# PROCEDURE FOR RECOVERING A CORRUPT BIOS CHIP

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INTRODUCTION TO BOOTBLOCK BIOS

Most BIOS code used today is called 'BOOT BLOCK' BIOS. A BOOT BLOCK type BIOS is different from previous BIOS types in that it is divided into two distinct sections. The first section of the BIOS is the BOOT BLOCK (hence the name). The BOOT BLOCK uses the first 24k of the ROM and contains information necessary to initialize only critical system devices such as the processor, memory and some ISA video cards as well as the floppy drive. The BIOS BOOT BLOCK is a write protected area and cannot be over written by a BIOS flash utility without using a special command line switch.

The second section is the SYSTEM BLOCK. The SYSTEM BLOCK is 232k in size and contains the information necessary to initialize all other system devices such as the video system, input devices, storage devices, COM ports and peripherals and performs the Power On Self Test. The SYSTEM BLOCK constitutes the bulk of the ROM.
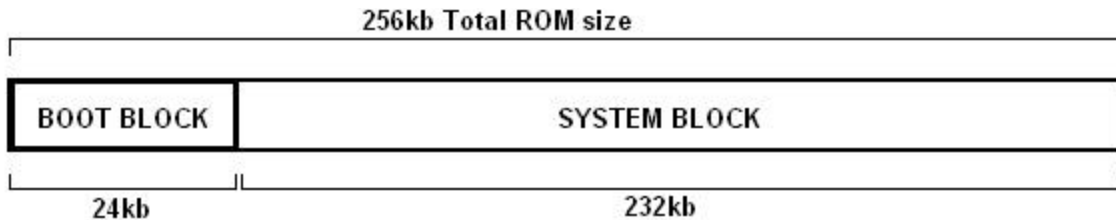
The illustration above depicts a standard 2Mb (256k) BIOS chip. Older BIOS chips may be only 1Mb (128k). The 1Mb BIOS chips are not BOOT BLOCK BIOS and therefore cannot be recovered in the same way. If you have a 1Mb BIOS chip and your BIOS is corrupt then you will need to reprogram the chip using the 'Hot-Swapping' method, or an EEPROM programmer.

UPDATING (FLASHING) YOUR BIOS

The process of updating your BIOS is called flashing. Because the type of ROM chip used is a Flash EEPROM. To update your BIOS you use a utility called a BIOS Flash utility. When you flash your BIOS the flash utility performs the following steps.

- Enters Protected Mode by loading the DOS 4G Protected Mode drivers
- Identifies the flash part (the BIOS chip)
- Identifies the flash part size and programming voltage
- Identifies the motherboard chipset
- Verifies the BIOS checksums (make sure that the BIOS file is correct)
- Erases the BIOS SYSTEM BLOCK (write over the data with all 0's)
- Rewrites the SYSTEM BLOCK with the new BIOS file
- Loads CMOS defaults and reboots the computer

UPDATING (FLASHING) YOUR BIOS (Cont.)

If an error occurs within the first five steps of the flash process then an error message will be displayed and the flash process will be aborted. Unfortunately if an error occurs after the flash utility has erased the SYSTEM BLOCK then the computer will be disabled. The system power

will come on, but the system will not startup as it normally does and you may or may not see anything on the screen. If your system has an AWARD BIOS you may see an error message on the screen that says.

AWARD BootBlock BIOS v1.0

CMOS Checksum Error

At this point the system will attempt to boot from a floppy disk. You will be able to boot from a bootable floppy, but without the BIOS SYSTEM BLOCK you can't do much else.

METHODS OF RECOVERING A CORRUPT BIOS CHIP

There are four options available if your BIOS has become corrupt:

1) Use the BootBlock function of the BIOS to reprogram the BIOS ROM.
2) Use a method called 'Hot-Swapping' to reprogram the BIOS ROM.
3) Remove the BIOS ROM and manually reprogram it on an EEPROM programmer.
4) Purchase a replacement BIOS from the motherboard manufacturer.

This paper was written to aid you in reprogramming your BIOS using either of the first two methods. If you are not comfortable or able to recover your BIOS using either of these methods then it would be best to purchase a replacement BIOS chip from the motherboard's manufacturer.

DIFFERENT BIOS DISTRIBUTIONS

There are two primary BIOS distributions used today they are AWARD, written by AWARD Software and AMI, which is written by American Megatrends International. The methods used to recovery your BIOS is different for each BIOS distribution, so it is crucial that your know which BIOS distribution you have.

To determine which BIOS distribution you have you can either read the sticker that has been placed on top of your BIOS chip, consult the user's manual, or contact the motherboard manufacturer. I will elaborate on each of these methods below.

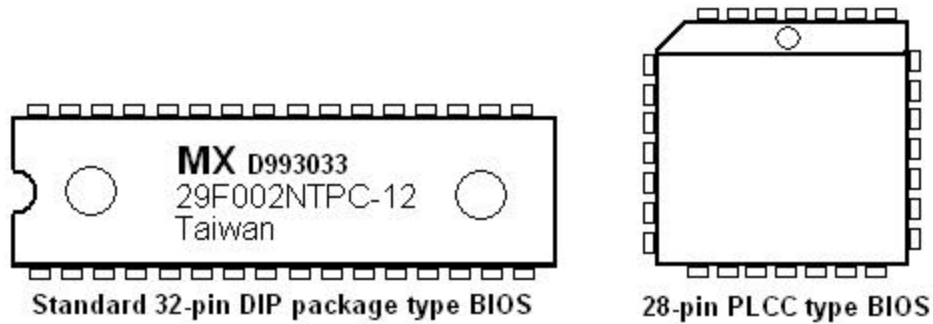## IDENTIFYING YOUR MOTHERBOARDS BIOS DISTRIBUTION

The quickest way to identify which BIOS distribution your motherboard uses when you cannot boot the computer is to read the manufacturers sticker on the BIOS chip itself, however not all manufacturers label their BIOS chips. To do this you must first locate the BIOS chip on the motherboard.

Currently there are two popular BIOS chip package types in use; 32-pin DIP (Dual In-line Package) and 28-pin PLCC (Plastic Leaded Chip Carrier). The most common is the 32-pin DIP type so this is what you should look for first. The DIP package type chip is a rectangular black

IDENTIFYING YOUR MOTHERBOARDS BIOS DISTRIBUTION (Cont.)

silicon chip with a row 16-pins along each of the longer sides of the chip. The PLCC chips are smaller square chips that are closely fitted into a plastic socket on the motherboard. The PLCC type chips have a total of 28 pins, which are inline on all sides of the chip and one of the corner of the chip is at a 45° angle.

The illustration below is a larger than normal diagram of what each chip looks like.

Standard 32-pin DIP package type BIOS   28-pin PLCC type BIOS

(This illustration is not to scale)

The motherboard manufacturer usually places a sticker on top of the BIOS chip, which specifies the BIOS distribution. The sticker will either say AWARD! or AMI.

Another easy way to identify your BIOS is by checking the user's manual. The manual does not generally mention the type of BIOS you have, but in most cases it will include screen shots (pictures) of the BIOS Setup Utility, which shows the BIOS name at the top. In your manual there should be a section that discusses how to setup your BIOS. Read the BIOS setup section and pay close attention to the illustrations. The following is an example of information taken from a screen shot in a motherboard user's manual.

AMIBIOS SIMPLE SETUP UTILITY – VERSION 1.20
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This motherboard obviously uses AMI BIOS.

The third and final way to identify your BIOS is to call the motherboard manufacturer and ask. This is often a pretty simple approach, but it is not uncommon for motherboards of the same model to use different BIOS distributions.

RECOVERING A CORRUPT AMI BOOTBLOCK BIOS

With motherboards that use BOOT BLOCK BIOS it is possible to recover a corrupted BIOS by reprogramming it from a floppy diskette as long as the BOOT BLOCK section of the BIOS remains unmodified. When a system with an AMI BIOS has a corrupt BIOS the system will appear to start, but nothing will appear on the screen, the floppy drive light will come on and the system will access the floppy drive repeatedly.

AMI has integrated a recovery routine into the BOOT BLOCK of the BIOS, which in the event the BIOS becomes corrupt can be used to restore it. The routine is called when the SYSTEM BLOCK of the BIOS is empty. The restore routine will access the floppy drive searching for a BIOS ROM file named AMIBOOT.ROM, (this is why the floppy drive light comes on and the drive spins.) If the

RECOVERING A CORRUPT AMI BOOTBLOCK BIOS (Cont.)

file is found it is then loaded into the SYSTEM BLOCK of the BIOS to replace the missing information.

NOTE: Make sure that the PC speaker inside your computer is working before you proceed. When the BIOS has been restored your system will beep four times to let you know.

To restore an AMI BootBlock BIOS follow these steps:

1) Format a good working 1.44MB floppy diskette.

2) Copy a working BIOS ROM file for your motherboard onto the floppy disk. BIOS ROM files can usually be downloaded from the motherboard manufacturer's web site. If you cannot locate a BIOS ROM file for your motherboard then call the motherboard manufacturer for technical support.

3) Rename the BIOS ROM file 'AMIBOOT.ROM'

4) Turn the system on and insert the disk into drive A:

5) After about 3 ~ 4 minutes the system will beep four times. Remove the disk from the drive. The computer will then restart.

At this point your BIOS should be restored and the system should startup normally. If your system does not startup normally then try using a different BIOS ROM file for your motherboard and read the TROUBLESHOOTING PROBLEMS section below.

RECOVERING A CORRUPT AWARD BOOTBLOCK BIOS

With AWARD BIOS the process is similar but still a bit different. To recover an AWARD BIOS you will need to create a floppy diskette with a working BIOS file in .BIN format, an AWARD flash utility and an AUTOEXEC.BAT file. AWARD BIOS will not automatically restore the BIOS information to the SYSTEM BLOCK for this reason you will need to add the commands necessary to flash the BIOS to the AUTOEXEC.BAT file. The system will run the AUTOEXE.BAT file at startup, which will in turn flash the BIOS. This is fairly easy. Here are the steps you need to take.

1) Create a bootable floppy disk. If you use Windows 95, 98 or DOS, this can be done by going to the DOS prompt and typing the command. (Be sure to insert a disk first)

   FORMAT A: /S

   The /S switch specifies that the system files should be copied to the diskette to make it bootable. If you are using Windows ME, Windows NT or Windows 2000 then you can not use the /S switch with the FORMAT command. If you are unable to create a bootable diskette because of the operating system you are using then you may download a bootable diskette image from the BootDisk.com web site at (http://www.bootdisk.com)

2) Copy a working BIOS ROM (.BIN) file for your motherboard and an AWARD flash utility to the floppy disk. You can usually download these files from the motherboard manufacturer. If you need help finding these files call the motherboard manufacturer for technical support.

3) Use a text editor or the 'edit' command at the DOS prompt to create a text file named 'AUTOEXEC.BAT' and save it on the floppy disk. Make sure that the file name is AUTOEXEC and that the extension is .BAT (nothing else). If you create this file from

RECOVERING A CORRUPT AWARD BOOTBLOCK BIOS (Cont.)

4) within Windows using a program such as NOTEPAD, you may need to change the file extension from .TXT to .BAT

5) With the text editor add the following commands to the AUTOEXEC.BAT file on the floppy disk and then save the changes.

```
@ECHO OFF
@AWDFLASH BIOSFILE.BIN /py
```

> **NOTE**: The '/py' switch will cause the flash utility to automatically reprogram the BIOS without any user intervention. Be sure to change the 'AWDFLASH' to the name of the flash utility that you are using and change the 'BIOSFILE.BIN' to the name of the BIOS ROM file you are using.
>
> If you are not sure what the command line switch to automatically flash your BIOS is, type the name of the flash utility with the '/?' switch after it at a DOS prompt and a list of the available switches will be displayed.

6) Insert the diskette you created into the floppy drive A: on the system that you need to restore the BIOS on. Turn on the system. The computer should startup, read the floppy disk, run the commands in the AUTOEXEC.BAT file and restore the BIOS.

At this point if everything went well then the BIOS should have been restored and the computer should restart normally. If your system still did not restart normally then go to the TROUBLESHOOTING PROBLEMS section below.

'HOT-SWAPPING' A BIOS CHIP

'Hot-Swapping' refers to removing a BIOS chip from the motherboard while the system power is on and the system is in an idle state. Hot-Swapping a BIOS chip is VERY dangerous to both the system and the person attempting to remove the chip. This method of BIOS recovery should only be performed by experienced technician as a last option. Hot-Swapping will work on any type of BIOS chip as long as both computers use the same type of chip.

WARNING: If done improperly this method of BIOS recovery could cause severe damage to the motherboard and BIOS as well as severe injury to the person attempting to remove the chip.

Hot-Swapping requires you to have two computers with the same BIOS distribution and type. The way it works is, while the second (working computer) is on the BIOS chip is removed and the BIOS chip from the first (non-working) board is inserted in its place. The BIOS flash utility is then run on the second computer and the BIOS chip is updated with the BIOS file for the first computer. In essence you are reprogramming the bad BIOS chip on a different motherboard and then putting the chip back into the non-working motherboard. The procedure is below.

1) Start the second (working computer) and go to a DOS prompt. Make sure that no programs are running in the background.

2) While the computer is on carefully remove the BIOS chip from the motherboard and set it aside. Be sure to note the orientation of the chip so that you can later inset it back in to the motherboard exactly as it was.

3) Insert the BIOS chip from the first (non-working) computer in to the BIOS socket on the second (working computer's) motherboard.

'HOT-SWAPPING' A BIOS CHIP (Cont.)

4) At the DOS prompt run the BIOS flash utility and update the BIOS chip with the correct BIOS file for the first computer. If you get a warning message that the chipset and BIOS does not match continue anyway. If the flash utility will not allow you to continue and it is an AMI flash utility then re-run the flash utility using the '/X' switch to enter the utilities graphical interface and manually reprogram the BIOS from there.

5) Once the BIOS chip has been reprogrammed successfully carefully remove the BIOS chip from the second computer and put it back into the first computer. Be sure to pay close attention to the orientation of the chip so that you insert it correctly. Plugging in the chip backwards will immediately damage both the chip and the motherboard.

6) Start the first computer. If all went well the first system should now be working again. If not see the TROUBLESHOOTING PROBLEMS section below.

TROUBLESHOOTING PROBLEMS

PROBLEM: After following all of the directions the system will still not start normally. When the system is powered on all it will do is try to access the floppy drive.

This would seem to indicate that the BIOS reprogramming was not successful or that the BIOS ROM file was either damaged or not the correct one. Try the procedure again using a different BIOS ROM file for your motherboard. Make sure that the BIOS ROM file is for your exact motherboard model and revision.

PROBLEM: When the computer restarts the message 'CMOS Checksum Bad' and 'Press F1 to Enter Setup' is displayed.

This is not necessarily a problem. This message is displayed when there are no CMOS settings saved. This simply means that you need to set your system settings (such as CPU speed, etc) Press whatever key you are prompted to and set the CMOS settings accordingly.

PROBLEM: While trying to recover a AWARD BIOS the system starts to read from the floppy disk and then stops and nothing else happens. When the system is rebooted it still has the same problem.

This most likely indicates that there is something wrong with the boot disk. Double check that the disk is bootable, contains the AUTOEXEC.BAT file, the BIOS flash utility and the BIOS ROM (.BIN) file. If all of the files are present and the disk is bootable then double check the AUTOEXEC.BAT file. Make sure that the name is correct and that all of the commands are correct.

If you can see on the screen what the system is doing then try typing the commands in the AUTOEXEC.BAT file manually to see if there is an error message that is displayed. If everything checks out then try using a different BIOS ROM (.BIN) file. If the problem persists use a different flash utility.

If you have any questions of comments regarding this procedure please e-mail me, my email address is: davido@amptronusa.com

Good luck!