Contents

Frequently Asked Questions

General Help 20108

Topics in the Tip help file are designed to be accessed from Wintune's Tip window. We recommend you search the main help file for further information on how to fine-tune your system.

Tip Disclaimer `Close`

We cannot and do not guarantee that these tips will work properly on all systems all the time, and therefore offer the tips "as-is" without warranty or guarantee as to merchantability or suitability to task. You use these tips at your own risk. If you aren't sure of the suitability to task of the tips in this help file, or are uncertain about your ability to perform any of the tips correctly, seek additional advice before proceeding. In any case, CMP Publications, Inc., its employees or freelancers are not responsible for any injury, damage or loss resulting from your use of the tips in this help file or information they contain.

Suggested SMARTDRV Settings

`Copy`
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If your computer has this much memory	If you are not running 32-bit file access	If you are running 32-bit file access
4MB	SMARTDRV 1024 512	remove SMARTDRV
8MB	SMARTDRV 2048 2048	SMARTDRV 2048 128
16MB	SMARTDRV 4096 4096	SMARTDRV 4096 128
32MB	SMARTDRV 4096 4096	SMARTDRV 4096 128

Click here to see how to adjust SMARTDRV settings.

The 32-bit file access feature is available if you are running Windows for Workgroups 3.11.

In general, Microsoft recommends that you dedicate one-quarter of your system RAM to a disk cache. If you use more than that, you can actually hurt performance because it reduces the amount of RAM that Windows can use to load and run applications. You may actually be able to use slightly less RAM for a disk cache but still get good performance, but the one-quarter rule of thumb is a good starting point.

Like any rule, though, there are exceptions. SMARTDrive caches over 4 megabytes (4096KB) generally don't offer much of a performance payback, so it doesn't usually pay to use a cache size of 8MB on a 32MB system.

Also, you need to be careful about setting the SMARTDrive cache size if you are using Windows for Workgroups and are using 32-bit file access (also known as VFAT). For more details, see the tip "Enabling 32-bit file access" in the Improving Disk Performance, section of the main help file.

Changing .INI Files

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Almost any Windows configuration change made through Windows Setup or Control Panel changes the contents of WIN.INI or SYSTEM.INI. So, before you make changes to an . INI file (directly or indirectly) be sure you can restore your present configuration. It is possible that you will be unable to start Windows after making a change. Here's a prudent set of precautions to take:

☞   Create a new DOS directory called TEMP or BACKUP (Select FILE/CREATE in File Manager)

☞   Copy WIN.INI and SYSTEM.INI to the new directory. Don't **move** them; **copy** them. Be careful; it is easy to move a file by accident. If you're inexperienced with moving and copying files, click here for some advice. In any case, it's a good idea to select refresh from the Window menu after you have "copied" these two critical files, to ensure that they are still in the WINDOWS directory.

☞   Make the WIN.INI or SYSTEM.INI changes (using setup, Control Panel or a text editor).

☞   Exit Windows. Reenter Windows. If your computer locks up or behaves oddly, use the DOS COPY command to return your backup copies to the WINDOWS directory (or whatever directory you found them in).

WIN.INI and SYSTEM.INI have the same general structure. They are divided into sections, each of which is marked by a keyword in square brackets, such as [386Enh]. Lines that are comments begin with a semicolon; if you wish to remove a line without deleting it, you can put a semicolon in front of it. If you are trying to reduce the size of your .INI files, don't comment out lines, delete them.

Click here to get specific instructions on **how** to edit WIN.INI or SYSTEM.INI directly.

Copying Files Safely With File Manager

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[Close]

If you select a file in File Manager and drag it to another directory on the same disk, File Manager doesn't copy the file, it moves it. If you hold down the Ctrl key when you click on a file, the little file icon has a "+" in it, indicating you are copying, not moving.

The safest thing to do is select WIN.INI or SYSTEM.INI in File Manager. Then, select File/Copy and copy it to a new name (like WIN.BAK for example). Then, move the copy to your new directory. This way, you are certain to leave WIN.INI and SYSTEM.INI undisturbed in your WINDOWS directory, where they belong.

Changing CONFIG.SYS or AUTOEXEC.BAT

Before you make changes to AUTOEXEC.BAT or CONFIG.SYS, be sure you can get back to your present configuration in case you make a mistake. If you edit these files incorrectly, it is possible that you will be unable to boot from the hard disk. Here's a prudent set of precautions to take:

Prepare a DOS boot diskette   using the FORMAT /S command.

Create a DOS subdirectory on it and copy essential DOS command files to it like FDISK, FORMAT and EDIT.

Test your diskette   by booting your PC with the diskette in the A: drive.

Create a BACKUP subdirectory on the diskette   and copy your AUTOEXEC.BAT and CONFIG.SYS files to the subdirectory. **You don't want to copy these files to the root directory** because DOS would try to execute them when it booted off the diskette .

If your system fails to boot or behaves oddly after you make the changes, boot from the diskette   and copy AUTOEXEC.BAT and CONFIG.SYS from the BACKUP directory on the diskette   to the root directory on your hard disk . Reboot from your hard disk . You should be back in business.

Click here to get specific instructions on **how** to edit your CONFIG.SYS or AUTOEXEC.BAT files.

Editing System Files

Before you edit any system file you must protect yourself by backing the system file up. Click here to see how to back up .INI files. Remember, if you change a setting in Control Panel or by using Windows Setup, you're changing an INI file. Click here to see how to back up AUTOEXEC.BAT and CONFIG.SYS.

We have created a batch file you can use from DOS to back up your AUTOEXEC.BAT, CONFIG.SYS and .INI files automatically. Simply click here, copy the text to Windows Clipboard , (push the Return button to return to this screen), select File/Run in Program Manager, type NOTEPAD, then select Edit/Paste and File/Save. Enter C:\SYSBU.BAT. Exit Windows, place an empty, formatted diskette in the A: drive and type SYSBU.

Windows ships with several text editors that can be used to alter system files, such as most .INI files, as well as CONFIG.SYS and AUTOEXEC.BAT.

The easiest tool to use is SysEdit . Because altering the system files can make a system unbootable, most systems do not have a SysEdit icon in any of the Program Manager groups. To bring up this program, select File/Run in Program Manager, type SYSEDIT, then click on the file you wish to edit. Be sure to save your changes before exiting. If you think you might have made an error, select File/Exit without saving and start again.

You can also use Notepad; select File/Run in Program Manager, type NOTEPAD. You will have to open the file you wish to edit. AUTOEXEC.BAT and CONFIG.SYS are usually found in the root directory (typically C:\) and WIN.INI and SYSTEM.INI are typically found in the WINDOWS directory. If you can't find them, open File Manager, select the root directory, then select File/Search . Make sure Search All Subdirectories is checked. File Manager will find the files for you.

Or, if you don't have these files for some reason, you can go to America Online, to the Wintune & Support Files library under keyword WinMag and download INIEDIT.EXE, a self-extracting .INI file editor developed by one of our contributing editors, Jim Boyce.

Online Access

@Echo Off

REM   The following three SET statements may have to be modified

REM   to reflect your computer's configuration.

REM

REM   WDir should be set to full path (Drive and directory) where

REM   Windows is installed.   The default is C:\WINDOWS.

REM

REM   Dest must be set to the drive letter of the floppy disk   drive

REM   where system files will be copied.   The default is A:.

REM

REM   Boot must be set to the drive letter of your boot disk.   The

REM   default is C:.

SET WDir=C:\WINDOWS

SET Dest=A:

SET Boot=C:

REM   Check for command line parameters that override variables.

If Not x%1 == x Set WDir=%1

If Not x%2 == x Set Dest=%2

If Not x%3 == x Set Boot=%3

```
REM   Validate variables

If Not Exist %WDir%\WIN.INI GoTo BadWdir

If Not Exist %WDir%\SYSTEM.INI GoTo BadWdir


If Not Exist %Dest%\nul GoTo BadDest


If Not Exist %Boot%\CONFIG.SYS GoTo BadBoot

If Not Exist %Boot%\AUTOEXEC.BAT GoTo BadBoot


GoTo Backup



:BadBoot

Echo Warning:   AUTOEXEC.BAT and/or CONFIG.SYS could not be located.

Echo           This may indicate that your Boot Disk (environment

Echo           variable BDrv) may not be set correctly.   Check the

Echo           REMarks at the beginning of this batch file for details.



:Backup

REM   Copies CONFIG.SYS, AUTOEXEC.BAT, and ALL .INI files found in

REM   the Windows directory (including SYSTEM.INI and WIN.INI

Echo Copying Files ...

If Not Exist %Dest%\BOOT\nul MkDir %Dest%\BOOT

If Exist %Boot%\CONFIG.SYS COPY %Boot%\CONFIG.SYS %Dest%\BOOT

If Exist %Boot%\AUTOEXEC.BAT COPY %Boot%\AUTOEXEC.BAT %Dest%\BOOT

If Not Exist %Dest%\INI\nul MkDir %Dest%\INI
```

```
Copy %WDir%\*.INI %Dest%\INI


GoTo Exit



:BadWDir

Echo Error:   WIN.INI and/or SYSTEM.INI could not be located.   This probably

Echo            indicates your WINDOWS   directory has not been specified correctly

Echo            (in the WDir environment variable).   Check the REMarks   at the

Echo            beginning of the batch file for details.

GoTo Error



:BadDest

Echo Error:  Your specified destination disk is not ready, or doesn't

Echo            contain a formatted diskette.   Please double-check and try

Echo            again.   If drive and diskette appear okay , your Destination

Echo            Drive may not be properly specified in the batch file.

Echo            Check the REMarks at the beginning of the batch file for

Echo            details.

GoTo Error



:Error

Echo -

Echo            Or you can override the variable settings by using the command

Echo            line shown below.   If you do so, you must specify all three

Echo            parameters (WINDOWS directory, destination disk and boot disk ).
```

```
Echo -

Echo              SYSBU WINDOWS directory destination disk boot disk

Echo -

Echo           For example, SYSBU C:\WINDOWS A: C:



:Exit

Set WDir=

Set Boot=

Set Dest=
```

Making Disk Changes

If you don't have a regular backup program for your hard disk you should. Hard disks are mechanical devices. They fail. Sometimes they fail catastrophically, and all the data on them is unrecoverable. This is not the place for a tutorial on backups, but, depending on how much data you change how often, you should probably do a full backup monthly and an incremental backup daily or weekly. In any case, before you make any changes to any disk settings, make **certain** that you have in hand your last full backup and all the incremental backups since then, and that the backups are readable. This may seem like a waste of time, but every second you spend on this activity will be paid back a thousand-fold if you change your disk settings and lose all your data.

Changing CMOS Settings

Details

Before changing any ROM BIOS or CMOS settings you should either make a copy of your existing CMOS or write down the settings so you can restore them if your computer fails to work properly after you make the changes. Among the utilities that   can save and restore your CMOS settings is Norton Utilities Rescue .

Also, while changing settings, make sure you don't change a setting by accident. If you think you may have changed a setting unintentionally, follow the CMOS setup program instructions for leaving the program **without** recording the changes you have made and start over. Better safe than sorry.

Click on the Details button above to see more detailed information about saving and restoring CMOS settings.

Enable 486 internal cache `Before You Start`
`Q&A`

Based on the performance of your system in our low-level tests, we believe that the internal RAM cache on your 486 chip is not working. This can happen because of an incorrect system board jumper or BIOS setup parameter. As a result, your system is performing significantly below average.

Please check the documentation for your system to see whether it has a 486 cache and whether that cache can be disabled. If you don't have documentation, run your PC's BIOS setup routine. If there is a parameter named something like "internal cache", "Level-1 cache" or "486 cache" make sure it is enabled.

Slow performance could also be due to an incorrectly set Turbo button.

Changing 486 Cache Settings

If you need to change   a jumper on the motherboard, <u>click here</u> to see our advice on how to prepare for a hardware upgrade.

If your cache problem appears to require a <u>CMOS</u> setting change, <u>click here</u> to see our advice on preparing for such a change.

Check memory wait states `Before You Start`
`Q&A`

Our tests indicate that your main memory may have one or more <u>wait states</u>. Memory wait states are used to match a PC's performance to slow (cheap) <u>RAM</u>. This seriously hurts performance.

The only definitive way to tell if your PC really requires memory wait states is to turn them off and see if the system still works. Sometimes wait states are inadvertently turned on because of an incorrect jumper on the system board or an incorrect BIOS setup parameter. Check your PC's documentation to see if a setting of this type is available.

Another possibility is that you are using a memory board plugged into the expansion (ISA) bus. This practice went out with 286-based PCs, but some people may have moved these old slow memory boards to newer 386 and 486 PCs.

Slow performance could also be due to an incorrectly set <u>Turbo button</u>.

Check Turbo settings `Before You Start`
`Q&A`

Your system is performing below the lowest level typically encountered for a processor of this type. This may be due to having your Turbo   switch (if there is one) set in the wrong position.

Check your Turbo   switch and make sure that one setting actually slows down the system, and the other gives you better performance. If the switch has no effect, it is possible that the switch is not connected and the PC is permanently in non-turbo mode. Check your system board documentation for more information.

Many top name-brand PCs from vendors like IBM or Compaq do not have a Turbo   switch, but most other systems do. If you do not see a Turbo   switch, there may be a CMOS setting for fast/slow bus speed (set it to FAST), or the system board may have a set of jumper pins for a switch that must be closed to get full performance. Some systems use a keyboard command such as Ctrl-Alt-+ to change to Turbo mode. Check your system documentation for more details.

`Copy`

Install more RAM `Copy`

Your PC appears to have less than 8 megabytes (MB) of RAM installed. We have found that the best performance upgrade you can make to a system when it has this little RAM is to add memory.

If you have 8MB or more of RAM installed, then check to see that all RAM is designated for use as **extended** memory. RAM reserved for use as **expanded** (or **LIM EMS**) memory is not available for use by Windows. Also check your CMOS settings to ensure that the system is recognizing all the memory you have installed.

Click here to see how to install more RAM.

Change EMS Memory to Extended [Copy]

We have determined that you are reserving some system memory as **expanded**, rather than **extended** RAM. **Expanded** memory is not used by Windows, so changing it to **extended** is likely to produce significantly enhanced performance.

Most likely, you have a memory manager installed that is configuring this memory as expanded memory. You may need such a configuration if you are running an old DOS application such as Lotus 1-2-3 Release 2, while outside of Windows. However, if you always run your DOS applications under Windows, you should configure your memory manager to use all memory as extended memory. Consult the documentation for your memory manager for more information.

The most common expanded memory manager is EMM386.EXE. Find the line in your CONFIG.SYS file that looks like this:

        C:\DOS\EMM386.EXE

And either delete it, or (if you need EMM386 for other reasons, such as using Loadhigh and Devicehigh, or marking certain memory regions as unusable by Windows for device compatibility), add a /NOEMS switch to the line:

        C:\DOS\EMM386.EXE /NOEMS

For more information, consult your DOS manuals (on DOS versions 6.0 and later you can also type HELP EMM386.EXE from a DOS command prompt for on-line information).

Another possibility is that you have an add-in expanded memory board installed. Since memory installed on the add-in (ISA) bus is very slow, you generally would not want to use this memory for other purposes. In this case, you can safely disregard this tip.

This tip involves changes to CONFIG.SYS. Click here to see how to change system files.

Copy

Add secondary RAM cache **Copy**

It appears that your PC does not have a secondary (external to the CPU) RAM cache. A secondary RAM cache can improve performance, especially for large applications.

It is possible that you already have a secondary RAM cache, but it is disabled. Check your system board or BIOS documentation for more information.

Not all PCs have the option to add external cache. Contact the vendor who sold you the PC to inquire about upgrade options.

Copy

Remove RAM drive **Copy**
Copy

Wintune has detected you are using a RAM drive that is relatively large considering your available RAM. Eliminating the RAM drive and allowing Windows to use the memory thus released will probably improve your overall performance. (The tip in the Windows 3.1 manual about directing TEMP to a RAM disk is--with rare exceptions--bad advice.)

The most common RAM drive is RAMDRIVE.SYS, which comes with Windows and most versions of DOS. In your CONFIG.SYS file, you will see a line that starts:

    DEVICE=RAMDRIVE.SYS

and may have other parameters after the filename. Change the line to read

    REM DEVICE=RAMDRIVE.SYS

to disable the RAM drive.

This tip involves changes to CONFIG.SYS. <u>Click here</u> to see how to change system files.

`[Copy]`

Install a disk cache `[Copy]`

`[Copy]`

Based on the performance of your disk, it appears you are not using a disk cache. Installing a disk cache can significantly improve your PC's performance.

Windows 3.1 includes a disk cache called <u>SMARTDrive</u>. There is an even better disk caching technology called <u>32-bit file access</u> in Windows for Workgroups 3.11.

It is also possible that you **do** have a disk cache installed, but Wintune was unable to detect it. However, your disk performance would seem to indicate that if a disk cache is in use, it is not working well. This may be due to an inadequate cache size. If you are using a third-party disk cache, check your documentation or contact the vendor about the settings.

Before following this tip, please <u>click here</u> to see the precautions you should take.

Copy

Increase SMARTDrive cache size **Copy**

Copy

Although you have SMARTDrive (or a SMARTDrive-compatible disk cache) installed, the cache size is smaller than the value recommended by Microsoft. You might be able to improve disk performance with a larger cache size.

To change the size of your SMARTDrive cache, see: SMARTDrive . To see some suggested SMARTDRV   settings, click here

This tip involves changes to AUTOEXEC.BAT or CONFIG.SYS. Click here to see how to change system files.

Copy

Decrease SMARTDrive cache size **Copy**

Copy

Your SMARTDrive cache size is probably larger than it needs to be. By reducing the size, you can free that memory for use by Windows, and improve overall performance.

To change the size of your SMARTDrive cache, see: SMARTDrive . To see some suggested SMARTDRV   settings,   click here

This tip involves changes to AUTOEXEC.BAT or CONFIG.SYS. Click here to see how to change system files.

Use SMARTDrive's write-back feature `Copy`

You do not appear to be using SMARTDrives   write-back cache feature on the disk that Wintune used for its tests. The write-back feature can greatly improve disk performance, although there is a possibility that some data may not be saved to disk if you turn off your PC without exiting Windows. If this is a notebook PC, or if you are using disk compression software, you may want to keep the write-back feature turned off.

Find the line in AUTOEXEC.BAT file that contains

        SMARTDRV.EXE /X...(etc.)

(there may be other things on the line as well; do not change them) and change it to

        SMARTDRV.EXE (etc.)

For more details see SMARTDrive in the main help file.

This tip involves changes to AUTOEXEC.BAT or CONFIG.SYS. Click here to see how to change system files.

`Copy`

Add /MEMTEST:OFF to HIMEM `Copy`
`Copy`

If you would like to reduce the time it takes to boot your PC, you may want to disable HIMEM's memory testing. Find the line in your CONFIG.SYS file that says

        DEVICE=HIMEM.SYS

and change it to

        DEVICE=HIMEM.SYS /MEMTEST:OFF

NOTE: If your PC "hangs" while running Windows, it is sometimes due to RAM problems. You should change the HIMEM line back to its original form if you encounter unexplained problems that might be due to RAM chip failures.

This tip involves changes to AUTOEXEC.BAT or CONFIG.SYS. Click here to see how to change system files.

`[Copy]`

Enable 32-bit disk access `[Copy]`

`[Copy]`

Windows offers a feature called 32-bit disk access or FastDisk that can increase performance of many hard disks. It appears that your disk may be compatible with this feature. If you are running Windows on a laptop or portable computer, we do not recommend using 32-bit disk access because it may not be compatible with the power-conservation features in your system's BIOS.

Click here to see how to enable 32-bit disk access.

Even though you make this change using Control Panel, you are, in fact, changing the underlying SYSTEM.INI file. Click here to see what precautions you should take before making such a change.

`Copy`

Enable 32-bit file access `Copy`

`Copy`

Windows for Workgroups 3.11 offers a disk caching technology called 32-bit file access that provides higher performance than the SMARTDrive cache that comes with Windows. You may want to try enabling this feature to see if you can increase your disk performance.

Click here to see our recommendations for the size of this cache.

Click here to see how to enable 32-bit file access.

Even though you make this change using Control Panel, you are, in fact, changing the underlying SYSTEM.INI file. Click here to see what precautions you should take before making such a change.

[Copy]

Create a permanent swap file **[Copy]**

[Copy]

Windows is currently using a temporary swap file for its virtual memory. You can often obtain better performance by creating a permanent swap file on your hard disk.

Click here to see how to create a swap file.

Even though you make this change using Control Panel, you are, in fact, changing the underlying SYSTEM.INI file. Click here to see what precautions you should take before making such a change.

[Copy]

Increase swap file size **[Copy]**
[Copy]

The size of your permanent swap file is small considering the amount of RAM installed in your system. You may want to increase the swap file size, particularly if you have been receiving "Out of Memory" messages.

For a good minimum swap file size, subtract the total amount of RAM in your system (in kilobytes) from 16384.   So, if you have 8MB (8192KB) of RAM, you should have at least a 8192KB swap file (16384 - 8192) .   For systems with more than 16MB of RAM, a 4MB swap file is usually plenty.

<u>Click here</u> to see how to enlarge a swap file.

Even though you make this change using <u>Control Panel</u>, you are, in fact, changing the underlying SYSTEM.INI file. <u>Click here</u> to see what precautions you should take before making such a change.

[Copy]

Decrease swap file size   [Copy]

[Copy]

Your swap file appears to be larger than necessary. This wastes disk space, and does not improve performance.

If you run applications that require large amounts of virtual memory, such as 24-bit image-editing programs like Photoshop or PhotoStyler, your swap file settings may be correct. If you reduce your swap file size and get "Out of Memory" messages then you should increase its size again.

For a good minimum swap file size, subtract the total amount of RAM in your system (in kilobytes) from 16384.   So, if you have 8MB (8192KB) of RAM, you should have at least a 8192KB swap file   (16384 - 8192) .   For systems with more than 16MB of RAM, a 4MB swap file is usually plenty.

Click here to see how to decrease swap file size.

Even though you make this change using Control Panel, you are, in fact, changing the underlying SYSTEM.INI file. Click here to see what precautions you should take before making such a change.

`Copy`

Increase 32-bit file cache size `Copy`
`Copy`

The size of your 32-bit file cache is smaller than the size recommended by Microsoft, and this may be causing reduced disk performance.

Click here to see how to enable 32-bit file access.

Click here to see our recommendations for the size of this cache.

Even though you make this change using Control Panel, you are, in fact, changing the underlying SYSTEM.INI file. Click here to see what precautions you should take before making such a change.

`Copy`

Recommended 32-Bit file access cache size

`Copy`
`Copy`

To adjust 32BFA cache, see Control Panel/Enhanced/Virtual/Change; for details on Control Panel, click on the green words Control panel on the main screen to the left of this screen):

If your PC's total RAM is:	Set the 32-bit disk access cache size to:
4MB	512KB
6MB	1024KB
8MB	2048KB
12MB	3072KB
16MB or more	4096KB

`Copy`

Decrease 32-bit file cache size   `Copy`

`Copy`

The size of your 32-bit file cache is larger than the size recommended by Microsoft. Windows might be able to use some of the memory you have allocated to the 32-bit file cache more effectively, increasing overall performance.

Click here to see our recommendations for the size of this cache.

Click here to see how to change 32-bit file access.

Even though you make this change using Control Panel, you are, in fact, changing the underlying SYSTEM.INI file. Click here to see what precautions you should take before making such a change.

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Increase available disk space   `Copy`
`Copy`

The hard disk tested by Wintune is very low on free disk space. A nearly full disk is more likely to become fragmented and will lead to reduced disk performance.

We suggest that you go through your hard disk carefully and copy any files you think you don't need to diskettes . Label the diskettes and save them for at least a month. After you have copied the files onto a labeled diskette, delete them from the hard disk. Later, if you are running a program and it asks for a file you have deleted you can copy it back.

Generally speaking, it is safe to delete files with an extension of .BAK. If you close Windows, it is usually safe for you to delete files with an extension of .TMP.

This tip involves changes to your hard disk . Click here to see how to prepare for such changes.

Copy

Upgrade your hard disk   **Copy**

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The disk that Wintune tested has very low capacity, and its performance is also slow. You may want to consider buying a larger, faster hard disk.

Click here to see how to upgrade your hard disk.

This tip involves changes to your hard disk . Click here to see how to prepare for such changes.

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Upgrade your 386 CPU **Copy**

Your CPU is performing like a low-speed 386 CPU. You may be able to replace the current CPU in this system with a higher-performance model.

Click here to see some general advice on upgrading a CPU.

Click here to see our advice on how to prepare for a hardware upgrade.

`[ Copy ]`

Upgrade your 486 CPU   `[ Copy ]`

Your 486 CPU appears to be running relatively slowly. You may want to consider upgrading the CPU using an OverDrive processor--or replacing it completely.

Click here to see some general advice on upgrading a CPU.

Click here to see our advice on how to prepare for a hardware upgrade.

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Increase system break points   `Copy`

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Your system has a low setting for system breakpoints. System breakpoints are a resource Microsoft uses to manage virtual machines and real-mode drivers in Windows. The default allocation is 4KB of memory for these on start-up. Once used, they are used up, and if you run out of them (Windows does not warn you) your system may become unstable or crash.

You can double the space allocated to these breakpoints by adding a line to your SYSTEM.INI file.

☞   Open a DOS box. Run MEM. Check the free memory below 1MB. Make sure the number is not larger than 600KB. If it is **DO NOT CONTINUE WITH THIS TIP.**

☞   Open SYSTEM.INI and search for

    MAXBPS=

    If the line is already there and it is less than 768, change it to 768

☞   If there is no MAXBPS line, find the line in your SYSTEM.INI file that says

    [386Enh]

and add a new line beneath it:

        MaxBPS=768

This tip involves editing SYSTEM.INI. <u>Click here</u> to see what precautions you should take before making such a change.

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Check low system resources `Copy`

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Wintune has detected that less than 50 percent   of your overall system resources are available. This can have several causes:

If you are running several applications, we suggest that you **exit Windows now**, and restart it while holding down the Shift key. This will cause a "clean" start, with only Program Manager running. Start Wintune from Program Manager, and see if this tip reappears.

If only Wintune and Program Manager are running, you should have more system resources available. It is possible that some program you previously ran, then closed, has "leaked" resources.

Click here for some things you can do to increase available resources.

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Increasing available resources

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Consider reducing your color depth. The more colors you display, the more system resources Program Manager uses to store bitmaps of your icons. Click here for some advice on reducing color depth.

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Reduce the number of Program Manager groups you use and the number of icons in them. If there are icons you seldom use (and they don't require special parameters at start-up), launch them using File Managers File/Run   command. .
To find out if one of your programs is "leaking" resources:

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select Help/About Program Manager   from the Program Manager menu. Note the percentage of resources available.

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Open the application. Close it.

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Select Help/About again.

The percentage of resources used should be roughly the same as before you opened the program. If it is more than a few percentage points lower, the program in question is probably "leaking" resources--using them, but not giving them back to Windows when it is closed. Complain to your vendor.

Click Here to see the details of a shareware tool that can be used to measure "leakage" more rapidly, and track resource usage at all times.

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Resource Tracker

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If one of your applications is leaking resources, you'll find it easier to track it down with this tool on hand: Infobar, among other shareware and commercial tools, can be left up on your screen at all times, tracking resource usage and warning you when you're about to run out. Usually, the only warning you get from Windows is bizarre behavior, a locked-up system or a General Protection Fault.

You can obtain this program from America Online. It is in the Wintune & Support Files library under keyword WinMag , in a file called INFOB1.ZIP

Copy

Filename: INFOB1.ZIP

Registration: $10

Author: Jan S. Smith

Increase Windows VM low memory   `Copy`

Wintune has detected that your system has very little memory below 1MB in the Windows virtual machine (VM). Windows uses a small amount of this low memory each time it starts an application. If you are unable to start applications, but seem to have plenty of system resources and virtual memory, then you have probably run out of low memory.

Note that the amount of low memory available to Windows itself is not the same as the amount of DOS memory reported at a Windows DOS prompt. After Windows starts, it loads certain device drivers and programs into its own low-address virtual memory space, but you don't "see" those drivers while running a Windows DOS prompt. If you want to know how much low Windows VM memory you have, you can find out by clicking on Wintunes RAM tab in   the Details screen.

To increase the amount of Windows VM memory available under 1MB, , you must either remove device drivers and TSRs from AUTOEXEC.BAT or CONFIG.SYS, or must load these programs into high memory. DOS includes a program called MemMaker   that can help you with this task. Consult your DOS manuals for more information (DOS versions from 6.0 on contain on-line help that may help you, type: HELP MEMMAKER in a DOS prompt). There are also third-party products like QEMM, NetRoom or 386Max that perform this function.

This tip involves changes to AUTOEXEC.BAT or CONFIG.SYS. Click here to see how to change system files.

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Use a lower video color depth   **Copy**

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To improve your video performance, you may want to try using a video mode that provides fewer colors. To do so, you will need to install a different video driver for your system. Most video boards deliver best performance if you use the vendor's custom driver at a color depth of 8 bits (256 colors).

Click here to see information on installing video drivers.

Click here to see information on updating video drivers.

Even though you make this change using Control Panel or Windows Setup, you are, in fact, changing the underlying SYSTEM.INI file. Click here to see what precautions you should take before making such a change.

Use a lower video resolution [Copy]

To improve your video performance, you may want to use a lower video resolution. To do so, you will need to install a different video driver for your system. Most video boards work fastest with a video resolution of 640x480 pixels. If you use a higher resolution, you greatly increase the number of pixels Windows has to draw:

horizontal resolution	vertical resolution	number of pixels
640	480	307,200
800	600	480,000
1024	768	786,432
1280	1024	1,310,720
1600	1200	1,920,000

Click here to see information on installing video drivers.

Click here to see information on updating video drivers.

Even though you make this change using Control Panel or Windows Setup, you are, in fact, changing the underlying SYSTEM.INI file. Click here to see what precautions you should take before making such a change.

`[Copy]`

Use a custom video driver   `[Copy]`
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Your system appears to be using the standard Windows VGA video driver. This driver is very stable and compatible with nearly any PC, but it is not very fast. Almost every video board vendor offers a Windows driver that provides better performance. Check your system to see if you can install a higher-performance video driver.

Click here to see information on installing video drivers.

Click here to see information on updating video drivers.

Even though you make this change using Control Panel or Windows Setup, you are, in fact, changing the underlying SYSTEM.INI file. Click here to see what precautions you should take before making such a change.

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Upgrade your video board   `Copy`
`Copy`

Your video board has very low performance. If you are using the vendor's **latest** <u>driver</u> and are still getting this kind of performance, you may want to upgrade to a faster video board.

<u>Click here</u> to see how to select a new video board.

<u>Click here</u> to see information on installing video drivers.

<u>Click here</u> to see information on updating video drivers.

Even though you make this change using Windows Setup, you are, in fact, changing the underlying SYSTEM.INI file. <u>Click here</u> to see what precautions you should take before making such a change.

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Install a math coprocessor   Copy

If you are a frequent user of computer-aided design (CAD), engineering, or other numerically intensive software, you may want to install a math coprocessor.

Click here to see our advice on installing an FPU.

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Defragment your hard disk   `[ Copy ]`
`[ Copy ]`

Wintune has detected very low uncached hard disk performance. This may indicate that you need to defragment your hard disk.

Click here to see our advice on defragmenting your disk.

This tip involves changes to your hard disk. . Click here to see how to prepare for such changes.

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Reduce number of fonts `Copy`

`Copy`

Wintune has detected a large number of installed fonts. Fonts occupy memory that   would otherwise be used by applications, so an excessively large number of fonts may negatively impact performance. In some cases, we've been able to add 10KB to the DOS memory available below 1MB, and save 5 percent in system resources by deleting unused fonts. **WARNING:** Wintune (and Windows itself) **requires** certain fonts in order to run. Click Here to see the names of the fonts you should **NOT** ever remove.

Deleting these fonts, particularly MS Sans Serif, may result in an "Invalid Property Value" error when attempting to start Wintune.

To remove unused fonts:

☞   Double-click on Windows Control Panel.
☞   Double-click on Fonts.
☞   Select a font.
☞   Press the Remove button.
☞   When you are done, press Cancel to leave the Font control and Alt+F4 to exit Control Panel.

Even though you make this change using Control Panel, you are, in fact, changing the underlying WIN.INI file. Click here to see what precautions you should take before making such a change.

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Do Not Remove These Fonts!

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- Arial (TrueType)
- Arial Bold (TrueType)
- Arial Bold Italic (TrueType)
- Arial Italic (TrueType)
- Courier 10,12,15 (VGA res)
- Courier New (TrueType)
- Courier New Bold (TrueType)
- Courier New Bold Italic (TrueType)
- Courier New Italic (TrueType)
- Modern (Plotter)
- MS Sans Serif 8,10,12,14,18,24 (VGA res)
- MS Serif 8,10,12,14,18,24 (VGA res)
- Roman (Plotter)
- Script (Plotter)
- small fonts (VGA res)
- Symbol (TrueType)
- Symbol 8,10,12,14,18,24 (VGA res)
- Times New Roman (TrueType)
- Times New Roman Bold (TrueType)
- Times New Roman Bold Italic (TrueType)
- Times New Roman Italic (TrueType)
- Wingdings (TrueType)

`[Copy]`

Add /EISA switch to HIMEM `[Copy]`

`[Copy]`

If you have an EISA system with more than 16MB of RAM, you need to add the /EISA switch to HIMEM.   Otherwise, HIMEM will not recognize any memory over 16MB.

Find the line in your CONFIG.SYS file that says

        DEVICE=HIMEM.SYS

and change it to

        DEVICE=HIMEM.SYS /EISA

This tip involves changes to CONFIG.SYS. Click here to see how to change system files.

`Copy`

Remove SHARE.EXE   `Copy`

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Wintune has detected SHARE.EXE in AUTOEXEC.BAT. Windows for Workgroups has an improved file sharing interface called VSHARE that supersedes SHARE.EXE. Since SHARE.EXE is disabled when Windows starts, it just takes up memory without performing any useful work.

If you need SHARE for DOS applications that you run while not in Windows, then keep SHARE in your AUTOEXEC file. If you run **only** DOS programs in Windows DOS boxes, delete it.

Here's how you delete SHARE:

☞   Find the line in your AUTOEXEC.BAT file that loads SHARE:

            C:\DOS\SHARE

            or

            SHARE.EXE

            or just

            SHARE

☞   Delete it.

This tip involves changes to AUTOEXEC.BAT. Click here to see how to change system files.

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Reduce DOS buffers **Copy**

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Wintune has detected a high BUFFERS= line in your CONFIG.SYS file. When using SMARTDrive or WFWGs 32-bit file access, Windows provides its own disk caching and doesn't require a large number of DOS buffers. A high BUFFERS value wastes memory, and can also keep DOS from being loaded into high memory.

If you are using the multi-config option available in MS-DOS 6, note that Wintune uses the first BUFFERS= line that it finds in your CONFIG.SYS file. This may not be the configuration that you are currently using.

To change the number of buffers:

Find the line in your CONFIG.SYS file that says

>   BUFFERS=N

where N is some number, and change it to

>   BUFFERS=4

Removing the line entirely will set BUFFERS= to its default value of 15. This tip involves changes to CONFIG.SYS. Click here to see how to change system files.

Copy

Increase DOS files **Copy**

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Wintune has detected a low FILES= line in your CONFIG.SYS file. The number of files that DOS allows to be open at once is controlled by this line, and Windows requires a large number of files in order to operate properly.

If you are using the multi-config option available in MS-DOS 6, note that Wintune uses the first FILES= line that it finds in your CONFIG.SYS file. This may not be the configuration that you are currently using.

To change FILES=

Find the line in your CONFIG.SYS file that says

      FILES=N

where N is some number, and change it to

      FILES=40

This tip involves changes to CONFIG.SYS. Click here to see how to change system files.

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Windows NT Tips **Copy**

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Wintune has determined that you are running the Windows NT operating system. The Wintune 2.0 Tip Advisor is optimized for use on Windows 3.1/WFWG 3.11 systems, and cannot provide specific recommendations for Windows NT. However, we do have some "generic" advice you may find useful.

Click here to see our general performance improvement suggestions.

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Windows 95 Tips **Copy**

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Wintune has determined that you are running the Windows 95 operating system. The Wintune 2.0 Tip Advisor is optimized for use on Windows 3.1/WFWG 3.11 systems, and cannot provide specific recommendations for Windows 95. However, we do have some "generic" advice you may find useful.

Click here to see our general performance improvement suggestions.

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OS/2 Tips **Copy**

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Wintune has determined that you are running the OS/2 operating system. The Wintune 2.0 Tip Advisor is optimized for use on Windows 3.1/WFWG 3.11 systems, and cannot provide specific recommendations for OS/2. However, we do have some "generic" advice you may find useful.

Click here to see our general performance improvement suggestions.

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Congratulations! `Copy`

Congratulations! We can't think of anything more you can do to improve your system's performance--it appears to be running quite well. We recommend that you save your current results for later reference, and run Wintune again every month or so to ensure that things stay in tip-top shape.

In the meantime, if you would like to see how your system compares with other well-tuned systems, click on the Performance tab on the Wintune home screen, then the System tab. To see how your individual components fare, click on the Comparisons tab on the Wintune home screen.

Improve Hard Disk Performance

Your hard disk performance seems low for your type of system. However, Wintune did not detect any specific items that you can tune or adjust to improve performance.

You may want to consider one or more of the following actions:

• Defragment the hard disk (highly recommended).

• Make sure the disk's parameters are correctly set in the BIOS.

If your disk performance results are still not very good, it may be that your disk controller and/or hard disk are, well, slow. You may want to consider upgrading them.

Delayed cache writes can adversely affect Wintune's disk performance measurements, especially with very large caches or very long write delays. If you have a large cache, or use long write delays, or if you suspect Wintune may not be delivering accurate disk performance measurements for any reason, try rerunning Wintune with a longer time delay between tests, to allow the cache to complete flushing and become stable. For example, type

c:\WT20\WINTUNE /t15

at Program Manager's File/Run command line to run Wintune with a 15-second delay between tests. You can substitute other time delays (in seconds) for the 15. If Wintune is in a directory other than C:\WT20, you'll have to substitute the correct directory path, of course.

Click here to see the general topic Improving Disk Performance.

Click here to jump to a listing of software-based disk improvement tips.

Click here to see advice on replacing your hard disk.

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Improve Memory Performance `Copy`
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Based on the RAM test results, your system memory appears to be running unusually slowly. There are several possible causes for this--the memory in your system may be physically slower than average, or there may be a configuration error in your system BIOS.

It's not possible for Wintune to determine the specific cause of the problem, but we can make some general suggestions that may help.

Click here to jump to Memory Improvement Tips

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Improve Video Performance `Copy`
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Your video performance seems low for your type of system. However, Wintune did not detect any specific items that you can tune or adjust to improve performance.

We highly recommend that you get the latest Windows video driver for your board. Even if you recently bought your video board or PC, the vendor often will have a newer and faster version available on their BBS or other on-line support forums.

If your video performance results are still not very good, you may want to consider upgrading your video board.

Click here to see the general topic Improving Video Performance.

Click here to jump to a listing of software-based video improvement tips.

Click here to see advice on replacing your video card.

BIOS Setup Routine

There is no single universal means of gaining access to the BIOS in a PC. Most computers built during the last few years show a message on- screen during boot-up that   explains how to gain access to the built-in BIOS setup program (sometimes also known as CMOS setup). Generally, you press a key during boot-up prior to the loading of the operating system to begin BIOS setup. Some PCs only give you a second or two to press the key combination before the continue the boot-up process; it may take several attempts to hit the key at just the right moment. Among the more common key combinations for CMOS access are:

Ctrl+Alt+Esc (this will sometimes work even after boot-up)

Ctrl+Alt+S

F2

DEL

On older Gateway PCs, press a key during the boot-up sequence, which will generate   a keyboard error and a prompt to enter the BIOS.

On the Compaq Prolinea, press F10.

If your computer does not display a message describing the key sequence, check the system documentation under BIOS, setup or CMOS. On older systems you may have to run a software utility or boot from a diagnostic diskette.

Saving and Restoring CMOS Information

This information is adapted from Karen Kenworthy's Power Windows   column in the October 1994 issue of WINDOWS Magazine.

Without knowledge   of your hardware configuration, your computer's BIOS can't boot up the operating system. And without an operating system, your computer is nothing but an expensive paperweight: It can't run simple programs or even start Windows. And the same will hold true when Windows 95 comes along, despite the fact that you'll no longer need to run DOS.

The information that the BIOS needs is stored in your computer's CMOS memory. The combination of CMOS memory and a setup program is a major improvement over the old jumper-and-switch approach But it's not without its problems. For one thing, many PC/AT users forget where they left the original CMOS setup diskette.

The more serious problem CMOS memory suffers from is amnesia. A lost CMOS setup diskette is a nuisance, but loss of CMOS data can be a disaster. Although the PC/AT's designers made it difficult for a program to access and change the data stored in CMOS memory, some errant programs still accidentally corrupt this information. Other hardware programs and battery failures also take a small but significant toll.

Cutting your losses

But first, what do you do about that lost CMOS setup diskette? Many CMOS setup programs are now contained inside the PC's BIOS, making it darned near impossible to lose them. Pressing a certain key or combination of keys during boot-up will activate the setup program and allow you to change CMOS data. But if you're using a computer that relies on a diskette-based setup program and you've misplaced your diskette, there are a few things you can do.

To begin with, contact your computer dealer or manufacturer for a replacement diskette. The company that wrote the computer's BIOS may also be able to help.

Resetting Values to Defaults

If your CMOS data has been badly damaged, you may need to rebuild it from scratch. This involves resetting the CMOS data to its factory default values, then entering as much information about your computer as you can. Most CMOS setup programs provide an option to reset CMOS data. If yours does, simply run the program and specify that option.

But don't give up hope if your setup program **doesn't** offer to reset the CMOS data. In many cases, pressing a certain key or key combination at the appropriate time will do the trick. Check your computer's documentation for details. If nothing seems to work, try holding down the Insert key while turning on the computer. This technique is favored by many BIOSs, including all AMI versions dated 1991 and earlier.

Once reset, your CMOS data will no longer reflect your computer's actual configuration. In most cases, the default indicates one floppy disk drive and no hard disk. Although the default settings are usually sufficient for booting from a diskette, they leave your hard disk unavailable, and may cause your computer to run more slowly than it's able.

To return your computer to its original condition, you must replace the missing CMOS data. If you're lucky, you may be able to locate the missing data by poring over your computer's documentation. A prudent person will create a copy of the computer's CMOS settings and

save it for just such a disaster.

One way to do this is to run your computer's CMOS setup program, and then simply write down the information it displays. This method works, but it's slow and error prone.

Repairing CMOS

First, use the CMOS setup program on your computer to examine the current CMOS information. If it looks reasonable, a simple touch-up may be all that's necessary. Examine the CMOS settings, change anything that's obviously wrong, and see if the computer now works.

If it doesn't, the hard disk geometry information may be at fault. Unless the CMOS reports the correct number of hard disks, heads, sectors and tracks, the hard disk will probably be unavailable.

If you have lost your documentation, a call to the disk's manufacturer or dealer may be in order.

Creating a Rescue Diskette

A better way of preparing for CMOS disaster is to have a computer program do all the copying for you. Then restoring the CMOS data will be as simple as inserting a diskette and rebooting your computer (you might first have to enter manually one bit of CMOS information: the drive type of A:).

First, you make a diskette that can boot your computer. Then you place a copy of your CMOS data on the diskette. Next, you add a utility program that can copy CMOS data from a diskette to your computer's CMOS memory.

The first step is easy. Simply specify the /S option when formatting the diskette, as follows:

FORMAT A: /S

This will cause DOS to copy the necessary files to the diskette after formatting is complete.

Now you're ready to copy your CMOS data to the bootable diskette. My favorite program for this purpose is a shareware utility called CMOSSAVE. To copy your CMOS data to a file named MASTER.DAT on the diskette in drive A:, execute CMOSSAVE with this command:

CMOSSAVE A:\MASTER.DAT

CMOSSAVE comes with a companion program named CMOSREST, which can copy CMOS data from a disk file to CMOS memory. That's just what you need for the next step, so copy CMOSREST to your rescue diskette. Once you've done that, you're ready to create an AUTOEXEC.BAT file in the root directory of the diskette. The file should contain this single line:

CMOSREST A:\MASTER.DAT

This CMOSREST command copies the CMOS data you previously stored in A:\MASTER.DAT back to the CMOS memory where it came from.

That's all there is to it! Now, whenever you boot your computer from your rescue diskette, the diskette's AUTOEXEC.BAT file will run, CMOSREST will copy MASTER.DAT to your CMOS

memory, and your CMOS memory's contents will be restored.

The simple rescue diskette works well for the most part, but it has one small problem: It **unconditionally** copies MASTER.DAT to CMOS memory. This could be disastrous if, for example, you used the rescue diskette to boot the wrong computer.

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First-Aid Kit

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In the event of a CMOS -memory emergency, you'll be glad to have this tool on hand: CMOSSAVE and CMOSREST, programs that save and restore the CMOS of an AT-compatible system to and from a file on disk

You can obtain these files from America Online. They are in the Wintune & Support Files library under keyword WinMag , in a file called CMOS16.ZIP.

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Filename: CMOS16.ZIP

Registration: $20

Author: Canadian Mind Products

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Balance Disk Cache Allocations

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Wintune has detected a large amount of memory allocated to both SMARTDrive disk cache and Windows 32-bit file cache. When 32-bit file access (32BFA) is on, SMARTDrive is only used to cache floppy disks and CD-ROM drives. So, you should usually change your SMARTDrive settings to **reduce** the amount of memory used while in Windows, or even remove SMARTDrive completely.

Typically when you enable 32-bit file access Windows will automatically reduce the size of your SMARTDrive cache. However, if Windows cannot find your SMARTDrive line in the AUTOEXEC.BAT file, SMARTDrive will continue to use a large amount of your memory.

As a starting point, try the following settings:

If you have:	Set 32-bit file access cache to:	and SMARTDrive to:
4MB RAM (or less)	512KB (default)	64KB
6MB RAM (or less)	1,024KB	64KB
8MB RAM (or less)	2,048KB	128KB
12MB RAM (or less)	3,072KB	128KB
over 12MB RAM	4,096KB	128KB

You should also disable SMARTDrive caching on any disks that are being cached by 32BFA. For example, if you have an 8MB system, and use 32BFA to cache your C: drive the SMARTDrive line in your AUTOEXEC.BAT should read:

    C:\WINDOWS\SMARTDRV.EXE C- 128 128

THIS TIP UNDER CONSTRUCTION

*** Someday there will be a meaningful tip here. In the meantime, search the general help file or the frequently asked questions file to see if there is some useful information. This help topic will not be included in the final release of Wintune 2.0, except by accident.

Click here if you want some help understanding the tip that should be here, or are confused by seeing this message, or would just like to express your opinion about Wintune 2.0. Just remember this is a beta, and we're doing the best we can. --**The Authors**

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Take A Moment

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Before you start taking our advice on this tip, please take a moment and read our disclaimer by pushing on the button below.

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Reduce WIN.INI Size `[Copy]`
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Your WIN.INI file (found in your WINDOWS   directory) is more than 32,000 bytes long. Some programs cannot process a WIN.INI file that is this big. As a result, you may get unexplained errors from applications or from Windows itself.

The most common reason for a large WIN.INI file is that a very large number of fonts are installed. Click here to see how to remove fonts.

Another common reason for a large WIN.INI file is that you have installed many applications that have placed their own settings into the file. Edit WIN.INI (Click here if you're not sure how to do that) and remove any sections that refer to applications you no longer use.

This tip involves changes to system files. Click here to see how to change system files.

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Changing Either AUTOEXEC.BAT or SYSTEM.INI

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The tip that you are considering involves either activating 32-bit file access or creating a SMARTDRV cache.

If you activate 32-bit file access on your system using Control Panel, you will be changing your SYSTEM.INI file. Please click here first and see what precautions you should take before making such a change.

If you decide to create a SMARTDRV cache, click here before you edit CONFIG.SYS or AUTOEXEC.BAT, to see what changes you should make.

Before You Start Editing AUTOEXEC.BAT or CONFIG.SYS

For technical reasons having to do with the way Windows Help files operate, we couldn't take you directly from where you were to the help topic that advises you what to do before you edit one of these files and how to edit them. Alas, you'll have to click here to see how to change either of these two system files.

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Consider A New System

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Your overall 386-based system performance is so low that, while you may achieve some improvement by replacing the current CPU in this system with a higher-performance model, we think that you might be disappointed by the results. Your best bet is to buy a new system, preferably a 486 or Pentium-class computer.

Click here to see some general advice on upgrading a CPU.

Click here to see our advice on how to upgrade your motherboard.

Click here to see our advice on how to prepare for a hardware upgrade.

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Avoid random-access disk I/O

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The hard disk   that Wintune tested is much slower at random-access disk operations than it is for sequential disk operations. This isn't a cause for concern in most cases, but it can significantly impact performance if you use a program such as a database that continuously accesses disk files.

One possible cause for this situation is that you are using a disk compression technology such as Stacker, DoubleSpace, DriveSpace or SuperStor on the hard disk that you tested.

If you make extensive use of databases--including PIMs and contact management programs--you may want to try moving your database files to the uncompressed (host) drive to see if you can improve performance. Most other applications use sequential access to read and write their files, so slow random-access disk operations will not hurt performance in those cases.

Aside from compression programs, some physical disks may be slow in random-access performance because of the time needed to position the disks read/write head(s). In such a case, it may be possible to increase effective disk performance by increasing the size of your disk cache.

If you are using a disk compression program, you can test the performance of the uncompressed (host) drive by using the disk drive selector on Wintune's toolbar to select the uncompressed hard disk. .

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Memory Improvement Tips

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The cold fact is that there's an upper limit on the speed of system RAM, and if your RAM isn't fast enough for the system, you'll have to replace it to make things better--but there are a number of things to check first. It's possible that an incorrect BIOS configuration setting is hampering performance, so click on each of the following BIOS settings to see how you might change them.

Wait States

Bus Speed

Cache Wait Cycle

If all else fails, click here to see how to check your memory speed.

Click here to jump to Upgrading/Installing RAM.

Click here to see our advice on how to upgrade your motherboard.

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Wait States

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Many system motherboards are designed to use a variety of different CPUs and memory chips at different clock rates. To be safe, some manufacturers use default BIOS settings that are "safe"--designed to work with any supported RAM and CPU. That usually means one or two wait states are set. Look for a BIOS setting labeled "wait states." If it reads a higher number than 0, write down what it's set to, and try resetting it to 0--then restart your machine. If your machine runs at 0 wait states, then you will probably see a performance boost. If your system doesn't run at 0 wait states, then reset to the setting you wrote down-- your motherboard and/or RAM aren't fast enough to run a 0 wait states. (For more information, see the discussion about memory speeds below.)

Other systems may use a jumper on the system board to set wait states.   Check your system board manual for this if you don't see a setting on the BIOS setup. If the jumpers are not set for 0 wait states, change them to 0 wait states and see if your system runs reliably.

Bus Speed

As with wait states, some motherboards will set a slow bus clock rate to accommodate slow CPUs. This is especially true of motherboards that accommodate both 386 and 486 CPUs-- the former uses a clock that's twice as fast as the physical CPU, and so must divide that clock down to get a usable rate for the memory. When a 486 CPU is used with such settings, poor memory performance results. Look for a BIOS setting labeled "bus speed." It may have high and low settings, or it may read something like "CLCKIN/6". In the former case, try setting the speed to high. In the latter, write down the existing setting, and try setting to the lowest fastest setting your motherboard supports (CLCKIN/3 is faster than CLCKIN/4, for instance). If your machine runs with the new setting, you will probably see a performance boost. If your system doesn't run with the new settings, then reset to the setting you wrote down.

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Cache Wait Cycle

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This is a variation on wait states. Some motherboards actually specify the memory
read/write cycle used by the CPU's cache controller. The settings are typically a set of
numbers expressing how many clock cycles are required to read and write cache lines.
Typical settings are 2-1-1-1 and 3-2-2-2, where the former is faster. Write what it's set to,
and experiment to find the lowest settings your motherboard supports. If your machine runs
with a lower setting, you will probably see a performance boost. Otherwise, set the value
back to the setting you wrote down.

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Memory Speed

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If you find that your PC won't run with the BIOS set to zero wait states, it's possible that your vendor installed slower RAM than your system was designed to handle. To check, look in the manual for your system motherboard. It should tell you what memory chips are compatible with your system. The speed of memory is normally expressed as an access time in nanoseconds (ns). Next, open the case and look to see what speed RAM is installed. If the motherboard supports 70ns RAM, but you have 100ns RAM installed, then replacing the RAM is likely to give you a performance boost by allowing you to change one or more of the BIOS configuration settings listed above to a faster setting.

Another possible explanation for not being able to run at zero wait states is that the L2 cache is missing or smaller than the maximum the motherboard supports. Again, compare the information in the manual with what's actually on the motherboard. If you've got an empty cache socket or smaller-capacity chip(s) than the socket(s) can hold, upgrading may make the difference.

If your motherboard doesn't support fast RAM or an L2 cache, then your only option to improve performance may be to replace it.