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The Beginner's Guide to XBOX Modification (v0.2)

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Disclaimer
I will not be held responsible for anything that might happen to you, your xbox, or your computer while attempting the procedures described herein. Modifying (or even opening) your xbox will void the manufacturer warranty! Any modifications you attempt are done so **at your own risk**!

From 30,000 Feet High
I don't think I'm an idiot, especially when it comes to computers; whether it is programming them, repairing them, upgrading them, or building them; whatever. As a nerd, I want to get as much out of my xbox as possible. However, trying to get information on such procedures was a lot more difficult than it should have been, and I felt like an idiot. I'm not saying that to modify something that isn't supposed to be modified (and has actually been designed with the intention to thwart any attempt at modification) should be easy. I'm just saying that to find information on such a project could be much easier if it were in one place, in one consistent format. I think that at least something to start off with to point one into the right direction is important; hence this guide.

When one ventures into this exciting realm, they are invariably referred to as a "newbie," or a "n00b," or whatever geeky version of the term the "elite" have come up with. Just remember, many of the so-called "elite" were "newbies" last week, and everybody was a "newbie" at some time! There's nothing wrong with being a "newbie." Why has the term become so pejorative?! There are always many who are very smart and knowledgeable about the subject and are willing to help, and they are usually the ones who aren't so rude. So don't get scared away! Ignore the rude folks. It's not as complicated as they like to think it is!

What's complicated is trying to put all the information that is out there together. To date I haven't seen any generalized guide that educates one on the subject. Many of the authors seem to forget that they had to learn about the subject before they could do anything, and that their readers are also going to need a general idea before they can jump into such a project. I can't imagine a person trying to modify their xbox without knowing why they're doing it! Most of the tutorials out there are on very specific procedures. If you don't know what they mean, how can you decide which you will need? Most of them will never apply to you! And almost all of them are step-by-step, detailed manuals, as if the reader is going to train a monkey to do it for them. This guide is not meant to teach you everything about the subject. It is not a step-by-step tutorial. **The point is for you to decide what** ***you*** **want to do, learn how it works, and do it correctly.** This is meant as a high-level introduction to how the xbox works and how xbox modification works. This is a general guide only. Think of it as a birds-eye view of the subject, and read it before you do anything! I will not answer detailed questions on how to do any of the modifications described below.

How Does a PC Work?
An xbox is basically a personal computer (a PC). It shares many characteristics and functionalities with a personal computer. It was purposely designed this way. The system you are using to download and read this guide is probably composed of the following:

1. A motherboard (sometimes called a mainboard) which is a printed circuit board has all the paths to connect all the components
2. A central processing unit (a CPU or just a processor) which does all the "thinking."
3. Main memory (sometimes called RAM or just memory) the CPU's working space, like a person's desk.
4. A hard disk drive (an HDD, or just a hard drive or disk) the storage area, like a person's filing cabinet.
5. A display adapter (sometimes called a video card or a graphics card) which creates the display you see on your monitor.
6. A network interface card (a NIC or a network card) which interacts with a network of other computers.
7. A sound card which creates the sounds you hear from your speakers.

8. A CD-ROM drive or a DVD-ROM (read only memory) which allows you to load large amounts of data.
9. Other input/output (I/O) devices such as a keyboard, a mouse, speakers, and a monitor which allow human interaction.

If you have a modem that you use to connect to the Internet over a phone-line (not DSL), then you probably have a 56k modem in place of a NIC. And if you have a CD/DVD burner then you probably know what that does.

To load something generally means to bring something from the HDD, the network, or the CD/DVD-ROM to the main memory so the CPU can work with it.

That's just the hardware. Your PC probably also has a lot of software, the most important being the operating system (the OS). Most of you are probably using Mr. Bill's Windows, although there are alternatives such as Unix, Linux, etc… The OS takes care of just about everything. It decides how to manage the memory, how to format and maintain the hard drive, how to manage all the other devices listed above, and the list goes on. The main idea is that nothing of interest can happen without an operating system, such as loading and executing programs. So how does the computer know what to do before the operating system is loaded? After all, the OS is a program! How can it be loaded to memory if there's nothing to manage the devices involved? That is where the BIOS comes in.

A BIOS is a Basic Input/Output System. It is a very small amount of software basically designed to tell your computer how to load the OS. This is a very simplistic view. The term CMOS might come to mind for some of you. The BIOS is sometimes referred to as the CMOS because of the type of chip it is sometimes stored on, but let's just stick with the term BIOS.

When you boot your computer (interestingly, this term comes from the idea of the computer picking itself up by it's bootstraps), the first thing that happens is it tests itself at a low level. It checks that the memory is okay, everything is powered, the disks are connected, the keyboard is connected, etc., this is called a Power On Self Test (POST). If any part of this test fails, you will usually get a beeping signal from the crappy little speaker in the computer case indicating that something is wrong, and the system will halt. This will probably happen to you on your xbox at some point. If it passes the POST, it looks to the BIOS to figure out what to do. Once the BIOS tells it how to load the OS, it does that, and bing-bang-boom you're in Windows (unless you use Win9x, in which case it's much longer than bing-bang-boom). Usually when you press the <del> key during the POST, you can change some of the BIOS settings (processor speed is a popular one, referred to as overclocking, which is a different subject altogether).

The BIOS is stored on a non-volatile chip, which means when you turn off your computer, the data is still there. It is a ROM (read only memory), which means it can't be changed. But these days ROM is sort of a misnomer, because it can be changed. That is what flashing refers to. To flash the BIOS means to overwrite the current data on the chip with other data. This is what we're most interested in!

How Does an XBOX Work?

So how does this all relate to your xbox? Well, like I said, your xbox is very much like a personal computer. It has a processor, a DVD-ROM drive, a display adapter, a sound adapter, a hard disk drive, and most importantly a BIOS. Not bad for $200, eh? When you turn on your xbox, it does its own little POST, goes to the BIOS, plays that flubber animation thing, and looks to the DVD-ROM for an authentic xbox game or a DVD movie. If it does find one of those things, it will boot up the game; or, if it's a DVD movie, it will play it (if you have Microsoft's little DVD playback kit installed, which is a dongle that connects to one of the controller ports that unlocks the DVD-ROM drive). If it doesn't find either of these (it's very picky), then it boots up it's own little OS referred to as the dashboard. This is that green screen with the three menu options like "Settings", "Music", and "Memory," or something like that. We want to replace the BIOS so it's not so picky about what it will execute.

Replacing the BIOS

Most of you probably wouldn't have a clue how to go about hacking the xbox's BIOS and writing your own. (Hacking, in this case, refers to the idea of uncovering the structure of how they went about designing and implementing the console so it can be exploited. Since Mr. Bill isn't going to just give away their design, this is the only option. The line between learning about the system and breaking the law is very blurry nowadays, unfortunately.) Luckily for us there are geniuses out there that have already hacked the BIOS and written new ones. All we have to do is replace the current BIOS with the new ones. How do we do this? Well, there are a few options. We could just flash the current BIOS with the new one. But this is fairly tricky. A more popular alternative is to buy another BIOS chip (the infamous "modchip") and "put it in front of" the original BIOS chip, so to speak. That way when the computer goes to look for the BIOS, it is fooled into looking at our replacement modchip, which has a BIOS on it. Installing the new BIOS chip is probably the hardest part of the whole project. If you pursue this, you will undoubtedly be haunted by "d0." You will know what this is… My advice is to not let it get to you!

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Now, I will not give a guide here on how to install it. There is a very good step-by-step tutorial with pictures on how to disassemble the xbox at www.xbox-scene.com, as well as some graphical guides for installing the chip.

I've Got the BIOS Replaced, Now What?
Now that you have the modchip in, a BIOS installed, and the xbox boots up normally, you have begun to unleash the xbox's potential. At this point you can play games that are not authentic, boot from other media (although most xboxes seem to be very picky about CD-Rs), run unsigned programs, etc… These are the reasons we did it in the first place! You can leave it at that, or you can do more. Most likely you will pursue the latter.

Replacing the Dashboard
One popular and powerful route from here is to replace the dashboard (remember, the "mini-OS" on the xbox). By far the most popular replacement dashboard is the Evolution-X dashboard (or Evox, for short). Those guys at work on the Evox project are brilliant, and we should all thank them! I will not tell you how to get it, where to get it, or which version to get. That's up to you.

Replacing the dashboard allows you to easily run programs that you can install on the HDD, backup games onto the HDD and play them from there, and even replace the original 8-10 GB HDD with a much larger one. You can also network your xbox with your PC. www.xbox-scene.com has more information on how to do this. You can even have several HDDs installed that you can switch between. You can imagine the possibilities. For instance, you might want to take your xbox to a friend's house, but you don't want to lug all the game discs. You can replace the dashboard without networking your xbox to your PC, and there is an entire guide dedicated to just that, guess where, www.xbox-scene.com. However you do it, the basic procedure is that you copy the Evox files over to your C: and replace the original dashboard file.

You will probably want to learn about the evox.ini file. This has all the settings for the Evox dashboard, including networking, menus, etc… There are many tutorials that demonstrate how to set up this file. Try to decipher them.

Replacing the HDD
Why replace (or swap) the HDD? More room for stuff. This procedure is not that hard, actually. Just buy a good, beefy HDD, follow the outline below, and go to www.xbox-scene.com for more detailed guides. Western Digital is a good brand, as well as Maxtor. Some say that the 7200 RPM (rotations per minute) drives are too hot, while others say it doesn't matter. Some even install their own cooling fan just to be safe. 5400 RPM drives are pretty hard to come by, nowadays, however, so a 7200 RPM drive should be fine.

There is a lot involved with this procedure, but it is not too complicated. Again, in accordance with this generalized guide, these steps are just an outline to the procedure.

1. Make sure you have a BIOS that has what is known as the HDD swap feature.
2. Make sure you have the latest Evox dashboard installed on your xbox already.
3. Backup the original C: and E: drives onto your PC's HDD. This will involve networking to your PC, so make sure you know how to do that.
4. Create an Evox boot disc with evox.ini set up to format the drive (can be found in a tutorial at www.xbox-scene.com). Burn it onto a CD-RW or a DVD-RW or whatever your xbox will accept. (Refer to the section on burning xbox discs.)
5. Open up the console again (you should already know how to do this because you should have already have a working modchip installed).
6. Unplug the original HDD and replace it with the new one.
7. Put the xbox back together.
8. Boot the disc you made. It will start Evox, and there will be a menu option to set up the drive (if you have the correct settings in the evox.ini file). Format it.
9. Copy the C: and E: drives from your PC's HDD back to your new HDD.
10. Take the disc out, boot the xbox again.
11. Keep the original HDD just in case. Besides, you can't use it for anything else anyway.
12. You're done. The extra space is all on F: (and G: for +137gb drives if you chose for a LBA48 F+G/67 bios) now.

Burning XBOX Discs

Like I said earlier, the xbox is very picky about what it will execute. Even when the BIOS has been replaced, the hardware is still quite picky. CD-Rs are very rarely an option for the xbox. CD-RWs usually work if burned at a low speed. DVD-RWs reportedly work too. You do not have to go out and buy a DVD burner, contrary to popular belief.

In order to burn an xbox bootable disc, you must first create a so-called image. An image is basically just an archive that can be written directly to a medium, a CD/DVD-RW in this case. Images are often referred to as ISOs because of the file extension. The file extension is that because of the group that came up with the standard (the International Organization for Standardization, no I did not put that name in the wrong order). The xbox, however, has its own version of the ISO image, which is usually referred to as an xISO. Get a tool to create an xISO (from www.xbox-scene.com) and use NERO or some other burning software to burn it to a CD/DVD-RW. It's that simple. If it doesn't work, don't fret; just get some help (see the resources section).

The disc must have a default.xbe file at it's root in order to be booted. An XBE file is xbox's version of an EXE file, or an executable binary file.

Now Get Out There and Do It!

I hope this guide did a good job of giving you a general idea of what xbox modification is all about. If you have any questions, comments, concerns, or suggestions, please email me at emyst56@yahoo.com. Please remember that I will not answer questions regarding exactly how to do the described procedures, nor will I tell you where to get any of this stuff! I think the next section should send you off to places where you can get **all** such questions answered!

Resources

www.xbox-scene.com
A very good source of information if you can sort it all out.
It has many detailed tutorials on the procedures I described above, and many more.

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