

Rebuilding a PC

(Windows Operating System 95 or 98)

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This document will provide you with the information to completely install a new PC using **Windows 95 or Windows 98**. You will complete everything from formatting the drive to a full Windows install. This can be useful when adding hard drives, or fixing a completely “sick” system. Personally, I always do this on my *new* systems so I know exactly how to fix it, no matter what happens! Before starting the installation, you’ll need to have *at least* the following items:

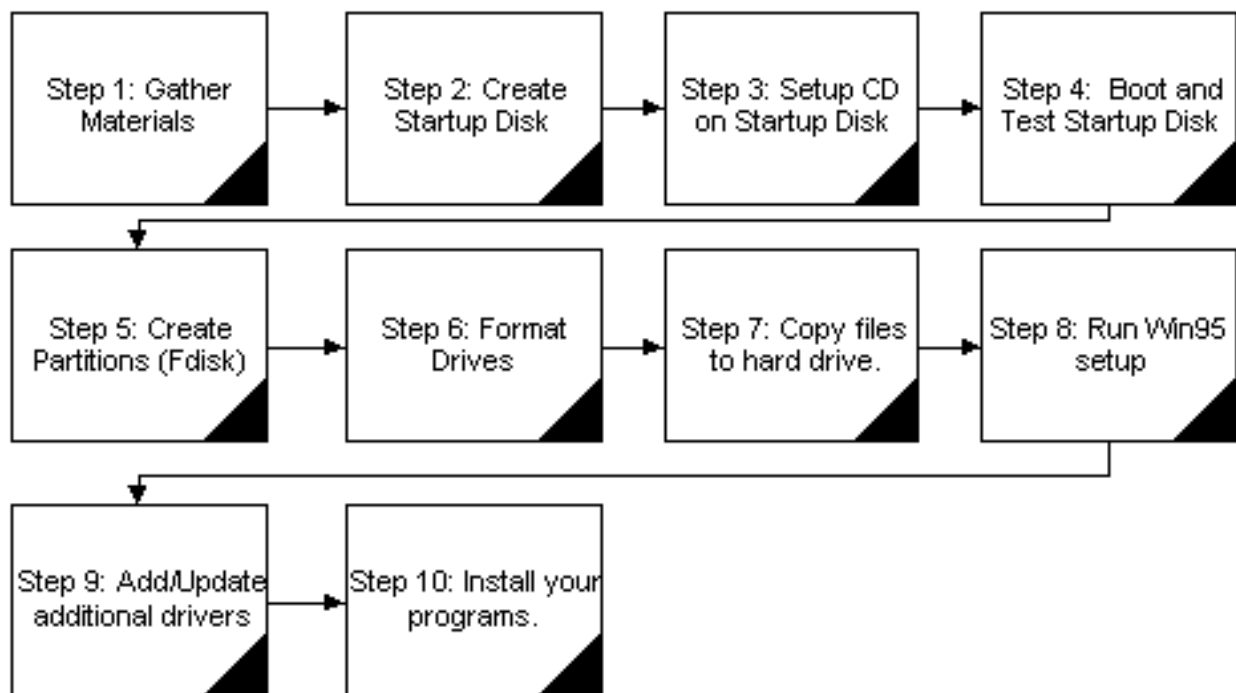
- Windows 95 or 98 CD and your Windows 95 or 98 certificate number. This serial number can be found on your “Using Windows” booklet on the green and white certificate. If your system is still running, you can also find your serial number by right clicking on the “My Computer” icon and Choosing “Properties”. The certificate number is in the format of: XXXXXX-OEM-XXXXXX-XXXX.
- A blank 3½ diskette (to make a boot diskette).
- The driver diskette for your CD-ROM drive.
- Any additional 3rd Party driver disks for your video card, sound card, network card, modem, printer, and other devices you might have. Make the effort *before* you rebuild to go to find your driver and program CD’s (and if possible, documentation). It’s also a good idea to go to the vendor websites for your video card, sound card vendor to see if they have new versions of the drivers (or to get *any driver* if you don’t have the original driver disks!).
- If you’re using a Windows Upgrade CD, you’ll have to have a valid previous Windows disk or CD (Windows 3.1 Disk one for Windows 95 Upgrade CD or a Windows 95 CD for Windows 98 Upgrade CD)

Important: You shouldn’t begin an installation without all of the above items, especially the Windows 95/98 materials and the driver diskette for your CD-ROM. If you don’t have driver disks for other items on your system (i.e. video card, sound card, printer, modem, etc.) you’ll probably still be able to get most of your system up and running (Windows 95/98 can use its own drivers for most devices); however, those items may not run at the best possible speed, resolution, or quality.

WARNING: Although I've tried to give complete and easy to follow steps, this is a fairly advanced procedure. You must be willing to accept the risk and responsibility of using this procedure. Please understand that this procedure completely erases your hard drive and reinstalls the Operating System (Windows 95/98). Do not continue unless you are willing to accept this risk.

What Are the Major Steps?

Before beginning a major undertaking, it's good to know the general flow of what you're doing. Here's what this procedure will walk you through:



Gather the Materials

The following procedure will guide you through completely rebuilding a Windows 95 or 98 PC. Double check all your materials. You'll need:

- Windows 95 or Windows 98 CD
- Plus Pack CD (optional)
- All your hardware driver diskettes
- A blank 3.5-inch diskette (to make a bootable disk)
- All of your application and utility diskettes.
- A copy of all the files or information you want to transfer to your system (documents, mailbox files, address books, fax or personal phone books, Browser favorites, shortcuts, program settings, save games, etc.) Also be sure to record your network settings, Dialup Networking settings (especially if you use a modem to dial an Internet Service Provider (ISP) to get on the Internet). If the system you're rebuilding is still running, it's a good idea to call your ISP or any other program support groups and ask for advice on what to find and save.

This procedure attempts to be as complete as possible, but this is NOT a novice task. You should read through the first few pages and see if you are capable of executing these tasks. You'll need to have some basic DOS skills to do a "from scratch" installation. The most difficult part of this procedure is making your bootable disks with CD-ROM drivers, FDISKing your hard drive(s), and formatting the hard drive partitions. Proceed at your own risk.

Before beginning, make *sure* you have your Win95/98 CD-ROM and your Windows 95/98 certificate number (i.e. XXXXXX-OEM-XXXXXX-XXXX).

Create a Startup Diskette

Make a Win95/98 startup (boot) disk. You may have to go to a working Windows 95/98 machine to create it. Most of the time, a Windows 98 startup diskette works best, because it has very good automatic CD-ROM driver support.

- Open the Control Panel (under Settings on the Start Menu)
- Open Add/Remove Programs
- Click on "Startup Disk" tab
- Click on "Create Disk" and follow the directions

Note: If you're using Windows 98, you may not have to setup the CD-ROM drivers as described in the next few steps. Windows 98 *automatically* boots and looks for a CD-ROM drive!

Setup CD Drivers on the Startup Diskette

If possible, try to boot your system with a Windows 98 boot disk first to see if the automatic CD boot sequence recognizes and provides access to your CD-ROM. Note that the boot process creates several temporary drive letters on your system, and the CD-ROM may not be on the “usual” drive letter. Watch the diskette boot screen for a message indicating what drive letter is assigned to the CD-ROM. If your system does not boot from the diskette, you may need to look in your BIOS settings (usually accessed by pressing the DEL or F2 key when turning on the system. In the BIOS setup screen, there is a setting that indicates boot order. Make sure the diskette drive A: is the first boot device, and that no other setting “disables” booting from diskette.

If a Windows 98 startup disk is not available, or does not support your CD-ROM drive, you’ll need to copy your CD-ROM drivers to your startup diskette and make sure that you can boot from the diskette resulting with the CD-ROM working. Personally, I prefer setting the CD-ROM as the Q drive. This enables your system to not “bounce” your CD drive letter if you ever add hard drives or partitions. Here’s an *example* config.sys and autoexec.bat for a CD-ROM drive:

Config.sys

```
device=cdrom.sys /d:cdrom1
```

Autoexec.bat

```
mscdex /d:cdrom1 /l:q
```

NOTE: This step can be one of the most difficult, because it requires you to:

- a) Find your CD-ROM driver and find the syntax to put in the `config.sys`
- b) Understand how to copy files (your CD driver and the `mscdex.exe` file) to your startup disk, and finally
- c) How to edit files in DOS mode (your `config.sys` and `autoexec.bat`). If you’re able to accomplish this task, it actually gets easier from here on!

Need Help? Find your CD-ROM driver disk and look at the .txt and readme files for information on the CD driver name (i.e. `atapi.sys`, or `cdrom.sys`, `tycdrom.sys`, `mtm01.sys`, etc.) and what syntax to use to run it in your `config.sys`. You must copy the CD-ROM device driver and and file `mscdex.exe` (`mscdex.exe` is located in the `c:\windows\command` directory of a working Win95 machine) to your startup diskette.

Your CD-ROM driver file (.sys file) is on the CD Driver disk, or it might be in the root or “top” directory of your existing machine (if the PC you’re rebuilding is still available). In order to create the startup disk CD-ROM support, you’ll need to copy and edit files. You can use a working Windows 95/98 machine notepad utility to edit files, as well as to “drag and drop” the mscdex.exe and cdrom driver .sys files to copy to your startup diskette. Otherwise, you’ll have you use DOS commands like EDIT and COPY to do this.

As I said, **this step can be the most difficult**. If you’re confused, or this seems “over your head”, try to find a Windows 98 startup diskette, or get an experienced computer user to help you create a Startup diskette with CD-ROM support.

Boot and Test the Startup Diskette with CD-ROM Support

Boot from the Startup disk. Put the Windows 95 or Windows 98 CD-ROM in the drive and make certain you can access it (assigned as the Q: drive in the above autoexec.bat example). You should be able to issue the command: dir q: and see files listed. You should not continue until you can boot from your startup diskette and successfully access the CD-ROM drive.

Make SURE you have your Windows 95/98 CD-ROM disk and your Win95/98 serial (certificate) number. (If your system is still running before you do the rebuild you can find your *existing* serial #, by right-clicking on My Computer and selecting properties.) DO NOT continue until you have a valid serial number for the Windows 95/98 media that you are installing from. A valid Microsoft serial number will be located on a certificate. Windows will not install without a valid certificate number for the Windows media. Note: Just any valid certificate number will not work on any Windows Installation CD. There are different certificate formats for different Windows media types (i.e. Upgrade CD vs. Full Install CD).

Are you ready to continue? The next steps will completely erase your hard disk.

Create Partitions Using FDISK

If you’re going so far as to completely reinstall, it’s best to delete and recreate all the partitions on your hard drive. In some cases where you are rebuilding to solve unexplained system problems, deleting and recreating the hard drive partitions is a necessary step to resolve underlying corruption on the hard drive structure. If you have multiple disks or existing multiple partitions, you might choose not to remove all partitions

in order to save existing information on other drives.

At this point, it's important to point out you can save information from *other* hard drives (i.e. you only want to **format the C: hard drive** and reinstall Windows – but want to **keep** your documents, utilities, programs or other files on **other hard drive** letters). This is a valid technique, but keep in mind that once you format the C: drive and reinstall Windows from scratch all registry program entries are erased. What does this mean? Basically, it means you may have to reinstall some programs, even if those programs were installed on other hard drives. Why? Because when the windows registry is “made new by reinstalling Windows from scratch” any settings made when you originally installed the program are gone. These entries may need to be put back in the registry by reinstalling your program(s).

If you are certain there are no underlying hard drive structure issues, you can skip down to the “**Format Drives**” step. However, if at all possible, I recommend using FDISK to create a new partition structure. If you haven't already done so, boot from your startup disk which has CD-ROM support. You should be at an A:> prompt.

Here are the FDISK steps:

- a) From the A: drive run the FDISK utility.
- b) In FDISK, remove ALL DOS, extended, logical and non-dos partitions on the active drive. You should reach the point where there are NO drive entries to view. (Note: If you have multiple disks or existing multiple partitions, you might choose not to remove all partitions in order to save existing information on other drives).
- c) Once all drive partitions are removed, press ESC to exit the FDISK program. Reboot (power all the way down and restart the machine from the Startup disk again).
- d) Run the FDISK utility again. Verify that there are NO partitions.
- e) Create your new partition (or multiple partitions).
- f) Once all drive partitions are removed, press ESC to exit the FDISK program. Reboot (power all the way down and restart the machine from the Startup disk (yet again)).

FDISK Notes: In most cases, it's OK to answer “Yes” to the “Enable Large Disk Support” question when FDISK starts. Most people can setup a single partition on one large disk to install Windows on. Understand that FDISK can access multiple hard drives, and it can also make multiple partitions on a single disk that appear in DOS and Windows as separate hard drives. (Generally, it's a good idea to not make any partitions over 700 megabytes if you plan on using disk compression.) If you are not using disk compression, it's generally a good idea to keep your partitions under 2 gigabytes each.

The exception to the 700 Mb and 2 Gb “rule” is if you are going to use the large disk scheme (FAT32). If you require *maximum* backward compatibility, don't use large disk schemes, make smaller 700 MB to 2000MB partitions.

Format Drives

At this point, you should have restarted the machine with the Startup disk that can access your CD-ROM drive.

Format the C: drive as a bootable drive with the command:

```
format c: /s
```

When prompted for the hard drive label, type in HARD DRIVE.

If you have multiple hard drives or partitions: Unless you're saving other hard drives, format the remaining hard drives (i.e. D, E, etc.) as a non-bootable drive (no /s on the format command). For example:

```
format d:
```

When prompted for the hard drive label, use HARD DRIVE. (it's Ok to use the same label for all hard drives, and it will make them appear as C: Hard Drive, D: Hard Drive... etc. in Windows).

Repeat the format command for as many drives as you are initializing.

Copy Files to the Hard Drive

Next, insert your Windows 95/98 CD in your CD-ROM drive if it is not already present.

The next step copies the WIN95 (or WIN98) files to your hard drive. This makes the installation much easier and will cause subsequent hardware installations to *automatically* find your Windows 95/98 files! (You won't have to reinsert your Windows CD every time a major change occurs on your system!)

Alternative: If you have a small hard drive, (if you are short on space), you can install

directly from the CD-ROM without copying the Windows setup files to your hard drive. How? Copy your CD-ROM driver file, config.sys, autoexec.bat, and mscdex.exe from your startup disk to your C:\ drive and boot *without* the startup disk. Then run SETUP directly off the CD-ROM to install Windows 95/98.

However, if at all possible, copy the Windows setup files to your C: hard drive. Here are the commands to type in at the DOS prompt (A:> C:> etc.) Press the [Enter] key after each command when at the DOS prompt:

```
C:  
CD \  
MKDIR WINDOWS  
CD WINDOWS  
MKDIR OPTIONS  
CD OPTIONS  
MKDIR CABS  
CD CABS
```

If you are using the example “Q” CD-ROM drive used in the autoexec.bat setup, copy the Win95 (or WIN98) files as follows. Otherwise, **substitute the letter Q** drive with the letter assigned to *your* CD-ROM drive:

```
COPY Q:\WIN95
```

If you are using **Windows 98**:

```
COPY Q:\WIN98
```

Run the Windows Setup

It will take several minutes for all the files to copy. You’ll see many file names (mostly .CAB files) scroll down the screen. When the COPY is complete, issue the SETUP command to begin the Windows 95/98 setup:

```
SETUP
```

The setup program will begin. It will start with a scandisk of your system. Once complete, you can click on EXIT to finish. **If you do not have a working mouse** at this point, you’ll have to use your

TAB and ARROW keys to move and the SPACEBAR and ENTER key to select or execute commands.

If you're using the Windows 95 **Upgrade** CD, you'll have to put in your Windows 3.1 Disk 1 and locate it by browsing to the A: drive during the install to allow the installation to take place. If you're using the Windows 98 **Upgrade** CD, you'll have to insert a Windows 95 CD locate it by browsing to it.

Read through the next section before continuing with the setup. You may accept all the default answers during the Windows 95/98 installation, except:

Typical or Custom: If you have plenty of space and want *everything* installed, choose CUSTOM when prompted for the type of installation. Then choose all checkboxes in the custom selection options. NOTE: If boxes are deselected, uncheck them and recheck them to make sure they are not slightly grayed out. When you deselect and reselect **accessories**, it will prompt you that it will remove FAX or NOTEPAD components. Select YES when prompted with that dialog box. Before continuing from the custom selection, make sure all boxes are checked and not grayed out. Doing this will install ALL Windows 95/98 programs, sounds and desktop components. (You can always go into Control Panel later and remove any components you don't want).

Additional Devices: If prompted for additional devices for setup to detect, choose CDROM, SOUND CARD, and NETWORK CARD as appropriate for what is on your system. If you don't know for certain what devices are on your system, select all the check boxes. (You may or may not receive check boxes for *all* these items).

VERY IMPORTANT: When asked what directory to install Windows into, **DO NOT** accept the default entry of C:\WINDOWS.**000**. Instead, click CUSTOM and change the install directory to C:\WINDOWS. You will receive a warning that this directory is already used. That's OK! This is only because you've already copied your WIN95/98 setup files to the c:\windows\options\cabs directory.

During network setup: You should typically do the following, especially if you will connect to local network, share files or printers, play network games or plan to use a dial-up to the Internet:

Remove the Netware network component (unless you plan to run on a Novell network)

Add protocol Microsoft TCP/IP.

Add protocol Microsoft IPX (if not already selected).

Add protocol Microsoft NETBEUI (if not already selected)

Add service Microsoft File and Print sharing

Components Displayed: When the components are displayed, you should change the monitor from UNKNOWN your monitor, or if you don't know, usually a standard SVGA 800x600 is safe.

Setup will proceed to copy files and then restart the machine. (This takes a little while).

After Windows 95 boots for the first time, you will be prompted to set the time zone, setup Exchange, and printers. (There are only slight differences for Windows 98). For now, just set the time zone and local time and CANCEL all others. You may also be prompted at this time for 3rd party driver disks for any other cards or hardware that you have installed in your system.

NOTE: If you're installing to a laptop with a PCMCIA controller, you may be prompted that the PCMCIA controller is incompatible, and the machine will be forced to reboot. The machine will reboot in SAFE MODE. After rebooting into SAFE MODE, simply shutdown/restart the machine and boot back into Windows95 normal mode. You may be prompted at this time for 3rd party driver disk for any PCMCIA cards that you may have. Insert those disks as prompted and follow the onscreen prompts. Laptops from various vendors may or may not do this. Some may display these messages *later*. Just be aware of it, and follow the instructions if it happens.

Add/Update Drivers

Once the basic system is up, you need to update all your hardware drivers, add printers, and get all the basic hardware and connections working. When Windows first boots, typical problems include poor video, sound not working, network card not seen, etc. It's not uncommon to boot a few times while the initial hardware is found. It can be a confusing mess of "hardware found" messages leaving you with no idea what device or driver the system is looking for.

You can slowly, and logically work through this and get all your devices up and running. Let's "walk through" the general steps of setting up devices to give you an idea of how to setup the devices on *your* system.

First, right-click on the My Computer icon on the desktop and choose Properties. Click

the Device Management Tab. Scroll down through the list and write down the device name next to any abnormal icon along the left edge. An abnormal icon has a red X or a yellow exclamation (!) over the icon. These are devices you need to get drivers loaded for. If you followed the instructions, you've already found all your driver disks, or have gone to the vendor websites and downloaded the latest drivers, then you need to get the latest drivers installed. If not, you'll have to do it now. Some system modems or network cards come back up with the default load of Windows. If you're not "back online" you may have to obtain drivers by downloading them to another computer and creating driver setup diskettes.

Most driver disks, or updated drivers downloaded from the web include specific instructions. You should always follow the vendor's instructions. In some cases, you may have driver disks, but no instructions. Here's a good step to try:

Go to the Device Management tab (Right-click on My Computer and choose Properties). Highlight and remove the device for which you have a driver diskette. (Only remove one "abnormal" device at a time). You'll probably be prompted to reboot. If not, manually restart the system by using the Start Menu Shutdown... Restart.

When the system comes back up, it should detect the "new" device. Insert your driver disk and follow the prompts. If given an option to look in a different location, choose or browse to the location of your driver disk or downloaded driver file. If this still doesn't work, repeat the steps and try browsing directly to any folders the disk, particularly if the folders are named with your Operating System version (i.e. a Win95 or Win98 folder). In most cases, if you have a valid driver disk (or updated driver in a folder on your hard drive) for the device, this will work. In other cases, you may have run the INSTALL or SETUP program on the driver diskette or CD.

Repeat this, one at a time, for each "abnormal" device on your system. This process should get all or at least most of the core devices working on your system.

Alternative Drivers: You can also try some "generic" drivers to run devices when you simply can't find the original driver diskettes or can't even determine the vendor.

Monitor: Try the "Windows Standard VGA"

Modem: Try generic or "Hayes Compatible"

Network: Try Novell/Anthem NE1000 or NE2000 compatible.

If you're still left with non-working devices, you'll need to contact the vendor, or ask a more experienced user for help. If you're still left with no answers (and the device(s) not

working), then you may be forced into taking your computer into a local computer shop and paying for help, or simply buying a replacement device.

Windows Update and Other Important Updates

You should try and get network (Internet) access up as soon as possible. This will help as you try to find additional drivers and updates. Once you get connected to the Internet, it's a very good idea to go to <http://windowsupdate.microsoft.com> website and download all the critical updates. I'd also recommend getting the latest version of Internet Explorer, DirectX, and Media Player from the Windows Update site.

You should also get your Anti-Virus software loaded as soon as possible, and download the latest anti-virus program and definition updates.

To customize your CD-ROM: Right click on the "My Computer" icon on the desktop and choose "Properties". Choose the "Device Management" tab. Expand the CD-ROM entry and highlight the CD-ROM. Click on the properties button. Click on the "Settings" tab for the CD-ROM. De-select the "autoinsert notification" box if you don't want programs automatically popping up or playing every time you insert a CD in your computer. Select Q as the start and Q as the end drive. Click OK. Let the machine reboot when prompted. Your CD-ROM drive will now be accessed as the Q drive. Setting the drive letter (i.e. to Q) can be very useful if you add other hard drives, zip drives, or card readers (for cameras). Setting the drive letters will prevent drive letters from "shifting" so much and causing problems.

Printers, Scanners, Cameras and Drives

Next, setup your printer(s), scanner, cameras, and any external or additional drives (ZIP drives, card readers, etc. Usually, these types of devices have program disks to install in addition to basic driver detection and loading as described earlier.

Install Software

Load the Windows95 Plus Pack now if you have it. To install the Plus pack, simply run the SETUP program from the CD or DISK #1 and accept all the default answers.

INSTALL YOUR APPLICATIONS

Install your *oldest* Windows applications first, and then the newest. This way, you'll end up with the

newest libraries and configuration files on your system. Remember, if you kept some hard drives in tact during the rebuild, you may need to reinstall applications originally installed on those other drives for them to work properly. In general, if you're prompted during an installation or hardware change to overwrite a newer version of a program or library, don't. As a rule, keeping the newer program, DLL, or other library or driver file is best.

If you are rebuilding your system due to lots of strange problems, lockups, and crashes, you should avoid loading older applications. In this case proceed slowly, loading an application and checking to see that your system remains stable. If you have problems, "back out" by uninstalling the most recently installed program(s). You should also consider installing a System Utility Suite such as Norton System Works. These suites have programs to help you detect and fix lots of system problems. In addition, they have installation "watch" utilities that can help you avoid problems with installed programs and assist in the removal of a "problem" program installation.

Most applications can be installed by running the SETUP or INSTALL program from the first diskette or CD.

DOWNLOAD AND INSTALL COMMON UTILITIES

Download and install common utilities such as Winzip, Adobe Acrobat, Tweakui (from Microsoft) or any other of your favorite utilities.

INSTALL YOUR GAMES

This is really hard, but try to install your games last! Games, in general, tend to cause more system problems than mainstream applications and utilities. Again, the general concept of avoiding older programs when possible tends to help. The older the program or game, the less likely it is to be fully compatible with your current operating system, and the more likely it will cause problems if installed.

DISK COMPRESSION

Optional Compression (with Plus Pack): (In almost all cases, **you don't need to do this**). If needed, you may compress your hard drives. This will allow you to store up to one and a half as much information on these drives. (This is optional -- if you don't want compressed drives, just skip these steps)

To compress drives in Windows 95

- Click on the START button.
- Go to Programs
- Go to Accessories
- Go to System Tools
- Choose DriveSpace

Compression Step 1: In DriveSpace, highlight the drive you wish to compress. To compress it, select Drive from the top menu bar and choose Compress... On the compress dialog, choose the Options button, and set the amount of free space to 20.00 MB (from 2.00 MB). Then check the "Hide host drive" box. A dialog box will appear to confirm. Choose YES. Then, click on OK. On the next dialog box, click Start. You will then be prompted to update your startup disk. Choose NO for now. (You can make a new startup diskette update it later. I recommend keeping your original startup diskette in this procedure, especially if you had to make a special CD-ROM boot diskette).

If prompted to backup or "COMPRESS NOW", just choose COMPRESS NOW. The compression on the empty drive will take about 15 minutes. Once complete, click the "close" button on the review dialog box.

Compression Step 2: Next, you will be asked choose the type of performance. I recommend High Performance, and let the drive be compressed by the System Agent on a regular basis. However, if you want to maximize the space and not have to worry about scheduling Compression, just choose "More Free Disk Space".

Repeat compression steps for as many drives as you want to compress.

NOTE: You may not see any space gain when selecting HIGH PERFORMANCE. The space gain will come as the compression agent runs (over time).

After compressing the drives, you will be prompted to reboot.

NOTE: In Windows 98, you can also gain significant space by setting up the drives with FAT32 instead of the default FAT16 (gains roughly 50 megs per gigabyte of disk space).

[Back](#)

[Home](#)

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