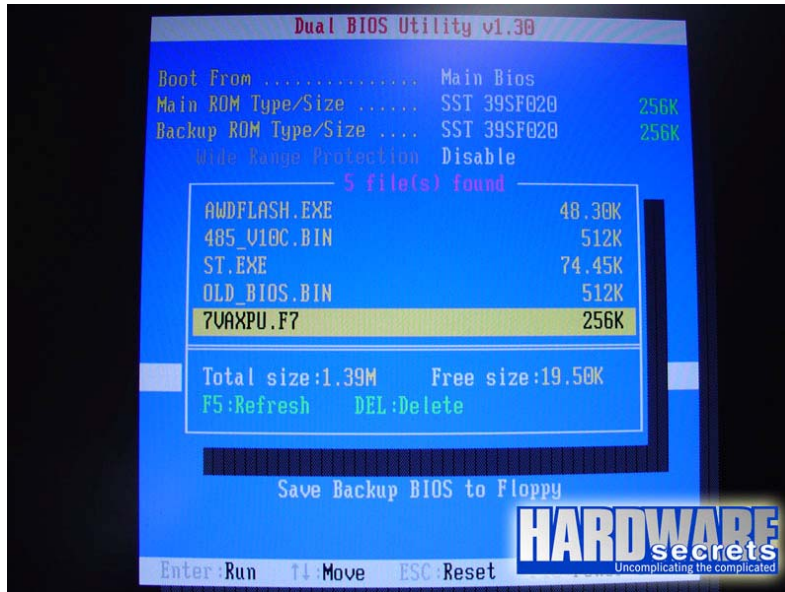


Figure 10: Loading the BIOS file from our floppy disk

Next the programmer will ask us to confirm that we want to upgrade our BIOS. In some programmers you may need to manually select an option called "Upgrade BIOS" or similar to program your BIOS chip. Select "Ok" or "Yes" and wait while your BIOS is being upgraded (see Figure 12).

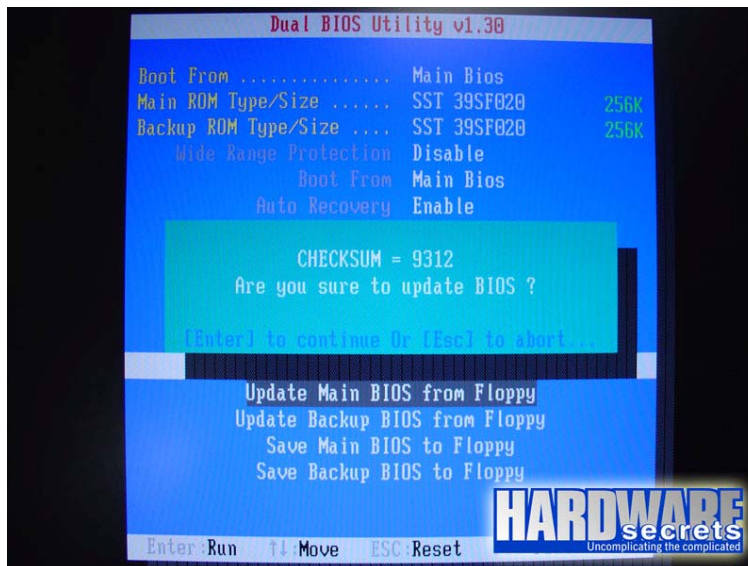


Figure 11: Confirmation screen

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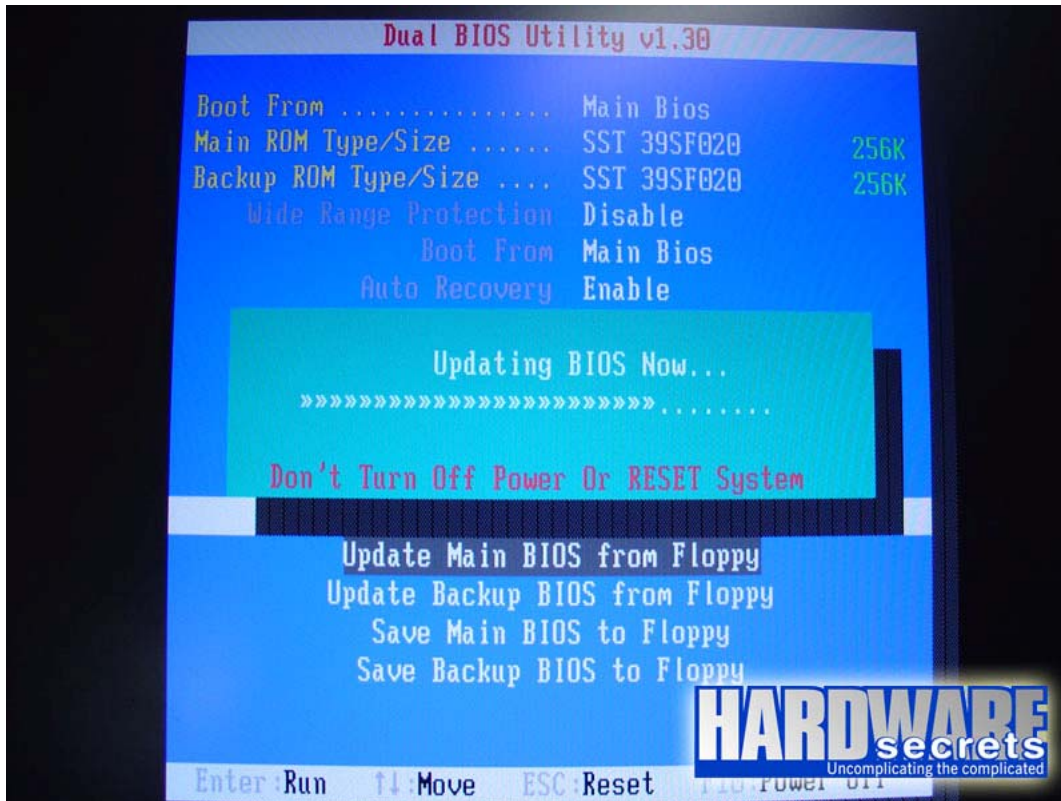


Figure 12: BIOS being upgraded

After the procedure is finished, simply reset your computer and your PC will be using the new upgraded BIOS.

Windows-Based BIOS Programmer

If your motherboard does not have an embedded programmer, you will need to use BIOS programming software. This program can be Windows-based or DOS-based. Of course it is easier to use a Windows program than a DOS one.

The trick here is to take a look on the CD-ROM that comes with the motherboard. Sometimes the motherboard manufacturer provides a Windows-based BIOS upgrade utility on the CD-ROM but not on their website.

In our examples we will be upgrading the BIOS of an ECS RS485M-M motherboard with a utility called Winflash, which was available on the motherboard manufacturer download page. Of course if you use a different program the exact option names and locations may be different, but the overall concept is the same.

On Figure 13 we see the Winflash's main screen.

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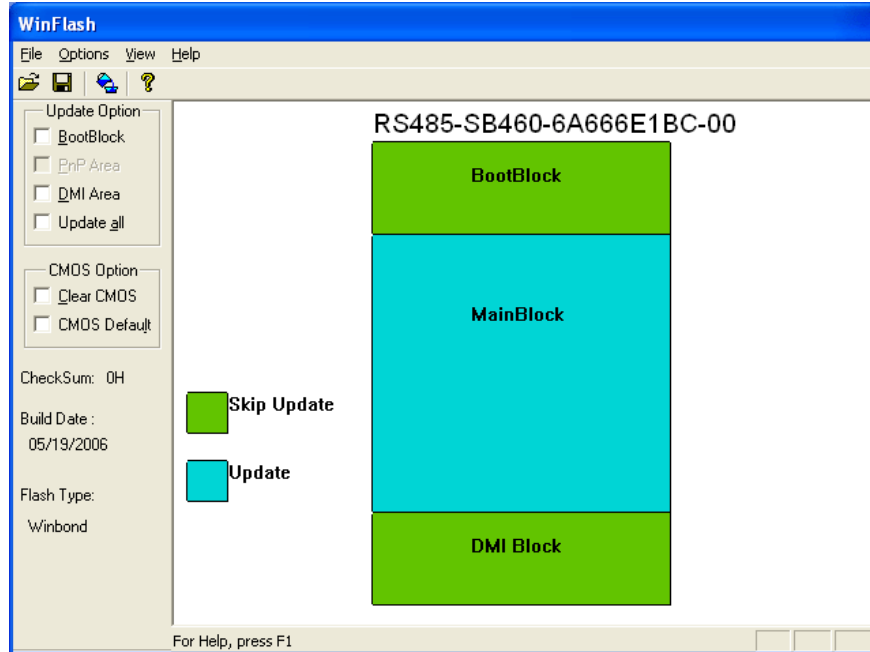


Figure 13: Winflash utility

The first thing you need to do is to backup your current motherboard BIOS, going to File, Save Old BIOS, see Figure 14. Save it on a blank floppy disk as "old_bios.bin" or something like this.

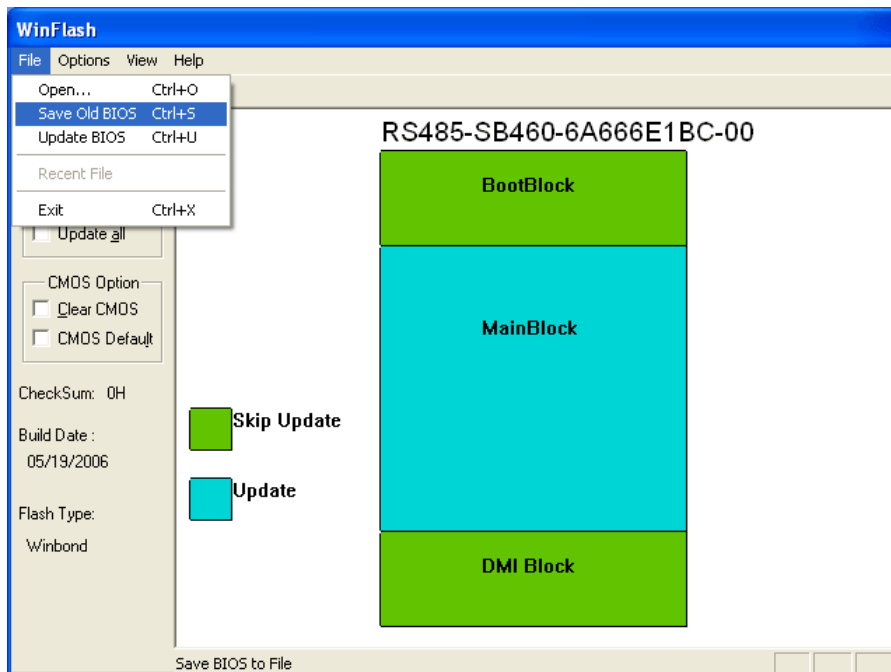


Figure 14: Saving the current BIOS to a file

Next load the BIOS file you want to upgrade, going to File, Open. After the BIOS file is loaded, select all areas of the BIOS chip to be updated (in this example, Boot block, DMI Area, Update All, see Figure 15 – compare it with Figure 13 to see the difference).

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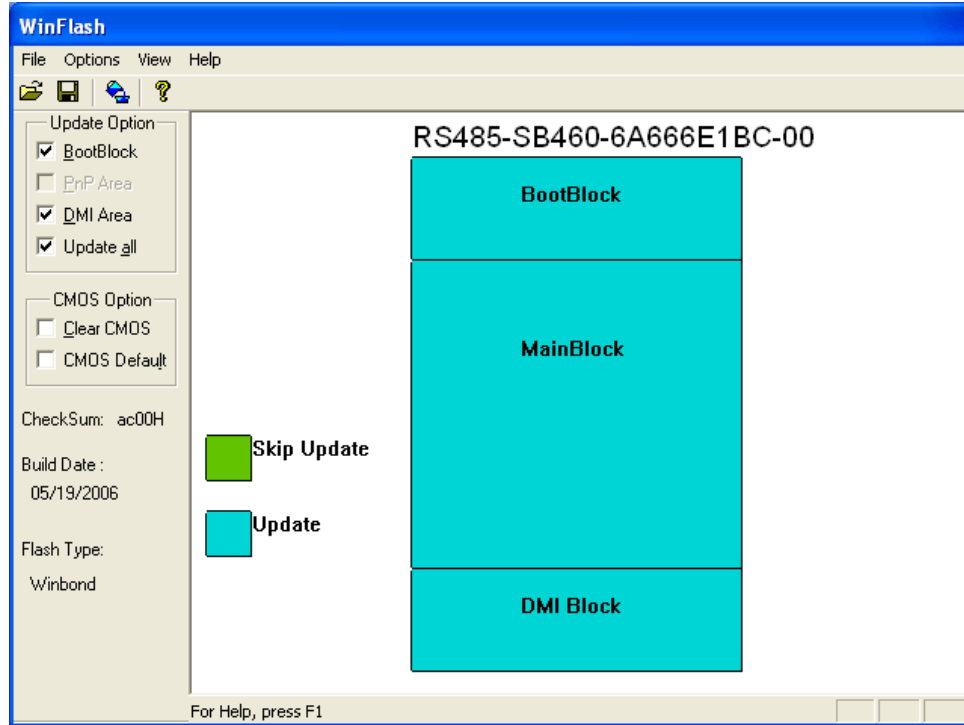


Figure 15: Select all BIOS areas to be updated

Next update the BIOS by selecting File, Update BIOS. A confirmation screen will appear. Click on Update and your BIOS will be upgraded. This procedure can take some time. Wait until it finishes.

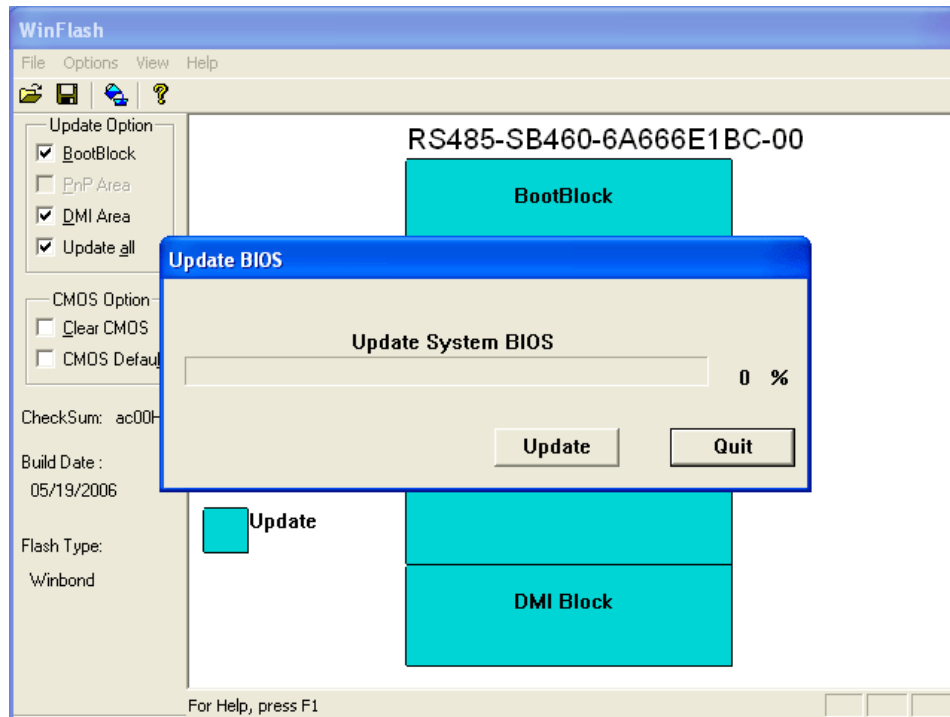


Figure 16: Confirmation window

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When the upgrade is finished, a window asking you to reset your computer will be shown. Reset your computer and the process will be finished.

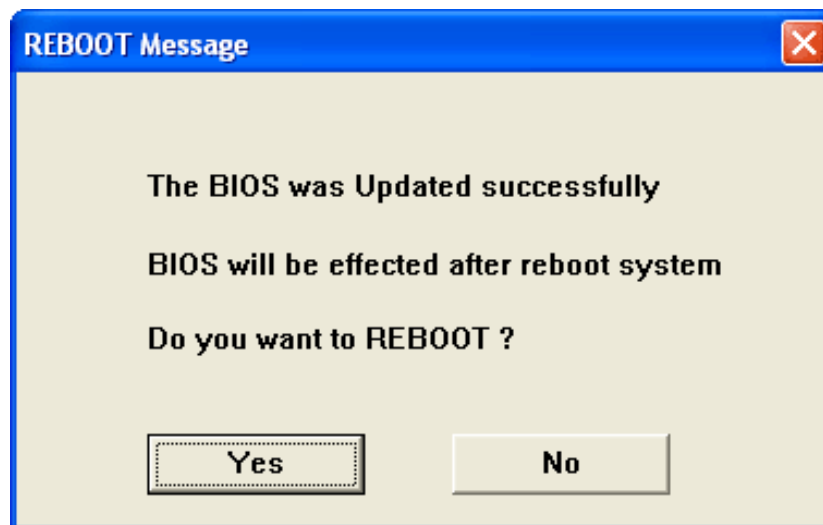


Figure 17: BIOS successfully upgraded.

DOS-Based BIOS Programmer

The oldest way of performing a BIOS upgrade is by using a DOS-based utility. Nowadays this is very complicated, as you will need a bootable DOS floppy (or a bootable DOS CD-ROM) to use this kind of program. This floppy can only be created on Windows up to Millenium Edition (ME), as Windows NT, 2000 and XP does not provide an option to create a DOS bootable floppy.

Don't try running the DOS programmer inside Windows. It won't work.

If you have access to a computer with Windows up to ME installed, you can create a bootable floppy by inserting a floppy in the floppy disk drive, going to My Computer and right clicking on A:, selecting Format. On the screen that will show up, check the "System" checkbox and then click on Format. Format a: /s command will also do the trick.

If you don't have access to a computer running an older operating system, you can download a pre-made boot disk at <http://www.bootdisk.com/bootdisk.htm>. Download the DOS 6.22 floppy and execute the .exe file to create the bootable floppy.

After creating this DOS boot disk, copy both the programmer (a .com or .exe file, in our case it was called Awdflash.exe) and the BIOS file (usually a .com or .bin file, in our example we will be using a file called 485_v10c.bin).

Enter setup and change the boot order (in an option called Boot Sequence or similar) to allow booting from the floppy disk drive before the hard disk drive. Exit saving the changes. Insert your floppy disk into the floppy disk drive and load DOS from it.

After you see the DOS prompt (the famous A:\>), enter the BIOS programmer name followed by the BIOS file name. In our case the command was:

```
Awdflash 485_v10c.bin
```

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Then the screen shown on Figure 18 was presented.

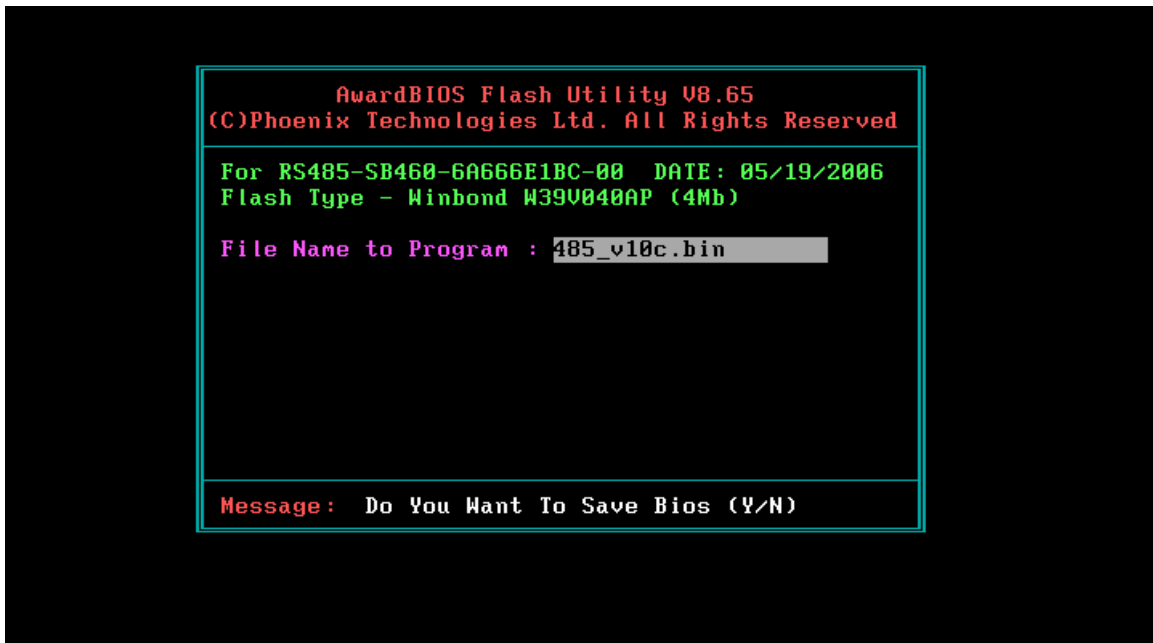


Figure 18: DOS programmer main screen

As you can see, the first thing the programmer asks us is if we want to backup the current BIOS used by our motherboard. Answer "Y" and save it to the floppy disk, as "old_bios.bin" or similar.

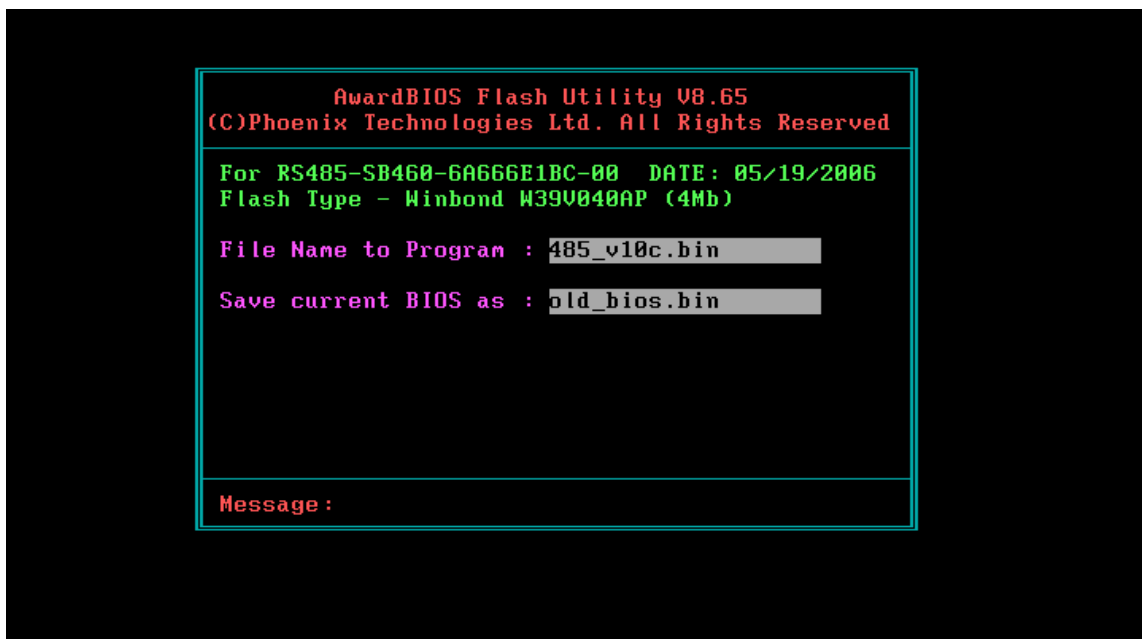


Figure 19: Saving the current BIOS to a file

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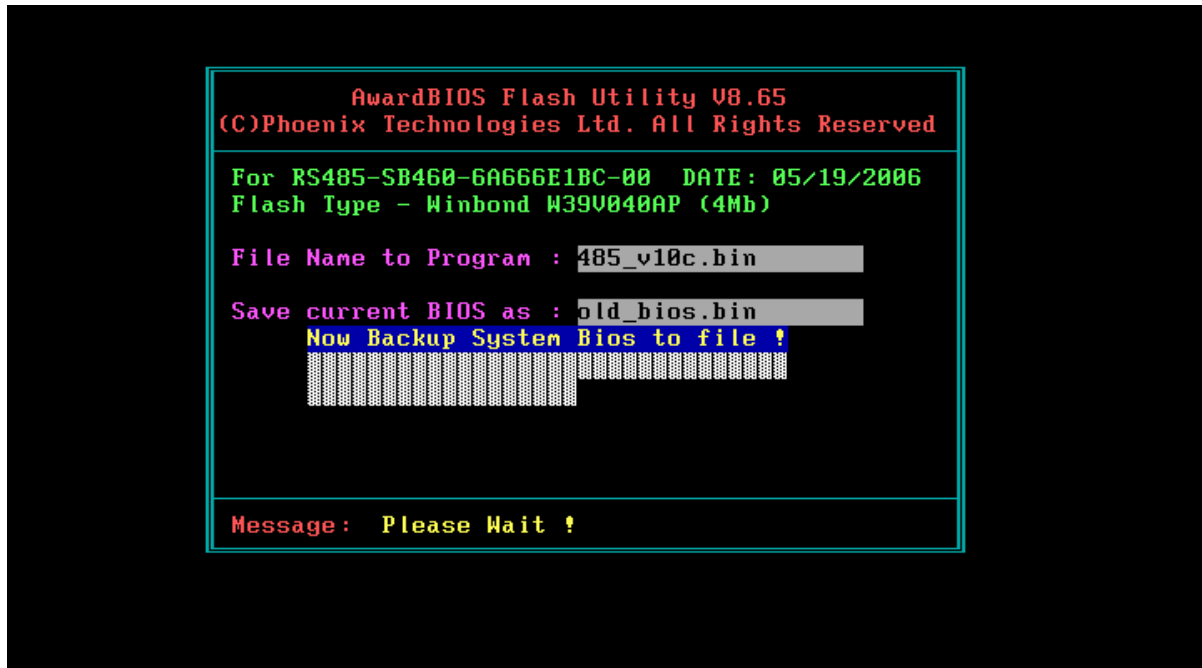


Figure 20: Saving the current BIOS to a file

Next the program will confirm if we really want to upgrade the BIOS. Hit “Y” and wait while it upgrades the BIOS chip.

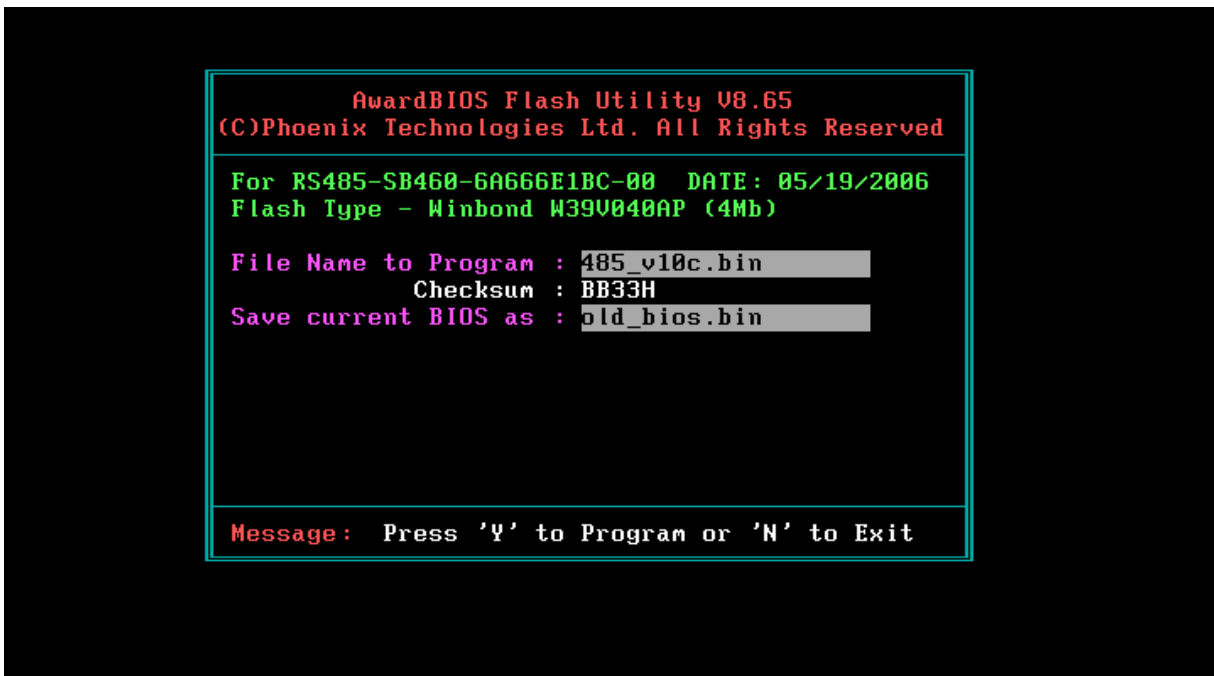


Figure 21: Confirmation screen

After the BIOS was upgraded, simply reset your system and that's it.

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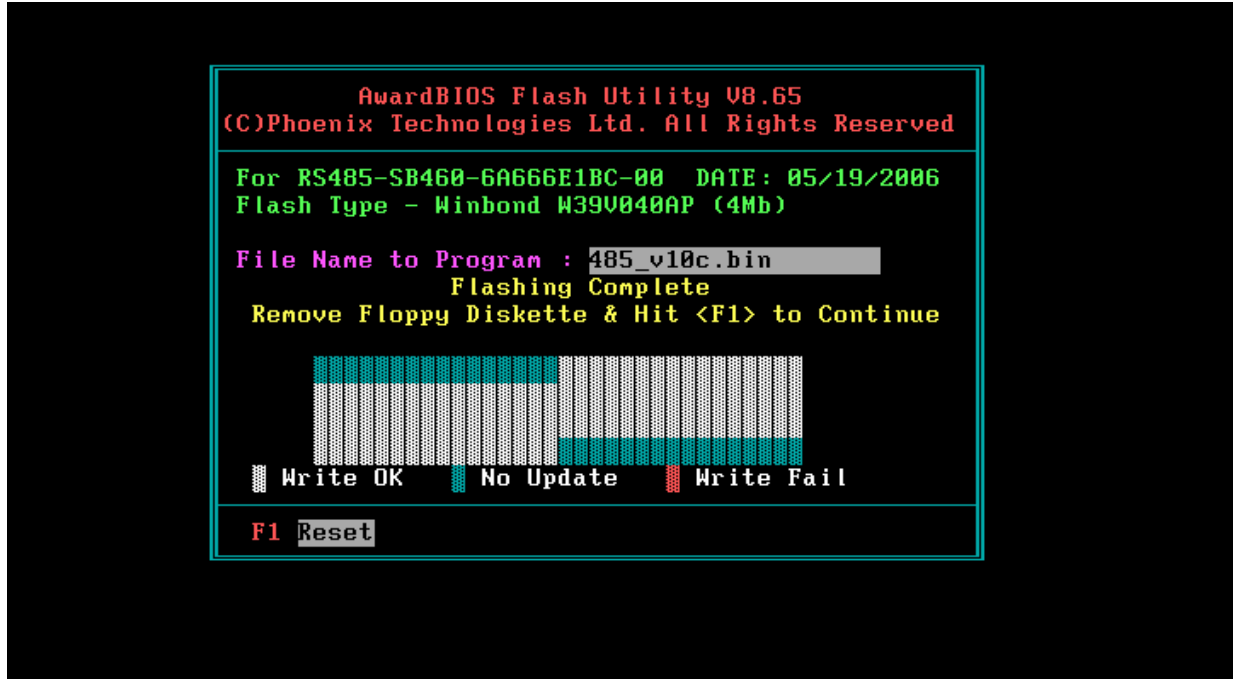


Figure 22: BIOS successfully upgraded

Don't forget to remove your floppy disk from the floppy disk drive and also to enter setup and set back your hard disk drive as the first boot option.

What If Something Goes Wrong?

If you use the wrong BIOS file or if power runs out during the BIOS upgrade the worst thing that can happen is your PC not turning on anymore – all you will see is a blank screen.

Luckily newer versions of BIOS upgrade programs check if the BIOS you are trying to upgrade was written for your motherboard, so the chances you program the wrong file are very small.

But if you turn off your PC during the BIOS upgrade process – whether this was done on purpose or by accident –, you will probably corrupt the BIOS chip, “killing” your motherboard. It won't turn on anymore.

There is a way to bring your motherboard from the dead, though, using another motherboard that uses the same ROM chip type (it doesn't need to be the same motherboard manufacturer and model, the important thing is that the other motherboard uses the same kind of ROM chip your defective motherboard does). By type we mean capacity (256 KB, 512 KB, 1 MB, etc) and physical type (PLCC or DIP).

What you will do is to use the good motherboard as a programmer for your dead chip. We have already explained in details how this can be done on our Recovering Dead Motherboards Killed by the CIH Virus tutorial. Read it to learn how to recover your BIOS chip if you erased or corrupted your BIOS chip by mistake.