Windows Tune-Up

This module attempts to evaluate the current system setup and make suggestions that will improve the performance of the system when running Windows. The following items are taken into consideration during the evaluation:

Processor Type - Different optimizations are appropriate for each processor type.

EMS Type - If the CPU is a Real Mode only CPU the type of EMS is evaluated and recommendations for optimum performance are made.

Operating Mode - If the CPU is capable of running Windows in multiple modes, recommendations are made to permit operation in the most efficient mode.

XMS Availability - If the CPU is a 286, 386 or 486 a check is performed to make sure the HIMEM.SYS driver is present. This is required for operation in Standard and Enhanced 386 Modes.

SMARTDRIVE Usage - The system is checked for the installation of the Windows disk caching software SMARTDRV.SYS. Correct use of SMARTDRIVE can substantially improve performance in all modes.

Foreign Memory Manager Presence - If the CPU is a 386 or 486 an attempt is made to identify the origin of any memory managment software present and a recommendation is made to replace it with the equivalent provided with Windows.

SwapFile Verification - If the CPU is either a 386 or 486 the system is checked for the utilization of a permanent swap file. Use of a permanent swap file can dramatically improve performance in Enhanced 386 Mode.

Available Optimization Topics:

SMARTDRV Optimizations

SMARTDRV is a disk caching utility provided with Windows. The purpose of this software is to improve the disk access times for frequently accessed data which resides on the disk.

Unlike other available disk caching software SMARTDRV "knows" about Windows and its memory management and can work in conjunction with the memory manager to provide balanced use of memory. This is true only of the version of SMARTDRV distributed with Windows 3. For this reason it is critical that only the Windows 3 version of SMARTDRV be used with Windows.

The syntax for installing SMARTDRV in the CONFIG.SYS file is:

DEVICE=SMARTDRV.SYS *MAX* *MIN*

Note that unlike previous version of this utility there are now TWO parameters. The MAX parameter is the amount of memory (in kilobytes) that be allocated initially. The MIN parameter is the minimum amount of memory SMARTDRV will retain under any condition. As noted previously, SMARTDRV will work in concert with the memory manager to balance the use of memory. In the event there is a request for more memory than is currently available in the system, SMARTDRV will relinquish any memory it was allocated in excess of the MIN value, returning the memory to the global memory pool.

Determining the optimum configuration for SMARTDRV should be based on the total amount of memory available in your system and the peak demand for memory by the application you use regularly. The MAX value should be about 25% of the memory in the system or 1024 WHICHEVER IS LESS. In no case should the MAX value be less than 256 nor greater than 1024. The MIN value should be set to 256 in most cases.

Special Note:

If your system includes a high performance caching disk controller such as the PSI hyperStore Controller or the DPT SmartCache Controller you should probably NOT use SMARTDRV. Your controller is probably in a much better position to determine the contents of the disk cache and the memory utilized by SMARTDRV will be much more useful to Windows and your applications.

Large Frame vs. Small Frame EMS

If your system is based on an 8086, 88, 186 or 188 CPU you have the option of improving Windows performance through the addition of Expanded Memory (EMS).

There are currently two flavors of EMS available, Large Frame and Small Frame. Large Frame EMS (available only with EMS version 4) offers the operating environment (Windows in this case) the ability to manage memory more effectively through the use of a large swap area (hence the name Large Frame). In this configuration Windows will make the best of the situation and you will be able to run several large applications simultaneously with minimal code swapping.

Small Frame EMS (available with all EMS versions) provides only a small window onto the larger EMS pool. Due to the limitations inherent in this scheme Windows will make only minimal use of Small Frame EMS and as a consequence the ability to support multiple large applications will not be available.

The WinSleuth Windows Information module will tell you the EMS mode being used in your system. If your system is using Small Frame EMS performance can be improved through the use of Large Frame EMS. Consult your EMS hardware manual to see if your adapter can support Large Frame EMS. Note that not all EMS 4.0 drivers are created equal. Unless the driver supports the advanced capabilities of the EMS 4.0 specification your hardware will not be able to provide the benefits of Large Frame EMS.

Special Note:

If your system uses a 386 or 486 CPU and the WinSleuth Windows Information module reports that you are using any form of EMS you should reconfigure your system to run with Extended Memory only. Windows will provide any EMS your DOS applications may require.

Standard vs. Enhanced 386 Mode

If your system is based on a 386 or 486 CPU you have the option of selecting either Standard (286 protected mode) or Enhanced 386 Mode. While it may seem obvious that a 386 (or 486) should be run in Enhanced 386 Mode this may not actually be the case.

Enhanced 386 Mode offers the advantage of running multiple DOS applications within windows and virtual memory. In return it exacts a performance penalty due to the requirement of trapping all I/O, interrupts and controlling the virtual machines. If you don't run DOS applications from within Windows and your system has sufficient memory to accomodate your Windows applications, you will probably achieve better performance by running Windows in Standard Mode. Start Windows using the WIN /S command to use Standard Mode.

If on the other hand you use Windows as a general purpose DOS application multi-tasking environment OR you system does not have enough memory to satisfy the requirements of your applications then Enhanced 386 mode will provide the best performance.

Special Note:

If you are using Enhanced 386 Mode with a swap file for virtual memory it is very important that SMARTDRV is installed properly.

Swap File Optimizations

If you are using Windows in 386 Enhanced Mode your system has the ability to use virtual memory. Virtual memory is a scheme whereby disk space is used as an extension of the memory addresses in your system. Windows will support up to 32 Megabytes of virtual memory.

The disk file which is used for the creation of virtual memory is referred to as a Swap File. There are two type of swap files Windows can use. A temporary swap file is one created by Windows every time it starts and deleted upon termination. The permanent swap file is created once and is used by Windows as long as it is found on the disk. A permanent swap file is much faster than a temporary swap file.

Creating a Permanent Swap File

The creation of a permanent swap file requires a little planning to achieve the best results.

First, the disk space MUST be contiguous. Defragment the disk drive before attempting to create a permanent swap file.

Second, there can be NO applications running during the creation of a permanent swapfile. Check the "load=" line in the WIN.INI file. If it is not blank comment the line out temporarily by placing a semicolon in the first column of the "load=" line.

Third, Windows must be running in Real Mode to create a permanent swapfile. Start Windows using the WIN/R command.

Run the SWAPFILE.EXE program using the Run... command from the Program Manager's File menu.

Special Note:

DO use SMARTDRV.SYS! Use of a swapfile without SMARTDRV will result in a substantial performance degradation.

DON'T specify a swapfile on a network drive. Transfer times are terribly slow and performance will suffer badly.

One strategy for creating a swap file is to devote an entire disk partition to the purpose. While this may require backing up, partitioning, reformatting and restoring the data there is a significant performance advantage to this approach since there will never be any contention for access to the swap drive and the SMARTDRV cache data will mirror the access history of the drive perfectly.