Windows 3.1

Optimizing Windows 3.1x

for the pre-6.1 versions of the

TNT Products

MicroImages software support engineers are ready to help you with TNT installation, setup, and operational problems. If you are using the TNT professional products, contact us at:

Software Support: (402) 477-9562
FAX (402) 477-9559
Email support@microimages.com

If you are using the TNTlite versions of the TNT products, ask for help from your campus computer lab supervisor or your company's computer support and training specialists. TNTlite users may contact MicroImages directly, but our support staff gives priority to our professional clients.

IMPORTANT: Your software license key IS your TNT professional product. Without your key, you can run only the TNTlite versions of the TNT products. Therefore, you should take steps to ***safeguard your key***, even as you take normal precautions to safeguard other valuable possessions. Insure your key for loss, theft, or damage. If you lose a diamond ring, the jeweler does not give you a new one. If you lose your key, MicroImages does not give you a new one. Keys are very sensitive to spurious electronic signals. If you attach your key to the wrong kind of device, the key could be damaged beyond repair. For example, you may install a parallel key in-line only with a printer: do not put a key in-line on a port with a device other than a printer (no "Parallel-to-SCSI" adapters, no ZIP drives, no tape backup units).

18 January 2000

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Overview

Few of today's professional software packages run well (if at all) in the 16-bit DOS/Windows 3.1x environment. MicroImages released the 6.0 version of its TNT professional products for Windows 3.1x as the last version for that platform. Windows 3.1x is not Y2K compliant and serious professionals should no longer be using it.

Nevertheless, some students and professionals have no alternative: they either use an older Windows 3.1 computer or nothing. PC's with DOS and Windows 3.1 need careful optimization to run the pre-6.1 versions of the TNT products acceptably. The default DOS / Windows 3.1 configuration does not provide the best environment for the TNT products.

To use pre-6.1 versions of the TNT products on a Windows 3.1x PC, your computer needs 16 Mb or more of RAM, a CD-ROM drive, and about 100Mb of free hard drive space. If you have only 8Mb of RAM, you can install and run TNT, but the performance will suffer.

Windows 3.1 Basic Configuration

Memory Management Let Windows 3.1 manage the RAM in your PC. MicroImages does not recommend the use of additional specialized memory management software. However, some special hardware peripherals need to reserve specific areas of RAM (usually in the address range A000 - EFFF). If Windows does not know about the special blocks of memory that your peripherals plan to use, then both Windows and the hardware device may try to use the same memory, and conflict. Read the documentation that comes with your hardware peripherals and use the suggested memory exclusions. Experience shows that Windows 3.1 exclusion statements are required for the satisfactory performance of these devices in particular:

```
Targa display board
SCSI interface cards
Network adapters
Matrox MGA display boards
```

Define memory exclusions with statements in the [386ENH] section of the SYSTEM.INI file in the Windows directory. Use any text editor, locate the [386Enh] section and add a line in the form

```
[386Enh]
EMMExclude=C000-C7FF
```

Some memory managers (for example, EMM386 and QEMM) also declare memory exclusions in the DOS startup files (CONFIG.SYS or AUTOEXEC.BAT). You still must add the EMMExclude statement to SYSTEM.INI even if you have exclusions in the DOS startup files.

Print Manager The Windows 3.1 Print Manager is an automatic feature that reserves a large portion of memory as a print buffer so that Windows applications can return sooner after a print command is given. In order to maximize the amount of RAM available to TNT processes, turn

off the Print Manager. Select the Printers icon in the Control Panel (in the Main Program Group) and then de-select the checkbox labeled "Use Print Manager." The default condition of the Print Manager is "on," so you must explicitly turn it off to free the RAM. —However, if you want to print over a network to a remote printer, you must not turn off the Print Manager.

Virtual Memory **Virtual memory** is a memory management technique whereby a computer system uses a portion of the hard disk to extend RAM. Of course, the virtual memory on the mechanical hard disk works much more slowly than the electronic RAM, so you will notice a definite performance slow-down when virtual memory begins to use the hard disk. (But at least it keeps you from running out of memory.) MicroImages does not recommend running the TNT processes with less than 16Mb of RAM. If you have only 8Mb of RAM, you may need to set up virtual memory, but you will notice the slow performance of a system that is constantly using virtual memory. In Windows 3.1, be sure to change the **Type** of virtual memory to **Permanent** (but do not specify permanent virtual memory in Windows 95). For permanent virtual memory, Windows 3.1 reserves a contiguous block of space on your hard drive and locks it away from other DOS use. Permanent virtual memory is faster in Windows 3.1 than non-permanent virtual memory.

32-bit disk access Another feature that should help you get the most possible speed from virtual memory is the 32-bit disk access in Windows 3.1. (You do not need to specify 32-bit disk access in Windows 95). Windows 3.1 can bypass DOS's normal 16-bit disk access methods on most types of drives (although ***NOT*** SCSI or ESDI). When you change the **Type** of virtual memory to **Permanent** in Windows 3.1, click in the checkbox that says **Use 32-bit Disk Access**. Windows tests your hard disk controller to be sure that its 32-bit access routines will work correctly. If your controller allows it, then Windows 3.1 will use its own 32-bit disk access routines. On the other hand, if your disk controller is one of the few types that cannot work with 32-bit access, Windows 3.1 displays a message and de-selects the 32-bit Disk Access checkbox.

Disk Compression Your hard drive can be configured with a "disk doubler" (such as Stacker, SuperStor, or DOS's doublespace) which uses transparent data compression technology to make your disk appear to have more room than it does. A 400 Mb hard disk with disk compression software can store 800 mb of data. Today's disk compression software is generally reliable and speedy. In particular, MicroImages can recommend

the disk compression in DOS 6.2. Nevertheless, you may be happier in the long run if you buy a large, fast hard drive, rather than doubling your old drive for the space. If you do use disk compression, take extra care to make regular backups. It is much more difficult to recover corrupted or lost data from a compressed drive than from a normal drive. Consider too that you have a better chance of recovery if your boot drive (C:) is not compressed. Use your doubler's configuration options to reserve part of your primary hard drive for uncompressed use: at least for your startup files, system files, DOS, and some utilities (including diagnostics and recovery). Define a secondary (non-boot) partition as D:, which will be compressed.

DOS Shell Multi-tasking in Windows 3.1 is not as robust as in Windows NT and 95/98. For example, if you suspend a TNT session in Windows 3.1x and spend a long time in a DOS shell, your background TNT session may eventually hang. Remedy: edit the DOSPRMPT.PIF using the Windows PIF editor, and set DOSPRMPT's Foreground Priority to something less than 100. That forces Windows to give the background processes some processing time.

Display Driver In Windows 3.1, the TNT products depend on the display driver supplied for your display board by the manufacturer and Microsoft Corporation. Most board and driver combinations work without a problem. In most cases, you never need to fuss with display board and driver issues. However, some older display boards available for Windows 3.1 require special setup to work correctly with TNT. Always begin by installing a board according to the manufacturer's documentation. If the board comes with a disk that contains a Windows driver, install the driver according to the installation instructions. Check the manufacturer's Web site for your board's most recent driver.

Windows 3.1: Targa and Matrox MGA Display Boards

Targa and Matrox boards require explicit memory exclusion statements in the [386Enh] section of the Windows 3.1 and NT SYSTEM.INI file. If you use one of these boards, read the documentation that comes with it and use the suggested memory exclusions. If your copy of the Matrox documentation does not have a section on exclusions, try this:

```
[386Enh]
EMMExclude=C000-CFFF
```

Windows 3.1: Hercules Graphics Station

If you have a Hercules Graphics Station display board, do NOT use shadow RAM. Refer to the CMOS setup documentation for your PC, and *DISABLE* shadow RAM.

Windows 3.1: VGA Display Boards

If you use a VGA type display board and also have a monochrome text display board in your PC, remove the monochrome board. The monochrome board does not prevent Windows from running on the VGA type color graphics board, ***BUT*** the mere presence of a monochrome board in an ISA expansion slot makes bus video operations drop to 8-bit speed. Even an unused monochrome board *cuts display performance in half* for an ISA VGA board.

Windows 3.1 Optimization

The system characteristics of DOS with Windows 3.1 makes optimization important. If you use Windows 3.1, you must optimize your configuration for the best performance with TNT. Many combinations of RAM, disk drive, CPU, and display subsystem can be used to run TNT products in the Windows 3.1 environment. HOWEVER, it is abundantly clear that not all configurations perform equally well. If you are not careful, you could be trying to run a TNT product in a system configuration that imposes unnecessary speed penalties. MicroImages, Inc. has developed and continues to refine TNT products to be fast and efficient. It is YOUR responsibility to turn TNT products loose in an environment that does not slow them down unnecessarily. This section reviews some steps you can take to optimize the speed of a DOS/Windows 3.1 system.

Hardware Speed Tips

CPU

The single most effective way to improve the speed of TNT is to upgrade your machine to a faster processor. TNT products will work in a PC that has an 80386 processor with an 80387 coprocessor. However, only the most patient users will be satisfied with 386 performance. The price of processors continues to fall, and "overdrive" replacement CPU's offer clock-doubling technology. Every serious production-oriented shop should upgrade their CPU's to the Pentium level. MicroImages has compared performance and found that some TNTmips processes work as fast on an optimized Pentium PC under Windows 3.1 as on a workstation.

One feature that significantly affects a CPU's performance is the presence and size of a processor RAM cache. Many 386 systems are designed with

very high speed cache memory on the motherboard (typically 64K or 128K) that is used to read-ahead in the system's (relatively slower) RAM. The i486 processor has an 8 K RAM cache built right in to the processor. In addition, most vendors supplement the 486's internal cache with a 386-like on-board processor cache (typically 128K, 256K, or 512K). Industry tests indicate that at some point, a larger cache makes only small contributions to overall speed. Generally a 64 K or 128 K processor RAM cache provides significant performance increases. On the other hand, some tests indicate that a cache of 512 K has little advantage over a 256 K cache. Do your own research, and select a CPU/motherboard with a high-performance caching feature.

Upgrade your CPU.

RAM

The second most effective way to improve performance under Windows 3.1 is to increase the amount of RAM in your computer. TNT will run in a minimum of 8 Mb of RAM. However, 16 Mb or more is highly preferred. The experience MicroImages has indicates that performance continues to improve significantly as more RAM is added. The more processes you have active, and the more windows you have open, the more RAM Windows needs.

DO NOT set up a RAM disk with a utility such as RAMDRIVE.SYS unless you have more than 16 Mb of RAM. It is true that a RAM disk is a nice performer, and having a RAM disk available for temporary files makes one aspect of the system run faster, but setting aside RAM for a RAM disk is like buying a penny for a dollar. You lose much more than you gain.

The amount and type of RAM you can add to you system depends on the design of your computer. The **best** (fastest) RAM is the RAM you add directly to your motherboard. If your motherboard is fully populated, then your **second** choice is adding RAM with a board in a proprietary expansion slot. The computer designer's proprietary memory slot (if your machine has one) gives much faster performance than your **last** choice: the standard expansion slot memory board. Even an 8-bit or 16-bit memory board that has relatively slow RAM chips will help performance, because it delays the point when RAM is full and Windows 3.1 resorts to the virtual memory on your hard disk.

IMPORTANT: MicroImages, Inc. does not recommend the use of a DOS memory manager such as EMM386 or QEMM. Windows 3.1 does all the memory management you need through the HIMEM.SYS driver it installs in your CONFIG.SYS file. Adding another memory manager delivers no benefit for TNT products. In fact, adding a DOS memory manager may introduce memory conflicts if the memory manager attempts to reclaim upper memory that it does not recognize as being already claimed by one of your system's special peripheral devices (such as a special video board). Consider using a DOS memory manager ONLY if you intend to run DOS sessions under Windows and the extra conventional RAM (below 640) that a memory manager can recover will make a big difference. HOWEVER, if you use a memory manager, pay special attention to the EXCLUDE statements in its configuration to protect upper memory areas that are used by your special peripherals. Contact MicroImages Software Support (402) 477-9562 (voice), (402) 477-9559 (FAX), or support@microimages.com (email) if you need assistance.

Disk drive

The slowest components of any PC system are always its mechanical devices. The purely electronic components of a computer (CPU and memory) spend a great deal of time waiting for mechanical devices, such as printers and disk drives. The mechanical devices that have the greatest impact on overall system speed are the disk drives. Your computer waits a long time for the read/write head to move to the correct track and the disk to spin bringing the desired sector around to the head. Thus, anything you can do to speed up disk access will significantly improve the overall performance of your computer.

Your first step should be to buy a fast drive. Every year disk drives on the market are larger, faster, and more dependable than their predecessors. If your disk drive is two or more years old, you should consider replacing it with a larger, faster, and more dependable new model.

Some controller cards for disk drives use a local bus (VESA or PCI) slot. As you would expect, local bus controllers offer a significant boost in drive performance. If you do not have a local bus slot, you can use a standard ISA 16-bit slot for your controller, but by all means, avoid using an 8-bit slot (even if your controller works in one) or an 8-bit controller.

If you use an older RLL or MFM type controller/drive pair, then you may

be able boost performance by selecting an optimal controller interleave. (Interleave is no longer an issue with today's common 1:1 IDE devices.) Most new drives have a 1:1 interleave (the best possible), but some older drives use a 2:1, 3:1, or even 4:1 interleave. Use a utility (such as Spinrite from Gibson research) to determine the optimal interleave for your controller and drive. You may be able to change from 2:1 to 1:1 (doubling its speed), or from 3:1 to 2:1 (cutting transfer time by 1/3). But you really should get a fast new SCSI or IDE drive and retire (or give away) the old RLL or MFM drives.

Disk Cache

A disk cache is a portion of memory that is used for "reading-ahead" from the drive. Most disk access happens to be sequential; that is, the processor asks for information in order, usually starting at the beginning of a file and proceeding to the end. Thus, documents are read from the first word to the last, spread sheets are loaded from the top left cell to the bottom right, and programs are read in from the first instruction to the last. The idea of a cache is to anticipate calls from the processor. When the processor calls for another "sentence" from the disk, the caching scheme goes ahead and retrieves an entire "page" (quickly passing along the first sentence). Then when the processor calls again, the cache is likely to have what the processor wants already on hand (in speedy electronic memory) so the system does not have to wait (for the slow mechanical disk).

Two kinds of caching techniques are used to speed the performance of disk drives. Some drives use hardware caching: that is, the drive or its controller has a built-in cache that automatically reads ahead. With hardware caching, the rest of the PC is ignorant that any caching is going on. To the rest of the system, the drive just looks like a very fast mechanical device.

More commonly, the computer's operating system or utility software sets aside a portion of the computer's regular memory for caching, and takes care of the read-ahead functions directly. (It generally does no harm to use both software caching and hardware caching.) Commercial caching utilities are included in many products, such as PC Tools and Norton Utilities.

Windows: SMARTDRV.EXE

The Windows 3.1 drive cache facility is named SMARTDRV.EXE.

Invoke SMARTDRV.EXE with a statement in your AUTOEXEC.BAT in the form

```
c:\windows\smartdrv  512 0
```

Consult your Windows 3.1 documentation for a complete description of SMARTDRV options. SMARTDRV.EXE automatically checks the amount and type of memory available in your computer and uses reasonable default values to set the size of the disk cache. You may override the defaults to specify values of your own choosing (as in the sample above). The size of cache you specify depends on the amount of memory you have available. MicroImages, Inc. makes these recommendations:

8 Mb of RAM	c:\windows\smartdrv 512 0
16 Mb of RAM	c:\windows\smartdrv 2048 2048

IMPORTANT: In general, do not dedicate much RAM to SMARTDRIVE. TNT has better things to do with memory, and you will enjoy better performance when TNT gets the memory than when SMARTDRIVE does. The examples above do not claim RAM for SMARTDRIVE below 16 Mb.

NOTE: do not confuse disk caching with processor caching. Some systems use a caching technique to supply the processor's very fast memory cache with read-ahead access to the system's (slower) RAM. Disk caching and RAM caching have no interrelation. Your system may use neither, or either, or both techniques. (Both techniques contribute to improved overall performance, so MicroImages recommends that you implement both.)

Display board

Another way to improve performance under Windows 3.1 is to obtain a color display board that is designed for high speed graphics performance. The performance of your display board has a large psychological impact on the apparent performance of your computer. Nothing seems to provoke an impatient response faster than a slow redraw on the screen. However, in terms of overall performance, actual display activity represents only a small percentage. Greater absolute gains in speed depend on your CPU, RAM, and disk drive. (If you have to choose between upgrading your CPU and getting a faster display board, always get the new CPU.)

Many display boards have a special graphics coprocessor or graphics

accelerator chip to boost performance. MicroImages, Inc. watches industry developments and can recommend specific display boards only on a "catch of the day" basis. New industry performance measurements and new product introductions make today's recommendation useless for tomorrow's purchase decision. Do some research and buy a high-performance display board.

If your display card does not use a local bus slot (see below), then be sure to install the card in a 16-bit expansion slot. Most emphatically: do NOT install your display card in an 8-bit slot, even if it seems to work there.

NOTE: If you have a VGA type graphics board and also a monochrome text display board in your PC, *remove the monochrome board.* The monochrome board does not prevent Windows from running on the VGA graphics board, ***BUT*** the monochrome board makes bus video operations drop to 8-bit speed for VGA-type boards. The mere presence of a monochrome board *cuts VGA display performance in half.*

Local bus video

A video card plugs into a computer's expansion slot and thereby connects to the system's I/O bus. The common ISA bus contains a 16-bit data path and runs at 8 MHz, no matter how fast the rest of the system is going. Thus, a 486DX running at 33 MHz is operating more than four times faster than its 8 MHz I/O bus. In order to let a video card communicate with the CPU at the CPU's own speed, a number of computers have been designed to circumvent the I/O bus by using a specially added video bus that connects directly to the CPU. Such "Local Bus" systems achieve much better display performance. Two different local bus specifications are current: the VESA (VL-bus) specification, and the PCI specification from Intel. Since both standards are current, the number of boards available for a particular local bus specification is limited. Do get a system with local bus video, but keep in mind that you will not be able to take along the VESA board you select for your 486 when you get your new Pentium with its PCI bus.

NOTE: Refer to the section on Display Board Setup, later in this manual.

Windows 3.1x Speed Tips

A fast hardware configuration will not perform at its full potential unless the system software is configured correctly. As processes that run under Windows 3.1, TNT products will suffer a speed loss for any software configuration inefficiencies in the Windows host environment.

Microsoft Windows is largely self-configuring. The Windows 3.1 install process makes intelligent guesses about setting software defaults, but these defaults may not always be the best for the MI/X server and TNT. Thus in addition to configuring the hardware components of your PC for maximum speed, you should look at the Windows 3.1 setup defaults.

Required

MicroImages categorizes speedup techniques in two categories: "Required" and "Optional." The configuration instructions in this Required section are simple and essential. You will not get optimal performance unless you take these steps.

DOS path

Put your Windows path and the TNT path near the top of your PATH statement in AUTOEXEC.BAT. Example:

```
PATH c:\windows;c:\tnt;c:\utils
```

Enable shadow RAM

If your computer supports shadow RAM, enable it. Enabling shadow RAM is usually accomplished with a setting in your computer's CMOS setup routine: consult your computer's documentation. The shadow RAM feature copies the slow system ROM into the fast RAM of the high memory area (addresses between 640K and 1 Mb). The RAM in the address range used by shadow RAM is not used otherwise by DOS. However, there is a slight chance that the shadow RAM feature will conflict with the addresses used by a special-purpose display board or other peripheral device. (There is a known conflict between shadow RAM and the Hercules Graphics Station display board.) Get everything else working on your system first. Then enable shadow RAM. If you have trouble, disable shadow RAM. Call MicroImages Software Support (402) 477-9562.)

Load DOS high

Load DOS into upper memory with a statement in your CONFIG.SYS in the form

```
DOS=HIGH,UMB
```

Memory manager

Use the Windows memory manager. The Windows memory manager is named HIMEM.SYS and is loaded as a device driver in your CONFIG.SYS in the form

```
device=c:\windows\himem.sys
```

Do not use another memory manager in addition, such as QEMM or EMM386. Do not specify a mix of expanded and extended memory. Windows efficiently manages all the memory your system has with the HIMEM.SYS manager.

Drive cache

Use the Windows disk caching feature. The Windows disk cache facility is named SMARTDRV.EXE. Invoke SMARTDRV.EXE with a statement in your AUTOEXEC.BAT in the form

```
c:\windows\smartdrv  512 0
```

Consult your Windows documentation for a complete description of SMARTDRV options. SMARTDRV.EXE automatically checks the amount and type of memory available in your computer and uses reasonable default values to set the size of the disk cache. You may override the defaults to specify values of your own choosing (as in the sample above). The size of cache you specify depends on the amount of memory you have available. MicroImages, Inc. makes these recommendations:

8 Mb of RAM	c:\windows\smartdrv 512 0
16 Mb of RAM	c:\windows\smartdrv 2048 2048

(Effectively NO reserved RAM unless you have more than 8Mb.)

Enable 386 enhanced mode

Windows 3.1 offers two modes: standard mode and 386 enhanced mode. TNT products ***do not work*** in Standard mode. Standard mode is included in Windows 3.1 primarily so Windows will run on older 286 PC's. All 386, 486, and Pentium machines should run in 386 enhanced mode. 386 enhanced mode is the only mode that supports Windows' virtual memory capability and also its 32-bit disk access routines – both features that are important for TNT.

Virtual memory: permanent

Change the **Type** of virtual memory to **Permanent**. For permanent virtual memory, Windows reserves a contiguous block of space on your hard drive and locks it away from other use. If you can afford the drive space, then let Windows have it for permanent virtual memory. Under DOS, the virtual space is a hidden, locked file.

NOTE: DO NOT designate a compressed drive (such as a drive created by SuperStor or DOS 6) for virtual memory.

NOTE: Sometimes the Virtual Memory setup window shows only a small possible virtual memory size (perhaps a few megabytes) even though you have much more space on your drive. The reason the virtual memory size smaller than the actual free space available is that permanent Virtual Memory can use only *contiguous* disk space. When the space on your drive becomes fragmented over time (a common situation in DOS), Windows reports only the largest contiguous piece as available for permanent virtual memory. To remedy the fragmentation situation, you can consolidate the free areas of disk space for a larger virtual memory designation by using a defragmentation utility. (Defragmentation utilities are available in commercial products such as Norton Utilities and PC Tools, and also in DOS 6.) Run the DOS CHKDSK utility first to find and reclaim lost allocation units or cross-linked files:

```
C:\> chkdsk /f
```

Then give the defragmentation command for whichever utility you are using, such as

```
C:\> defrag
```

After defragmentation, Windows will offer a larger portion of disk space available for permanent virtual memory.

Larger Permanent Virtual Memory By default, Windows 3.1 limits the maximum size of all memory (RAM plus virtual) to four times the size of your RAM. Thus, if you have 8Mb of RAM, your maximum memory size is 32 Mb (= 8 Mb RAM + 24 Mb permanent virtual memory on disk). You can increase the RAM/disk multiplier so Windows will allow you a larger permanent virtual memory. Edit the SYSTEM.INI file and change the [386Enh] section in the form:

```
[386Enh]
PageOverCommit=20
```

You can use any value from 1 to 20 for the PageOverCommit multiplier. The default value is 4 (8 Mb RAM means a maximum total of 4 x 8 Mb = 32 Mb). With PageOverCommit = 20, your virtual space on the drive in a computer that has 8 Mb of RAM can be as large as 156 Mb: total memory (RAM + virtual) = 20 x 8 Mb = 160 Mb.

Enable 32-bit disk access

One option within the 386 enhanced mode lets Windows bypass slower DOS routines for disk access and use faster 32-bit routines. If you do not enable 32-bit disk access, then Windows passes all disk access requests to DOS and waits for the slower 16-bit DOS routines to perform. Most disk/controller combinations can work with faster 32-bit routines. (Back up your data first: some older controllers may look okay to Windows, but may not work.) Enable 32-bit disk access with the checkbox in the 386 enhanced window. Windows automatically tests your hard drive controller to verify that its 32-bit access routines work correctly. If your controller allows it, then Windows will use its own 32-bit disk routines. However, if your controller is one of the few types that cannot work with 32-bit access, Windows displays a message and deselects the 32-bit Disk Access checkbox.

Close or iconify unused windows

Both the MI/X Server and Microsoft Windows allow you to have multiple display and process windows open simultaneously. Each window that is open and each background process that is running taxes the processing power of the CPU. Each window must be managed, and moving or resizing one window may trigger a system event that causes other windows to be redrawn. Definitely, close all background windows and processes in Microsoft Windows unless they are absolutely necessary. It also helps to close or iconify any TNT windows that are not required by your immediate task.

Disable Print Manager

The Windows Print Manager facility sets aside and holds on to valuable system memory. The general rule is, keep as much memory free for TNT as you can. Turn off the Windows Print Manager. Select the Printers icon in the Control Panel (in the Main Program Group) and then deselect the checkbox labeled “Use

Print Manager." The default condition of the Print Manager is "on," so you must explicitly turn it off to free the reserved RAM.

However, if you want to print over a network to a remote printer, you must not turn off Print Manager.

General Speed Tips

The suggestions in this section are generally helpful, but may not be required in your circumstances. They work with all types of computers, but are especially important for slow Windows 3.1 systems.

Pyramid display raster objects

Very large raster objects require some processing time for resampling when you view them "full view" or at any zoom level less than 1:1. Of course TNT display processes automatically resample any raster image "on the fly" in order to display it at any zoom level you want. However, constant, repeated resampling for frequently viewed materials is not the best use of time. Run the pyramiding process on every large raster object that you will view multiple times. The process creates an efficient set of pre-sampled display subobjects, while adding only 6% or so to the size of your project file.

However, If all of your viewing is at 1:1, or if you view project materials only once, or if you use project materials for processing only, and not for viewing, then you can skip the pyramiding operation. Pyramiding is designed to accelerate the display of frequently viewed large rasters, and delivers no benefit for small images.

Network (depends on local circumstances)

In most situations, you should not designate a network drive for temporary files. In heavy network traffic, a large file transfer or any kind of heavy I/O demand could slow your performance to a crawl. If you have a fast local drive, use it. Likewise, it is generally faster to have the TNT executable files on the local machine. Do not invoke executable processes that must load across a busy network.

However, in some cases, such as a lightly used network that has a very fast drive, your quickest available drive will be the network

drive.

Select 8-bit color display mode

(marginal benefit in some cases)

If your display board supports both 8-bit and 24-bit color, then you may wish to select an 8-bit display driver, at least for some work sessions. In broad terms, 24-bit color display processes are inherently slower because the system is moving around three times as much display data. (For example, a Windows display board benchmark test typically gives a lower grade to a board running in 24-bit color mode as compared to the same board's 8-bit mode.) Thus, you may gain some speed advantage by selecting an 8-bit color mode, assuming your work with TNT does not require 24-bit display depth.

However: The speed advantage of an 8-bit color mode is by no means consistent across all boards and processes. Some 24-bit boards are faster than some 8-bit boards. Even on a single board, some 24-bit modes may be virtually as fast as the 8-bit modes. In addition, when TNT displays a particular 24-bit color source image in an 8-bit color mode for the first time, the system takes an extra step to reduce the 24-bit color information to an optimal 8-bit color palette. If most of your image display is done from new 16-bit or 24-bit color images (whether composite or 3-raster RGB sets), then the 8-bit color mode loses any speed advantage it might have over a 24-bit mode.

Select a lower display resolution

(marginal benefit in some cases)

In the same way that moving 24-bits of color information is (in broad terms) slower than moving 8-bits of color information, so moving display information for 1280 x 1024 pixels is (in broad terms) slower than moving display information for 800 x 600. You may gain a slight speed advantage by selecting a lower resolution display mode.

However: Some display boards are designed specifically to speed up high resolution displays. In addition, if your work requires the use of display images that are larger than the low resolution dimensions of your display, then any speed advantage you gain by using a lower resolution will be more than lost in the extra time it takes to scroll around the image or resample it to fit your

viewing area. For large-image work, use the highest resolution your board offers.

I/O bound processes

Some processing tasks are heavily bound to the speed of your I/O devices. Using separate drives for input and output generally speeds up a process. In some cases, processing time can be cut in half when you carefully designate input and output drives. If both your input and output files are on the same device, then the read/write head constantly moves back and forth between the physical file locations, and that seek time slows things down. On the other hand, if the input is one disk (perhaps an erasable optical drive) and the output goes to another disk (such as a fast hard drive), then the read-write heads on each device stay in one physical area (unless the files are fragmented), minimizing access delays.

If your input process uses multiple files or objects, it may not be possible to put each one on a different device. The rule of thumb in all cases is to assign the heaviest load to the fastest device. Thus if you are processing three 8-bit RGB raster objects to produce one classified output raster object, put the three input raster objects on the fast hard drive and put the output raster object on the slower device.

Close unused windows

Windows and TNT both allow multi-tasking with multiple stacked, overlapping windows open concurrently. Realize, however, that the system must keep track of each window and redraw it when triggered by a screen event. Such "management overhead" drains the resources of the CPU away from its primary task. Close windows and processes that are not necessary for your current task.

UPGRADE!

This booklet is increasingly of historic interest only, and has less and less current value. 386 and 486 PC's with DOS and Windows 3.1 need careful optimization to run the TNT products acceptably. However, if you are a serious professional, by now you should be using Windows NT or 95/98 on at least a Pentium PC. The optimization tricks presented in this chapter apply only to systems that are essentially outdated.

Notes:

Upgrade from Windows 3.1x

Few of today's professional software packages run well (if at all) in the 16-bit DOS/Windows 3.1x environment. In 1999, MicroImages released the 6.0 version of its TNT professional products for Windows 3.1x as the last for that platform. Windows 3.1x is not Y2K compliant and serious professionals should no longer be using it.

MicroImages supported the 16-bit Windows 3.1x market longer than most while pursuing rapid product advancement in 32- and 64-bit architectures. All of our Windows 3.1 clients should upgrade their systems.

Version 6.0 was the Last

Version 6.0 was the last release of the TNT products for Windows 3.1x. MicroImages will continue to provide support for all versions of its products, but the TNT products for other platforms continue to advance in features and power, leaving the Windows 3.1x version behind.

Advanced Software for Geospatial Analysis

MicroImages, Inc. publishes a complete line of professional software for advanced geospatial data visualization, analysis, and publishing. Contact us or visit our web site for detailed product information.

TNTmips TNTmips is a professional system for fully integrated GIS, image analysis, CAD, TIN, desktop cartography, and geospatial database management.

TNTedit TNTedit provides interactive tools to create, georeference, and edit vector, image, CAD, TIN, and relational database project materials. TNTedit can access geospatial data in a wide variety of commercial and public formats.

TNTview TNTview has all the same powerful display features for complex visualization and interpretation of geospatial materials as TNTmips. TNTview is perfect for those who need flexible access to the TNT project materials but do not need the technical processing and preparation features of TNTmips.

TNTatlas TNTatlas lets you publish and distribute your spatial project materials on CD-ROM at low cost. TNTatlas CDs contain multiple versions of the TNTatlas software so that a single CD can be used on any popular computing platform.

TNTserver TNTserver lets you publish TNTatlases on the Internet or on your intranet. Navigate through massive geodata atlases with your web browser by using the free, open-source TNTclient Java applet (or any custom applet you create) to communicate with TNTserver.

TNTlite TNTlite is a free version of TNTmips, TNTedit, and TNTview for students and professionals with small projects. You can download TNTlite for your computer (about 100MB) from MicroImages' web site, or you can order TNTlite on CD-ROM with the current set of *Getting Started* tutorial booklets (shipping and reproduction charges apply).

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