

# **HyperDisk SpeedKit User's Manual**

**by  
HyperWare**

**“Extreme PC Performance”**

**HyperDisk  
HyperCP  
HyperKey  
HyperScreen  
HyperRAM**

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## **Quick Installation**

If you are familiar with IBM PCs and the configuration of your machine, follow these steps for quick installation of SpeedKit:

1. Back up your system.
2. Exit from all DOS enhancement products or extender software packages, such as Microsoft Windows, Quarterdeck's DESQview, etc.
3. Place the SpeedKit floppy in drive A (or drive B), and at the command prompt type:  

```
A: [ENTER]
INSTALL [ENTER]
```
4. The opening screen of the install program will give the option of installing each component of SpeedKit separately. The screen will show [ √ ] by each component on the install disk. A check mark in the brackets means that component will be installed on your system. Look to the bottom of the screen for further instructions.
5. When you are asked to set the parameters for each product, you can simply accept the default conditions specified by the installation procedure. If you want to change the option settings, we recommend that you first read the "Options" sections for HyperDisk, HyperKey, HyperScreen, and HyperRAM.

For more detailed information about the installation procedure, see Part 1, "Installation."

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## **Introduction**

### **What's In SpeedKit?**

HyperDisk SpeedKit comprises four PC speed-up utilities — HyperDisk, HyperKey, and HyperScreen, and HyperRAM — that dramatically increase the efficiency of your personal computer. You can use them together or separately to completely customize your PC to fit your personal needs.

### **HyperDisk**

HyperDisk is the most efficient disk caching utility available for your personal computer system. HyperDisk can improve hard disk system performance by up to 1000 percent, while simultaneously prolonging the lifetime of your drive by reducing the wear and tear caused by frequent and redundant access.

#### ***How Caching Works***

In recent years, caching has become a common buzzword in the PC industry. The concept of caching, however, has been around for a long time and is quite simple. Caching is simply keeping often-used items accessible. Consider, for example, the way you use items in your kitchen. You probably use some items every day, others less frequently, and some only a few times each year. You probably store the frequently used items in the most accessible place.

Disk caching is simply keeping often-read items readily accessible in your computer's Random Access Memory, or RAM. Accessing information from RAM is far faster than accessing it from disk memory. A disk cache maintains a history of data usage, and when the buffer is full, the oldest or least-used data in RAM is replaced with new data. You never run out of space because it is automatically reused to hold your most recent requests.

#### ***How HyperDisk Works***

When your application issues a disk read operation, HyperDisk intercepts the request, copies the data from the disk to its buffer memory, and then passes the data on to the requesting application. HyperDisk copies all subsequent requests for the same data from its buffer memory to the requesting application.

When your application issues a disk write operation, HyperDisk compares the new data to the data already in the cache memory. If it is the same data, the time-consuming disk update is bypassed. HyperDisk copies only active data (data you are actually using) to the buffer, thus providing much more efficient use of your machine's RAM.

### **HyperCP**

HyperCP is the HyperDisk Windows Control Panel which allows you to monitor HyperDisk's setup and performance from within Windows.

### **HyperKey**

HyperKey is a powerful keyboard enhancement package that allows each user to customize all keyboard functions including the type-ahead buffer size, key repeat rate, length of delay before a key begins repeating, keyboard clicking sounds, and Touch Shifting for one-finger typing. By adjusting these functions you can enter data at your own rate.

## **HyperScreen**

HyperScreen is a video enhancement tool that gives you the most power and versatility from your existing video hardware. HyperScreen's state-of-the-art software provides automatic screen blanking to keep images from burning into your display terminal, manual screen blanking at the touch of a key to maintain the confidentiality of your on-screen documents, and video basic input/output system (BIOS) speedup to increase display speed in all text modes.

## **HyperRAM**

HyperRAM speeds up the performance of your computer by as much as 10% by reducing the amount of CPU time used managing RAM. HyperRAM requires no resident memory when installed.

## **Part 1: Installation**

The following procedures give step-by-step instructions for installing the various components of SpeedKit.

### **System Requirements**

To install SpeedKit, you will need:

- A PC which uses a 386sx or better micro processor.
- Microsoft's MS-DOS operating system version 3.3 or better.

### **Installation Procedure**

It is a good idea to back up your hard disk before installing any new program, including the utilities in SpeedKit. This is especially true if you have a particularly complex or nonstandard system.

**Caution:** Do not install SpeedKit while operating under one of the DOS enhancement or extender software packages, such as Microsoft Windows or Quarterdeck's Desqview. HyperDisk is compatible with these systems but must be installed before these systems are executed. SpeedKit operates by intercepting a variety of system interrupts (8, 9, 10, 13, 15, 19, 21, and 28) and redirecting their actions accordingly. DOS enhancement packages often change the system interrupts on a per task basis and create a situation in which SpeedKit cannot maintain a coherent image of the system's devices.

To install SpeedKit on your hard disk, place the SpeedKit floppy in drive A (or drive B). After you have exited from all DOS enhancers, at the command prompt type:

```
A: [ENTER]
INSTALL [ENTER]
```

### **Installing HyperDisk**

1. The installer will ask if you want to install HyperDisk. If you have a complete system backup, type Y.
2. The second screen of the installer shows all the program files that can be installed on your system. Here is an example of an option screen which lists some of the files you may install.

HyperDisk	[√]
HyperKey	[√]
HyperScreen	[√]
HyperRAM	[√]
HyperCP	[√]
Support Files	[√]

A [√] means the corresponding component will be installed. To not install a particular program use the [Tab] key or your mouse to highlight the program and toggle the [Enter] key. When you see [ ] the item will not be installed. For online instructions for installation look to the bottom of the screen. Press the [F10] key to continue to the next screen. Push [Esc] to exit the installer at any time. To alter the install destination tab to the line that says Install to C:\HYPER and then type in the drive and directory in which you wish to place your SpeedKit files, remember to edit your configuration files to so that SpeedKit will be loaded during the BOOT process. The default location for installation is drive C directory HYPER.

3. If you are unfamiliar with your computer we recommend you use the defaults recommended by the installer.

4. You will be asked whether you want to install HyperDisk, HyperScreen, and HyperKey as device drivers or as TSRs (terminate-and-stay-resident software). The device driver method uses less conventional memory. We recommend this method for all SpeedKit components except for HyperRAM. HyperRAM is neither a device driver nor a TSR, it makes an alteration to your system and is not memory resident. If you have conflicts with your system then you might try the TSR method.
5. Enter the amount of memory to use for the disk cache, the amount you enter corresponds to 1K increments. For example, 2048 will create a 2 megabyte cache size, 1024 will create a 1 megabyte cache size. If you do not specify a cache size, the recommended cache size of 2 megabyte or less (depending on the total amount available) will be used. In most cases the default size is fine. Press [Enter] to select the default size.
6. Windows users can set a smaller cache size while Windows is enabled. The purpose for this is to make more extended memory available for Windows, yet still allow HyperDisk to put that memory to use when your system is not using Windows. For precautions necessary to ensure that HyperDisk works correctly when you are running Windows see Appendix C, "HyperDisk Notes for Windows Users."
7. Next, you can specify HyperDisk options. Generally, first-time users do not need to set extra parameters. However, you can fine-tune your system by using the options available to you. If you do want to specify options please refer to "HyperDisk Common Options" and "HyperDisk Technical Options" in Part 2 for a list and description of available options.
8. HyperDisk will install with the Staged Write features turned on. HyperDisk's Staged Write functions can greatly improve the performance of your PC, but you should be familiar with these functions, explained in detail in "Basic Options" in Part 2, before using them.
9. The HyperDisk installer, alters your CONFIG.SYS file and sets BUFFERS=10 . A disk cache makes having more than ten DOS buffers redundant.
10. HyperDisk's Verify Read function is much faster than the DOS Verify function. The installer by default sets the DOS Verify function to off in your AUTOEXEC.BAT file.

### Installing HyperCP

If you have selected to install HyperCP, the HyperDisk Windows Control Panel, the file HYPERCP.EXE will be copied to the C:\HYPER directory unless you have specified an alternate drive or path to install to. To run the Windows Control Panel, you will need to go into Windows and run it from Program Manager or File Manager. You can also create a new Program Item (see Windows documentation for instructions) and click on the HyperCP icon to run.

### Installing HyperKey

1. Select installation as a device driver or as a TSR (if your system requires it).
2. Next, you can specify HyperKey options. If you are not sure about how you want to set the options, try using HyperKey's default parameters. Please read "HyperKey Options" in Part 3 before changing the parameters for HyperKey.

**Note:** When Microsoft Windows is active, a device driver such as HyperKey cannot intercept keystrokes. Therefore, HyperKey is inoperative in the Windows environment.

## Installation

### Installing HyperScreen

Installing HyperScreen is similar to installing HyperKey. The series of questions is much the same, and your answers also should be much the same.

Please read “HyperScreen Options” in Part 4 before changing the parameters for HyperScreen.

When you have finished all of these steps, reboot your computer to complete the installation of SpeedKit.

### Installing HyperRAM

HyperRAM is neither a device driver nor a TSR, it makes an alteration to your system and is not memory resident. The default installation for HyperRAM is the best for almost all systems. Do not change the parameters during installation unless you have memory parity errors. If this happens check the section on “Troubleshooting HyperRAM” in Part 5.

### Setting SpeedKit Options

The operation of all SpeedKit products can be customized by using command-line parameters. These parameters can be used on the line that installs the utility into memory, whether in CONFIG.SYS or AUTOEXEC.BAT. You can also use the same parameters once the product is running by typing them on the command line with the program name. Parameters can be upper- or lower-case except where noted. If you specify more than one parameter, separate parameters with a space, forward slash, or dash (hyphen).

#### *Sample Device Driver Parameter Specifications*

The following example illustrates the use of device driver parameter specifications in the CONFIG.SYS file. This example assumes you are installing SpeedKit products manually and not with the installer. The example shown is for HyperKey:

```
device=hyperkey.exe D:250 R:25 B:-
```

With this set of parameters, the following conditions apply:

- The delay to repeat time is 250 milliseconds;
- The minimum repeat delay is 25 milliseconds;
- No type-ahead buffering.

#### *Sample TSR Parameter Specifications*

The following example illustrates the use of TSR parameter specifications in the AUTOEXEC.BAT file or from the command line:

```
C:\>HYPERKEY D:300 R:35 B:-
```

With this set of parameters, the following conditions apply:

- The delay to repeat time is 300 milliseconds;
- The minimum repeat delay is 35 milliseconds;
- No type-ahead buffering.

## **Part 2: HyperDisk**

### **What is HyperDisk?**

HyperDisk is the most efficient disk performance utility for your personal computer system. HyperDisk can dramatically improve the performance of your hard disk and increase its lifetime by reducing the wear and tear caused by frequent access.

HyperDisk improves disk performance by using a small amount of RAM to store the data you use most often, a process known as buffering. Conventional RAM requirements vary from 0K to 35K, depending on the model and size of cache selected, your DOS version, and the available memory of your PC system.

HyperDisk maintains a history of data usage, and when the buffer is full and space is needed to store new data, the oldest data in the buffer is replaced. Replacing the oldest data with new data improves performance because in many cases data is reused frequently.

Many users are familiar with RAM disks as a way to use memory more efficiently. HyperDisk is similar to a RAM disk but is superior in several ways. Both a RAM disk and HyperDisk transfer data to and from RAM. However, if you use a RAM disk you must first copy all the needed files to the RAM disk and then copy them back to the hard disk after processing has finished. You must put the entire file in RAM, even if you are only using part of the file. If you need additional files, you must stop what you're doing and copy the necessary files to the RAM disk. If the RAM disk becomes full, you must decide which files to copy back to your hard disk and then delete those files from the RAM disk. If you need more files for a given task than the RAM disk can hold, you cannot use the RAM disk. If the power fails or your computer crashes, or if you forget to copy the data back to your disk or diskette, all your work in the RAM will be lost.

## HyperDisk

With HyperDisk you can bypass all the shortcomings of a RAM disk. HyperDisk is fully automatic. If the cache memory is full when an application issues a new disk request, HyperDisk will make space available to hold this new data. HyperDisk continually updates your disk with changes you have made. The updating is done in the background at times when your computer is idle, to avoid interrupting your work. HyperDisk automatically writes all new data to disk, even if you soft-reboot with the [Ctrl][Alt][Del] key combination, so no updates are lost. When you change diskettes, HyperDisk automatically updates the cache for the new diskette and beeps to let you know it recognizes the new diskette.

You can set HyperDisk options to delay immediate updating of the disks and diskettes, a process that provides much greater disk and diskette efficiency. Delaying or staging the update allows HyperDisk to sort data for the most efficient updating. In this way, HyperDisk minimizes the number of disk rotations and head movements required to update the disk, thus prolonging the lifetime of your drive.

Additionally updates are performed in the background asynchronously (Advanced Update Mode), so that you don't have to wait while the data is being written to the disk or diskette drives.

## HYPERDKX.EXE

HyperDisk uses the memory above 1 MB as cache memory. (Technical note: HyperDisk supports two transfer protocols, XMS and INT 15h-87h. XMS is the default mode.) For more information on this HyperDisk, see Appendix E, "Technical Notes on HyperDisk HYPERDKX.EXE."

## HyperDisk Common Options

Although most users readily install and use SpeedKit without setting any options at all, you can improve your system's performance by specifying various parameters. We strongly recommend that you read this section before specifying any installation options, so that you know how the options will affect your system's operation.

Several of the following functions have hotkey commands, which are listed after the option name. When you use the hotkey commands, the speaker will beep once to acknowledge completion of the command. If the caching process is disabled by the hotkeys, the speaker will beep again. In other words, if the command is accepted and you hear one beep, caching is enabled. If you hear two beeps, caching is disabled.

The following options can be used to tune the behavior of HyperDisk. Remember that the default values for all options are the optimal settings for most systems, except for the Staged Write functions. The default for each parameter is listed at the end of the description, if applicable. Lowercase, italic *nn* following a parameter is a placeholder for a number that you provide.

## Basic Options

### **E — ENABLE/UPDATE HYPERDISK — [Ctrl][Alt]E**

Enables caching of the selected drive types. If caching is already enabled, any modified data will be written to update the disk/diskette. Default setting.

### **D — DISABLE HYPERDISK — [Ctrl][Alt]D**

Disables caching of all drive types. You can enable caching later using hotkeys or at the command line. It may be appropriate to use this hotkey command before loading a program from a copy-protected disk. However, several copy-protected programs have been tested, and no problems are known.

**Note:** Always disable HyperDisk when you run disk diagnostics or other system tests, or any program that directly accesses the disk and/or diskette adapter hardware.

### **H — HARD DRIVES ONLY**

Caches only hard (fixed media) drives.

**F — FLOPPY DRIVE CACHING**

Caches all drive types. Default setting.

**S — STAGED WRITE HARD — [Ctrl][Alt]S**

Delays writing hard-drive data changes until the computer is idle, then writes all changes to disk.

With HyperDisk's Staged Write enabled, you should always press [Ctrl][Alt]E to update your disk before either turning off your computer or pressing the RESET button, if one is provided. This precaution will ensure that HyperDisk has copied all data to your disk. HyperDisk will beep once to inform you that the cache is making any needed disk updates. If any updates are pending, they will be copied to disk immediately. After your disk access light goes out, feel free to turn power off.

When HyperDisk accepts data to be written to the disk, it stores that data in a buffer. Later, when the system is idle (no disk, keyboard, or mouse activity), the modified data is written to the disk. This feature increases your computer's performance, since disks are updated only when your computer is not being used for other tasks. For removable media such as floppy disks, wait until the diskette has completely updated before removing it. If you remove the diskette before the update is complete, HyperDisk will interrupt your current foreground process, beep three times, and indicate that an error has occurred. Simply replace the diskette in the drive and press R for Retry.

**Warning:** Staged Write is not for everyone. Never turn power off or press RESET without first disabling HyperDisk! Do NOT use the Staged Write feature if:

- all users of a shared computer are not familiar with the HyperDisk Staged Write feature. With Staged Write enabled, your disks will not be updated immediately, which might cause confusion for a user not familiar with Staged Write. Select Staged Write only after all users are aware of how it changes the behavior of the computer.
- the computer crashes frequently because of poor software and/or hardware.
- bad weather or an overloaded power network cause the power system to fail frequently or unpredictably. Most users in this category should purchase an Uninterruptible Power Supply (UPS). For more information on UPS, see Appendix G, "Uninterruptible Power Supply Support."
- new software is being tested or developed that may crash the system.
- you use a software package that does not support the warm-boot [Ctrl][Alt][Del] function correctly. Qualitas' 386Max version 4.04 or earlier and several other public domain programs fail this test. Additionally, if you use any software to reboot your PC automatically, disable HyperDisk before running the reboot program.

You can easily disable or enable the Staged Write features with the keyboard hotkey commands. HyperDisk has separate controls for hard and floppy drives. When in doubt, use the Write Through functions instead of Staged Write.

You can also have staged writes on specific hard drives by using S:nn where nn is the physical drive number starting with 0 for the first drive. You may also specify specific drives for staged write floppies as well.

**A — STAGED WRITE FLOPPY — [Ctrl][Alt]A**

Same as Staged Write Hard, for floppy drives.

**W — WRITE THROUGH HARD — [Ctrl][Alt]W**

Writes all data through to the hard disk immediately, rather than waiting for the Timer Delay or Background Update functions. HyperDisk performance will be somewhat less efficient than with Staged Write enabled, since HyperDisk must write data to the disk immediately, instead of waiting until the system is idle or the cache is full.

**Note:** Always select Write Through Hard when you test or install new programs, debug programs of uncertain integrity, or perform any operation that may crash your computer.

**Q — WRITE THROUGH FLOPPY — [Ctrl][Alt]Q**

Same as Write Through Hard, for floppy drives. See the note above for Write Through Hard. Default setting.

## HyperDisk

### **XF:file — EXECUTE COMMAND FILE**

Directs the program to carry out the commands contained in the designated file where *file* is a standard DOS path and filename. You can use this function to store common procedures or personalized options. Create a file that contains the command line and parameters desired for a specific user or application. The command file can contain multiple lines, and comments should be delimited by a semicolon. The following example is for HyperDisk:

```
C:\>>HYPERDKX XF:C:\ANYFILE.EXT
```

Example of ANYFILE.EXT format:

```
EH:0           ; enable only first hard drive
OT OC         ; disable tone & change line
XB:9          ; update every 1/2 second
```

Windows users can use the parameter XF:CON to be prompted for console input/output. Use this option for Windows program information file (PIF) default command-line parameters.

## Display Options

### **OR — OVERRIDE REPORT**

Disables the output report that is normally generated whenever you run a SpeedKit product from the command line. This option is useful if you are running from batch files and do not want the report to fill the screen. Specifying OR:- will disable the installation report delay, but the report itself will still be displayed.

### **OX — DISABLE REPORT**

Displays report unless Override Report is applied. OX or OX:+ disables report panel; OX:- restores report panel display. OR:- can be used to override the OX setting. Default is to display report.

### **OK — OVERRIDE DISPLAY METHOD**

Selects the display method. SpeedKit products normally display data directly by means of the video BIOS . OK or OK:+ forces I/O directly to the video BIOS , while OK:- forces DOS I/O. Alternatively, the standard output device can be redirected to any device or file. Default is direct to video BIOS . In the following example, HyperDisk will display the report by means of DOS standard output device:

```
C:\>>HYPERDKX OK:-
```

In the following example, output from HyperKey is redirected to console (CON) device:

```
C:\>>HYPERKEY >>CON
```

### **OK:nn — OVERRIDE COLORS/ATTRIBUTES**

Selects the colors/attributes for the current display. Color displays provide 16 foreground colors to be applied on either 8 (CGA) or 16 (EGA/VGA) background colors. Monochrome displays provide a variety of display attributes. Some allow two or more intensities, underlining, blinking, etc. For CGA displays, there are 120 useful combinations; EGA/VGA displays, 240. Monochrome displays vary and are generally less than CGA. You can enter a value for *nn* in either decimal or hexadecimal formats. The first example below is a decimal example with HyperDisk; the second is a hexadecimal example with HyperScreen:

```
C:\>>HYPERDKX OK:30
C:\>>HYPERSCR OK:X1E
```

Both of the above examples select yellow on a blue background. Alternatively, you can select the colors manually by specifying:

```
C:\>>HYPERKEY OK:0
```

**OKC:nn — OVERRIDE COLORS ONLY**

Same as OK:nn, except only color display attributes are affected. Useful for systems with both monochrome and color displays.

**OKM:nn — OVERRIDE ATTRIBUTES ONLY**

Same as OK:nn, except only monochrome display attributes are affected.

**I:nn — FLUSH INDICATOR**

Selects a beep indicator tone whenever HyperDisk is updating the modified data to disk. This feature is useful if you have a system that does not have a drive indicator light. Experiment with tone frequencies by specifying *nn* in hertz (Hz). Also see the P: *nn* parameter. Default is disabled (I:0).

**P:nn — FLUSH INDICATOR PERIOD**

Specifies how frequently the Flush Indicator should sound. Units *nn* are in seconds. For example, specifying P:5 will set beeps every 5 seconds during the update flush operation.

**R — RESET HYPERDISK HIT**

Resets the HyperDisk cache hit percentage after the report is displayed.

**OT — OVERRIDE TONE**

Disables the hot key acknowledgment tone. OT or OT:+ disables the tone; OT:- restores the tone. Default is tone enabled.

**KF — ENABLE UPDATE TONE**

KF or KF:+ enables the tone sounded when a cache update occurs; KF:- disables the tone. Default is tone disabled.

**KT — DISABLE FLOPPY CHANGE TONE**

KT or KT:+ disables the tone sounded when a floppy disk media change is detected; KT:- enables the tone. Default is tone enabled.

**Memory-Related Options****C:nn[:nn] — CACHE SIZE**

Sets size of memory (in kilobytes) to install initially for use by the HyperDisk cache. For example, a value of 2048 for *nn* means 2 MB. You can vary the cache size after installation using the XC, XD, or XA options, but the size cannot be larger than the initial value set at installation with the C: *nn* option. Use the second [: *nn*] to set the cache size while Windows or DesqView is active. You can add it instead of the CW: *nn*, CB:*nn*, or CP:*nn* parameters described later. Example: C:2048:1024 sets a 2 MB cache size when Windows is not being used and a 1 MB cache size whenever Windows is active.

**CW:nn — WINDOWS CACHE SIZE**

Sets size of cache memory (in kilobytes) while Windows is active. For example, a value of 1024 means 1 MB. (This also applies to DesqView)

**CB:nn— ALTERNATE WINDOWS 3.1 SIZING METHOD**

Sets the minimum base free memory for use with Windows. Default is 512K.

**CP:nn — PERCENT FREE MEMORY**

Sets the percentage of free memory HyperDisk can use while Windows is active. Default is 35 percent.

**Windows example**

Assume all of the following: Your machine has 6098K of extended memory. HyperDisk under DOS uses 4096K (C:4096). When Windows starts up, HyperDisk frees the 4096K and requests the total free memory size, now 6098K. HyperDisk then subtracts the base free memory size (default of 512K, set using the CB: *nn* parameter) for a result of 5585K and takes 35 percent to obtain 1954K as the new HyperDisk cache size. The actual cache memory will be rounded down to the nearest whole-number multiple of cache buffers.

## HyperDisk

### **XS — SHADOW RAM LOADER**

Loads program in Shadow RAM memory. If you have a Chips & Technologies NEAT 210 or 300 Series chip set-based computer or use an XMS-type product that supports upper memory blocks (UMBs) such as 386Max 4.30+, the SpeedKit program will load in this special memory using none of the lower 640K of conventional memory. This option is automatically inactive if loaded high with an external loader, such as DeviceHigh, LOADhi, LOADhigh, etc.

**Note:** For Chips & Technologies computers, load high occurs in the E000:0000-FFFF memory area. Therefore, other programs, adapters, ROMS, or expanded memory specification (EMS) memory banks must not use this area.

### **XSL — SPLIT SHADOW RAM LOADING**

Load High memory load. Loads code and data tables high and leaves I/O transfer buffer in low memory. If you have trouble loading HyperDisk high, try this option. Automatically inactive if loaded high with an external loader, such as DeviceHigh, LOADhi, LOADhigh, etc.

### **XC:nn — RESIZE CACHE BUFFER**

Resizes the cache buffers to *nn* K. You cannot specify more cache memory than was originally installed. XC without a numeric parameter will restore the cache to its startup value.

### **XD:nn — DELETE CACHE BUFFERS**

Deletes *nn* K of memory from the current cache buffer. Use this parameter in conjunction with XA or XC to adjust the cache buffer size for the best use of your system memory.

### **XA:nn — ADD CACHE BUFFERS**

Adds *nn* K of memory to the current cache buffer. You cannot specify more memory than was originally installed. Use XA in conjunction with XD: *nn* to adjust the cache buffer size for the best use of your system memory.

### **XU — UNINSTALL CACHE**

Attempts to uninstall HyperDisk from memory. After writing any pending updates to the disk, HyperDisk will release the cache buffers, restore the system interrupt vectors as they were before HyperDisk was installed, and release the memory used by the program code and tables. If you load into memory other device drivers and/or TSRs that use the same vectors as HyperDisk, the uninstall operation will fail. Only the cache buffers will be released, and the cache will be disabled.

## Keyboard Command Options

### **KW — KEY WAIT TIME**

Selects wait for key after No Parameter status panel. KW or KW:+ enables a pause after the status panel. KW:- disables the wait for a key. Alternatively, you can select a time delay by specifying KW: *nn*, where *nn* is the number of seconds to wait before continuing automatically. Default is to wait for a keystroke if no parameters are specified.

### **K — HOTKEY ENABLE**

Enables or disables the use of HyperDisk's hotkeys. K or K:+ enables the hotkey functions. K:- disables the hotkeys. Default is enabled.

### **K:aclr — HOTKEY SHIFT STATES**

Alters HyperDisk's hotkey shift states. Normally, you must press [Alt] and [Ctrl] before you select a hotkey letter. However, you can use any combination of [Alt], [Ctrl], [LeftShift], and [RightShift]. Specify only the first letter of the shift key name. For example, to select [Ctrl] and [LeftShift], specify K:cl. Default is [Ctrl][Alt].

## Windows Support Option

### KA — FLUSH CACHE AT WINDOWS EXIT

KA or KA:+ will force a flush of all cache buffers when you issue an Exit command from the Program Manager in Windows. This option is useful if you want to have all of the modified cache buffers written to disk before the exiting of Windows is completed. KA:- disables this option. KA:- is the default.

## Write Verification Options

### V — VERIFY READ

Verifies the disk and/or diskette after each disk and/or diskette write. This option replaces the DOS Verify command. Using the DOS Verify command is not recommended while HyperDisk's Verify Read is enabled.

### N — NO VERIFY

Does not verify the disk and/or diskette after each write. If HyperDisk's Verify Read is disabled, use DOS VERIFY=ON. Default setting.

### VF — VERIFY FLOPPY WRITE OPERATION

VF or VF:+ enables Verify operations for diskettes only. VF:- disables the verify after write operation. V, V:+, and V:- affect both drive types. Default is disabled.

### VH — VERIFY HARD WRITE OPERATION

VH or VH:+ enables hard disk Verify operations. VH:- disables the verify after write operation. V, V:+, and V:- affect both drive types. Default is disabled.

## HyperDisk Technical Options

These are parameters that can be used to access various technical HyperDisk functions. These parameters should not be used unless they are specifically needed. If you are not sure about how these parameters will affect your system, do not use them.

## Advanced Drive-Support Options

### EH:n:... — ENABLE SPECIFIC HARD DRIVES

Enables only specified hard drives. *n* refers to the physical drive number starting with zero. You can specify as many drives as needed, each delimited by a colon.

### EF:n:... — ENABLE SPECIFIC FLOPPY DRIVES

Same as EH:*n*, for floppy drives.

### DH:n:... — DISABLE SPECIFIC HARD DRIVES

Disables specified hard drives. *n* refers to the physical drive number starting with zero. You can specify as many drives as needed, each delimited by a colon.

### DF:n:... — DISABLE SPECIFIC FLOPPY DRIVES

Same as DH:*n*, for floppy drives.

### H:dd:ss:hh:ff — HARD DRIVE FORCE PARAMETERS

In the case of translation-type drives where HyperDisk is unable to figure out what type of physical parameters need to be cached with your hard drive the H: parameter can be used to tell HyperDisk the configuration of your drive. Be very careful when using this parameter and make sure to test without Staged Writes to verify that HyperDisk can properly cache the drive.

- *dd* drive number (e.g., 0 for first hard drive)
- *ss* number of sectors per track
- *hh* number of heads
- *ff* first track to start caching on (almost always 0)

### Advanced Tuning Options

#### **T:nn — TIMER DELAY**

Specifies the computer idle time before writing the modified HyperDisk cache data to disk, when using Staged Write. You can specify a value of zero for a 1/2 second delay. Units *nn* are in seconds. Default is 1 second.

#### **M:nn — MEDIA CHECK RATE**

Specifies the time period for floppy diskette media verification. Removable media devices (floppies) are checked periodically to confirm that the media in the drive still matches the media image in the cache. Units *nn* are in seconds. Default is 3 seconds.

#### **Z:nn — SECTORS PER BUFFER**

Specifies the number of sectors per cache buffer. A track is mapped to one or more buffers. This value is autoselected by default. Z:0 specifies full-track caching. You can respecify this parameter after installation, but for the extended memory models, you cannot increase the sectors per buffer beyond that specified at installation. If you want to experiment, install with full-track buffering. Generally the autoselected value will provide the best overall performance.

#### **XP:nn — BACKGROUND UPDATE PERCENT**

Specifies an upper limit on the percentage of modified buffers before updating the disk and diskette on every access. The oldest data (LRU data) will be updated on each cache access until the modified buffer percentage falls below *nn*. Default is 75 percent.

#### **NR — NO READ AHEAD**

Disables read-ahead operations. Improves error handling for some controllers that time-out when reading over bad sectors. Useful for debugging. Default is read ahead.

#### **OB:nn — BYPASS SECTOR SIZE**

Fine tunes performance when using a small (32K) to medium (384K) cache size. Normally, HyperDisk disables this value. Specify *nn* in sectors, ranging from 0 to 128, to restrict the maximum-sized block to be stored in the cache. For example, if you set OB:10, all transfer requests greater than 10 sectors will be passed on to the system BIOS and will not be stored in the cache. This option is useful if you are moving a large amount of data through a small cache, which would immediately be flooded with new data before the previous data could be reused. Setting OB:0 will disable this option. Default is disabled.

### Advanced Update Options

#### **XB:nn — BACKGROUND UPDATE TIME**

Specifies an upper limit on the age of the oldest modified buffer. After *nn* system timer ticks (55 milliseconds per tick), the oldest modified buffer is updated to disk. The Background Update functions are most useful in systems that are seldom idle, such as network servers. Default is disabled (XB:0).

#### **XI — ENABLE ADVANCED UPDATE**

Enables asynchronous update of the disk and diskette modifications for AT, PS/2, and some XT-class computers. XI or XI:+ enables function; XI:- disables. Default is enabled.

#### **XIH — ENABLE ADVANCED HARD DISK UPDATE**

Same as XI, except affects hard disk drives only.

#### **XIF — ENABLE ADVANCED FLOPPY UPDATE**

Same as XI, except affects diskette drives only.

## Advanced Memory Options

### VI — QEMM STEALTH SUPPORT

VI or VI:+ enables virtual interrupts; VI:- disables virtual interrupts. Default is enabled.

### XM — XMS MEMORY ALLOCATION MODE

Requests HyperDisk to use the Extended Memory Manager for allocating extended memory buffers. If your system uses HIMEM.SYS (an XMS of Lotus-Intel-Microsoft-AST), HyperDisk automatically allocates and deallocates memory using XMS.

### XML — XMS MEMORY BLOCK LOCKING

XML or XML:+ locks XMS memory block; XML:- unlocks XMS memory block. Some XMS providers and/or applications alter HyperDisk's XMS memory block if it is unlocked. DR-DOS 6.0's EMM386 and an early Lotus 123R3 release revealed this problem. Locking the block prevents these bugs in other software from destroying the cache memory block. Default is to lock XMS blocks.

### XT, XTR, XTP — XMS MEMORY TRANSFER MODE

Requests HyperDisk to use the Extended Memory Manager (XMS) allocation and memory transfer method. See the XM parameter, above. Recommended for AT&T PCs. XT selects XMS transfer mode in both real and protected mode. XTR selects XMS transfer mode in real mode. XTP selects XMS transfer mode in protected mode.

### OD — DMA BOUNDARY TEST OVERRIDE

Disables DMA boundary testing.

## Diagnostic/Override Options

### OC — MEDIA CHANGE SIGNAL

Disables the diskette drive media change signal test. All diskette drives, other than 160/320/360K types, support a media change detection function. Basically, a signal from the drive indicates that the media latch has been opened or the diskette has been removed from the drive. By default, HyperDisk uses this signal to detect when a diskette has been changed. Use this option if you suspect that your diskette drive has an unreliable media change signal. OC or OC:+ will disable Media Change Signal testing; OC:- enables it. Default is enabled.

### OH:*nn* — HOTKEY VECTOR METHOD

Provides direct control of the Hotkey Vector Method. If your machine is an AT-type machine, you can select either interrupt 09h or 15h. Interrupt 15h is compatible with foreign keyboard support. If your application has conflicting key assignments, you can disable HyperDisk hotkeys by selecting K:-.

### OI — OVERRIDE INSTALL

If you run the program with this parameter it will only update previously installed parameters but will not install HyperDisk if it is not already resident in memory.

### KD — UPDATE MODIFIED BUFFER ON DISK RESET

KD or KD:+ will not update modified buffers when a DOS disk reset, INT 21h, 0Dh is called; KD:- enables update. Default is update enabled.

### Y — DIAGNOSTIC DUMP

Creates a diagnostic file on the current disk and directory of the resident HyperDisk program memory. The function aids in problem determination.

### YD — DISPLAY SYSTEM ACCESS COUNTS

Displays total system read/write requests, saved accesses (cached sectors), and disk accesses in a diagnostic report.

## **Part 3: HyperCP**

### **What is HyperCP?**

HyperCP is the HyperDisk Windows Control Panel which allows you to monitor HyperDisk's setup and performance from within Windows. It provides users with a convenient method of changing HyperDisk's settings without first having to go to a DOS window or exit Windows completely.

### **HyperCP Options**

#### **Master Switch**

The Master Switch enables or disables all caching activity on all hard and floppy drives.

#### **Hard Disk Panel**

The Hard Disk Panel displays the caching status for all hard drives on the system. Caching is **On** if any hard drives are being cached. It is **Off** if no hard drives are being cached. Staged Writes is **On** if HyperDisk is staging write operations to hard drives. Verify is **On** if each write operation is followed by a verify. The number of Sectors per Track is shown for the first two physical drives (0 and 1) on the system. If caching has been disabled for either of the drives, the number of sectors will be shown as "n/a". The **On** and **Off** buttons may be used to enable or disable any feature.

#### **Floppy Disk Panel**

The Floppy Disk Panel displays the caching status for all floppy drives on the system. Caching is **On** if any floppy drives are being cached. It is **Off** if no floppy drives are being cached. Staged Writes is **On** if HyperDisk is staging write operations to floppy drives. Verify is **On** if each write operation is followed by a verify. The number of Sectors per Track is shown for the first two physical drives (0 and 1) on the system. If caching has been disabled for either of the drives or if they have not been used since the last time the system was booted, the number of sectors will be shown as "n/a". The **On** and **Off** buttons may be used to enable or disable any feature.

#### **Cache Performance Panel**

The Cache Performance Panel displays the percentage of saved reads and writes. Values less than 50% are displayed in red. Values from 50% to 65% are shown in blue. The last 35% is shown in green. The Refresh Display shows the interval (in seconds) between updates. You can enter a new value in the edit control between 1 and 60, or use the "spin button" next to the edit control to increase or decrease this interval.

#### **Status Panel**

The Status Panel displays the number of hard errors, soft errors, sectors in each cache buffer, whether advanced update is active for hard or floppy drives, and the memory transfer model.

#### **Cache Memory Panel**

The Cache Memory Panel displays the resident memory, the amount of memory used for caching under DOS and Windows, the amount of memory currently allocated to cache buffers, and the transfer mode.

#### **Iconic Display**

When the HyperDisk Control Panel is minimized or iconic, the graph from the Cache Performance Panel is used instead of a static icon. The graph will continue to be updated at the same interval as when the window is displayed normally. To minimize the window, click on the minimize button at the top right of the window, or press [Return] whenever the window has the focus.

## **Part 4: HyperKey**

### **What is HyperKey?**

HyperKey is a powerful keyboard enhancement package that dramatically improves the speed and performance of your PC keyboard. With HyperKey you can customize all keyboard functions including the type-ahead buffer size, key repeat rate, length of delay before a key begins repeating, keyboard clicking sounds, and Touch Shifting for one-finger typing.

Your PC has a basic input/output system (BIOS) that normally controls your keyboard functions. The BIOS provides little support for many windowing- and scrolling-type applications common in PC systems. Both the delay to repeat (Typematic Delay) and the period of repeat (Typematic Rate) are slow and cumbersome. Although the PC BIOS provides a type-ahead feature, it is only 15 keystrokes. The BIOS type-ahead buffering can be both an advantage and a disadvantage. If you are waiting for a slow program, you can enter data before you are prompted, saving time when the program needs your input. However, when you are scrolling or repeating a keystroke, the BIOS type ahead can cause you to overshoot your target.

HyperKey addresses all of these problems. You can set the Typematic Delay and Typematic Period to any value. HyperKey type-ahead buffering provides 128 keystrokes and does not fill with repeated keys as the PC BIOS does. The Typematic Period is paced to match your application's needs and will never get ahead of your application.

### **HyperKey Options**

The defaults for each parameter are listed at the end of their description, if applicable. Lowercase, italic *nn* following a parameter is a place holder for a number that you provide.

#### **D:*nn* — TYPEMATIC DELAY**

Sets the delay time before a key repeats itself, starting from when you hold down the key until repetition begins. Units are in milliseconds (1/1,000 of a second). Recommended starting value is 350; decrease it as you become accustomed to a more responsive keyboard. Default is 300.

#### **R:*nn* — TYPEMATIC PERIOD**

Sets the minimum time between repeats of a key after the initial Typematic Delay. Smaller values repeat keys faster; larger values repeat more slowly. Units are in milliseconds. Start with a value of 30. Default is 30.

#### **P:*nn* — TYPEMATIC PITCH**

Decreases the Typematic Period automatically after each repeated key. The value *nn* is subtracted from the repeat period after each repeated key, causing repeats to speed up the longer you hold down the key. Units are in microseconds (1/1,000,000 of a second). Default is 500.

#### **S:*nn* — TYPEMATIC SPAN**

Sets the number of repeat characters the Typematic Pitch control will affect. For example, if you select a Typematic Pitch of 500 and a Typematic Span of 10, each of the first 10 repeated keys will repeat faster than the previous one by 500 microseconds (1/2 millisecond), then remain constant for all keys thereafter. Default is zero (disabled).

#### **H:*nn* — SPAN HOLDOFF**

Delays the initial effects of the Typematic Span function. The repeat period will remain constant for *nn* characters before the Span functions begin to decrease the period, or in other words increase the rate of repeats. For example, if you have set the span to 30 and the pitch to 500 and now want the first five characters to repeat without increasing the rate, set the Span Holdoff to five. Default is zero.

#### **B — EXTENDED BUFFERING**

Enables HyperKey's type-ahead buffer. B or B:+ to enable; B:- to disable. Default is enabled.

## HyperKey

**Note:** If after installing other enhancement products two or more keys are delivered for each key you strike, disable this option.

### **B:nn — EXTENDED BUFFER SIZE**

Specifies the size of the extended keystroke during installation. Values for *nn* range from 16 to 4096. Two bytes of memory are required for each keystroke. Default is 128 bytes.

### **I — KEYBOARD LOCK INDICATORS**

Changes the keyboard lock indicators, such as [CapsLock] and [NumLock]. Use the first letter of the key indicator name; UPPERCASE sets the key active, lowercase clears the indicator. Indicators are: [CapsLock], [NumLock], [ScrollLock], and [Insert] state. In the following examples, the first sets all indicators active, the second sets [CapsLock], clears [NumLock]:

```
C:\>HYPERKEY -ICNSI
C:\>HYPERKEY -ICn
```

Some computers do not accept indicator changes by device drivers; therefore you may need to run HyperKey during AUTOEXEC.BAT initialization to change the indicators after booting the machine. Default is no changes to key indicator states.

### **A — ACTIVE**

Enables all HyperKey functions. A or A:+ to enable; A:- to disable. If you discover one of your programs is incompatible with HyperKey, you can disable HyperKey while you are using that program. Default is enabled.

### **C — CLICK ON MAKE**

Issues a click when a new key is struck. C or C:+ to enable clicks; C:- to disable. Default is disabled.

### **C:nn — CLICK PITCH**

Sets the pitch of the click. This function depends on machine speed. Experiment to create the sound you find most pleasing. Default is 100.

### **CR — CLICK ON REPEATS**

Issues a click on all keys, new and repeated. CR or CR:+ to enable; C:- to disable. Default is disabled.

### **L:nn — CLICK PERIOD**

Sets length of time the click sounds. This parameter also depends on machine speed. Experiment to find a pleasing value. Default is 32.

### **T — TOUCH SHIFTING**

Sets Touch-Shifting mode active. Makes it possible to enter a shifted key combination (one that requires you to hold down two or more keys at a time) by pressing only one keystroke at a time. For example, to enter [Ctrl][F1], simply press [Ctrl] and release, then press [F1] and release. Touch Shifting is very useful for 101- and 102-key keyboards. T or T:+ to enable; T:- to disable. Default is disabled.

### **U — UNINSTALL**

Uninstalls the TSR-type model, if it was previously installed. If HyperKey can be removed from memory, all memory used will be released. You cannot uninstall the device-driver version. If it's not possible to uninstall, you will receive a message that the uninstall failed. You might consider disabling all functions instead by using the Active option. The following example disables HyperKey:

```
C:\>HYPERKEY A:-
```

### **XS — SHADOW RAM LOADER**

Loads program in Shadow RAM memory. If you have a Chips & Technologies NEAT 210 or 300 Series chip set-based computer or use an XMS-type product that supports UMBs such as 386Max 4.30+, the SpeedKit program will load in this special memory using none of the lower 640K of conventional memory. This option is automatically inactive if loaded high with an external loader, such as DeviceHigh, LOADhi, LOADhigh, etc.

**Note:** For Chips & Technologies computers, load high occurs in the E000:0000-FFFF memory area. Therefore, other programs, adapters, ROMS, and EMS memory banks must not use this area.

**XF:*file* — EXECUTE COMMAND FILE**

Directs the program to carry out the commands contained in the designated file where *file* is a standard DOS path and filename. You can use this function to store common procedures or personalized options. Create a file that contains the command line and parameters desired for a specific user or application. The command file can contain multiple lines, and comments should be delimited by a semicolon:

```
C:\>HYPERKEY XF:C:\ANYFILE.EXT
```

**KW — KEY WAIT TIME**

Selects wait for key after No Parameter status panel. KW or KW:+ enables a pause after the status panel. KW:- disables the wait for a key. Alternatively, you can select a time delay by specifying KW: *nn*, where *nn* is the number of seconds to wait before continuing automatically. Default is to wait for a keystroke if no parameters are specified.

**OR — OVERRIDE REPORT**

Disables the output report that is normally generated whenever you run a SpeedKit product from the command line. This option is useful if you are running from batch files and do not want the report to fill the screen. Specifying OR:- will disable the installation report delay, but the report itself will still be displayed.

**OX — DISABLE REPORT**

Displays report unless Override Report is applied. OX or OX:+ disables report panel; OX:- restores report panel display. OR:- can be used to override the OX setting. Default is to display report.

**OK — OVERRIDE DISPLAY METHOD**

Selects the display method. SpeedKit products normally display data directly by means of the video BIOS . OK or OK:+ forces I/O directly to the video BIOS , while OK:- forces DOS I/O. Alternatively, the standard output device can be redirected to any device or file. Default is direct to video BIOS .

In the following example, HyperKey will display the report by means of DOS standard output device:

```
C:\>HYPERKEY OK:-
```

In the following example, output from HyperKey is redirected to console (CON) device:

```
C:\>HYPERKEY >>CON
```

**OK:*nn* — OVERRIDE COLORS/ATTRIBUTES**

Selects the colors/attributes for the current display. Color displays provide 16 foreground colors to be applied on either 8 (CGA) or 16 (EGA/VGA) background colors. Monochrome displays provide a variety of display attributes. Some allow two or more intensities, underlining, blinking, etc. For CGA displays, there are 120 useful combinations; EGA/VGA displays, 240. Monochrome displays vary and are generally less than CGA. You can enter a value for *nn* in either decimal or hexadecimal formats. The example below is a decimal example with HyperKey:

```
C:\>HYPERKEY OK:30
```

The above example selects yellow on a blue background. Alternatively, you can select the colors manually by specifying:

```
C:\>HYPERKEY OK:0
```

**OKC:*nn* — OVERRIDE COLORS ONLY**

Same as OK:*nn*, except only color display attributes are affected. Useful for systems with both monochrome and color displays.

**OKM:*nn* — OVERRIDE ATTRIBUTES ONLY**

Same as OK:*nn*, except only monochrome display attributes are affected.

## **HyperKey**

### **KH — USE ALTERNATE INTERRUPT VECTOR**

Forces HyperKey to use Interrupt 9 instead of Interrupt 15. This is for older BIOS machines that do not support Interrupt 15. Only use if HyperKey fails to load. KH or KH:+ enables this function. Default is disabled.

### **M — SMART CAPS**

Turns on the Smart Caps feature that makes the CAPSLOCK work like a typewriter. When Smart Caps is enabled, pressing a SHIFT key will unlock the CAPSLOCK function. M or M:+ enables Smart Caps. Default is disabled.

## **Part 5: HyperScreen**

### **What is HyperScreen?**

HyperScreen is a video enhancement tool that gives you the most power and versatility from your existing video hardware. With state-of-the-art software, it provides manual and automatic screen blanking and video BIOS speedup.

The automatic screen blanking function shuts off your video display after a preset time to prevent a persistent image from burning into the display's phosphors. Phosphors are the light emitting substances that make the electronic image visible. If a fixed image is displayed continuously, the phosphors deteriorate, producing a burned screen. Although monochrome displays are most often affected by burning, color displays can lose brightness and contrast if an image is displayed too long.

With HyperScreen's manual blanking function you can quickly blank any information displayed on the screen. This feature protects sensitive data from exposure to unexpected visitors. By specifying parameters, you can choose which key activates this feature and the number of times it must be pressed to blank the screen.

The Fast BIOS feature increases the speed of your display by replacing inefficient portions of video BIOS code. This option speeds all text mode displays in DOS or any text-based programs, but it does not speed up graphics displays or direct display access applications. These functions are based on the individual software packages rather than the BIOS code on the video card.

### **HyperScreen Options**

The defaults for each parameter are listed at the end of their description, if applicable. Lowercase, italic *nn* following a parameter is a place holder for a number that you provide.

#### **A — GLOBAL HYPERSCREEN ENABLE**

Enables all HyperScreen functions. A or A:+ to enable; A:- to disable. Default is enabled.

#### **F — ENABLE FAST BIOS**

Enables the Fast BIOS routines for speeding up all mode operations. F or F:+ to enable; F:- to disable. Default is enabled.

#### **B — ENABLE BLANKER**

Enables the screen blanking function. B or B:+ to enable; B:- to disable. Default is enabled.

#### **B:*nn* — SET BLANKING TIME**

Sets the inactivity timer, where *nn* is the number of minutes that the keyboard has not been used. After *nn* minutes expire without a keystroke, HyperScreen will blank the screen. B:0 disables the timer. Default is 10 minutes.

#### **K — ANY KEY DEBLANKING**

With this option enabled, you can strike any key to restore the display after HyperScreen has blanked it. With some software, Microsoft Windows for example, only the SHIFT and LOCK keys will restore the display. However, if you want to specify a single key to use for restoring the display, disable this option (K-) and use the Hotkey Selection option. Default is K:+, any key debanking.

#### **K:*nn* — HOTKEY TAP COUNT**

Specifies the number of successive times the hotkey must be pressed (tapped) to manually blank or restore the screen. The timing of the taps is important; they should be spaced no more than about 1/2 second apart. Normally, this is easy to do. If the Any Key Deblanking option is active, one tap will restore the screen. Default is three taps.

## HyperScreen

### K:s — HOTKEY SELECTION

You can select any of the hotkeys listed below for manual screen blanking and restoring. Substitute for `s` the hotkey you want to use. For example, `K: A` selects [Alt] as your manual screen blanking and restoring hotkey. Default is [Ctrl].

Use	to choose blanking, restoring hotkey
K:L	[LeftShift]
K:R	[RightShift]
K:C	[Ctrl]
K:A	[Alt]
K:S	[ScrollLock]
K:N	[NumLock]
K:P	[CapsLock]

### U — UNINSTALL

Uninstalls the TSR-type model, if it was previously installed. If HyperScreen can be removed from memory, all memory used will be released. You cannot uninstall the device-driver version. If it isn't possible to uninstall, you will receive a message that the uninstall failed. You might consider disabling all functions instead. The following example disables HyperScreen:

```
C:\>HYPERSCR A:-
```

### XS — SHADOW RAM LOADER

Loads program in Shadow RAM memory. If you have a Chips & Technologies NEAT 210 or 300 Series chip set-based computer or use an XMS-type product that supports UMBs such as 386Max 4.30+, the SpeedKit program will load in this special memory using none of the lower 640K of conventional memory. This option is automatically inactive if loaded high with an external loader, such as DeviceHigh, LOADhi, LOADhigh, etc.

**Note:** For Chips & Technologies computers, load high occurs in the E000:0000-FFFF memory area. Therefore, this area must not be used by other programs, adapters, ROMs, or EMS memory banks.

### XF:file — EXECUTE COMMAND FILE

Directs the program to carry out the commands contained in the designated file where *file* is a standard DOS path and filename. You can use this function to store common procedures or personalized options. Create a file that contains the command line and parameters desired for a specific user or application. The command file can contain multiple lines, and comments should be delimited by a semicolon:

```
C:\>>HYPERSCR XF:C:\ANYFILE.EXT
```

### OR — OVERRIDE REPORT

Disables the output report that is normally generated whenever you run a SpeedKit product from the command line. This option is useful if you are running from batch files and do not want the report to fill the screen. Specifying `OR:-` will disable the installation report delay, but the report itself will still be displayed.

### OK — OVERRIDE DISPLAY METHOD

Selects the display method. SpeedKit products normally display data directly by means of the video BIOS `.OK` or `OK:+` forces I/O directly to the video BIOS `,`, while `OK:-` forces DOS I/O. Alternatively, the standard output device can be redirected to any device or file. Default is direct to video BIOS `.`

In the following example, HyperScreen will display the report by means of DOS standard output device:

```
C:\>HYPERSCR OK:-
```

In the following example, output from HyperScreen is redirected to console (CON) device:

```
C:\>HYPERSCR >>CON
```

#### **OK:*nn* — OVERRIDE COLORS/ATTRIBUTES**

Selects the colors/attributes for the current display. Color displays provide 16 foreground colors to be applied on either 8 (CGA) or 16 (EGA/VGA) background colors. Monochrome displays provide a variety of display attributes. Some allow two or more intensities, underlining, blinking, etc. For CGA displays, there are 120 useful combinations; EGA/VGA displays, 240. Monochrome displays vary and are generally less than CGA. You can enter a value for *nn* in either decimal or hexadecimal formats. The first example below is a decimal example; the second is a hexadecimal example:

```
C:\>HYPERSCR OK:30
C:\>HYPERSCR OK:X1E
```

Both of the above examples select yellow on a blue background. Alternatively, you can select the colors manually by specifying:

```
C:\>HYPERSCR OK:0
```

#### **OKC:*nn* — OVERRIDE COLORS ONLY**

Same as OK:*nn*, except only color display attributes are affected. Useful for systems with both monochrome and color displays.

#### **OKM:*nn* — OVERRIDE ATTRIBUTES ONLY**

Same as OK:*nn*, except only monochrome display attributes are affected.

#### **M — MOUSE DETECT UNBLANKING**

If you use this option any movement of the mouse will unblank the screen. M or M:+ enable this option. Default is disabled.

#### **D — DISPLAY UNBLANKING KEY**

Normally the key pressed to unblank the screen is captured by HyperScreen. If you wish this key to be passed on to the application that is running in the background use this option. D or D:+ enable this option. Default is disabled.

## **Part 6: HyperRAM**

### **What is HyperRAM?**

HyperRAM increases the speed of your system CPU by changing the refresh rate of your system's 8253 timer chip. All Personal Computers, including the original IBM PC were designed with a very high refresh rate. The rate used by all personal computers is far beyond the rate required by the RAM chips used in these machines. HyperRAM sets the refresh rate to match closer with RAM manufacturers specifications and in turn frees up CPU cycles. These free cycles can be used by your software rather than going to waste by refreshing the RAM too often. The change in refresh rate matches within specifications of most DRAM manufacturers. Depending on your system, HyperRAM should increase your CPU's performance from 2% to 10%. You can measure this in many ways such as Landmark's CPU Speed Test or the Norton Utilities SI program.

### **HyperRAM options**

**HYPERRAM [+][-][R:nn]**

**+ — Enable HyperRAM.**

Entering a + will enable HyperRAM and set the optimum refresh rate.

**- — Disable HyperRAM.**

Entering a - will disable HyperRAM and set the refresh rate to stock values.

**R:nn — Set refresh rate to nn Us.**

Entering R:nn will set the refresh rate to nn micro seconds. Only use this if you have a good understanding of the refresh rates. **DO NOT** set your refresh rate higher than 65 micro seconds. Setting too high a refresh rate will cause memory Parity errors or hang your system. If you find that HYPERRAM + causes parity errors or hangs your system than you will want to try this option. (See the section on trouble shooting at the end of this chapter.)

### **What Is A Refresh Rate And What Does It Do?**

The memory in your Personal Computer is called DRAM, or Dynamic Random Access Memory. This memory is made of banks of 9 chips each holding up to as much as 4MB of 1 bit data. Each chip in a bank represents one of 9 bits. In Personal Computers, 8 of the bits store data and the 9th bit is called a parity bit, used to determine if the data bits are holding the proper information. DRAM chips can not hold a charge of electricity for a very long time. In fact, a new charge of 5 volts (3.3 volts in some systems) must be supplied about every 65 micro seconds or it will lose its data. To supply this charge, that is refresh the memory, the CPU must stop processing data and direct the 8253 chip to send the refresh charge to the bank of memory. Once the refresh is done the CPU can continue processing. By reducing the number of times the CPU has to stop to refresh the DRAM is how HyperRAM speeds up your system.

### **Notes**

HyperRAM is not a TSR. It does not require any RAM or take any away from your system. HyperRAM only needs to be loaded once and will perform until the machine is rebooted.

HyperRAM has now loaded and changed your systems speed. Now try loading some software to insure that the system is working properly. Run all the programs that you normally run on your system. Do not load any data that isn't already saved in case HyperRAM causes a problem. Any problems caused by HyperRAM will most likely be memory problems, your system will either hang or you will get a Parity Error type message. If have any problems refer to the Troubleshooting section that follows for further instructions. If everything works fine then you might want to install HyperRAM so it loads every time you boot your machine.

If you have any type of Memory or RAM test you can further insure that everything is working properly by running that test. If it reports no problems than it is safe to assume that HyperRAM has no conflicts with your machine.

**Troubleshooting**

HyperRAM has been thoroughly tested on many systems before being released but due to the complexity and variety of equipment available we can not guarantee that it will work on every Personal Computer.

If you notice memory errors, parity errors, or that your machine is hanging after running HyperRAM + then the rate that HyperRAM has chosen for your system is causing the DRAM chips to fail. This is in no way a permanent failure, you will just have to pick a lower rate at which to run HyperRAM. To use a manual refresh rate with HyperRAM enter the following:

```
HYPERRAM r: nn [ENTER]
```

where *nn* is the refresh rate you wish to use. Start with 60 and retest your system. If you continue to have problems keep decrements the amount by 5 until you reach a value that your system works with. If the value is less than 18 then you will most likely not benefit from HyperRAM. If this is the case contact technical support for further help.

If you have to use a manual refresh rate then install with the rate override option, and give it the value that worked with your system when the installation program prompts you.

Some problems in benchmarking are caused by TSR or Memory Resident software such as screen blankers or print spoolers.

The benchmark ATPERF.EXE from PC Tech Journal which measures overhead is usually not affected by these programs. It is a very good sign of the change HyperRAM has with your program.

Norton Utilities SI and Landmark's CPU Speed can be effected by TSR's and may not show the increase in performance. If notice no improvement in performance try running the benchmarks without any TSR's loaded. If you still see no increase, call technical support.

## **Part 7: Error Messages**

### **General Error Messages**

The following error messages are common to all SpeedKit components:

#### **Already Installed!**

SpeedKit product has already been installed. The program type and version of the resident program are displayed, followed by the error message.

#### **Invalid Parameter: UNKNOWN**

An invalid command-line parameter was specified. Verify your command-line parameters against the definitions in the “Options” sections for HyperDisk, HyperKey, and HyperScreen. Inserting a delimiter (/,:,-, etc.) between parameters will ensure that only the invalid character is chopped; other valid parameters will be installed.

#### **Incorrect DOS Version**

SpeedKit requires DOS version 3.3 or later. SpeedKit product was not loaded.

### **HyperDisk Error Messages**

Following is a list of HyperDisk error messages:

#### **Extended Memory Not Supported (INT 15h)**

HyperDisk could not find the extended memory BIOS software (INT 15h). Your computer does not support INT 15h extended memory functions. You should use either the Expanded Model or the Conventional Model instead.

#### **No Extended Available**

HyperDisk could not find any free memory in the extended memory manager. You should free some extended memory from other uses.

#### **Insufficient Extended Memory**

HyperDisk could not find enough free memory in the extended memory manager. A minimum of 128K is required to use HyperDisk.

#### **HyperDisk Error RShft: Retry=LShft Skip=Ctrl Abort=Alt?**

This message supports responses by both keystrokes and shift state hotkeys. Shift state hotkeys allow entry of commands even when the foreground application has taken normal keyboard control (i.e., Microsoft Windows, SmartCom, etc.). The error message is preceded by three beeps. The following table lists hotkeys and keystrokes you can use to choose a command:

<b>To Choose</b>	<b>Press</b>
Retry	R or [RightShift][LeftShift]
Skip	S or [RightShift][Ctrl]
Abort	A or [RightShift][Alt]

If you don't enter a response within four seconds, a Retry is automatically entered for you. See the following error message for the meanings of Retry, Skip, and Abort.

### **Error [drive]#:n: - [error message]: Retry, Skip or Abort**

An error was detected during a disk write operation. The error code will be either an extended memory, EMS, or BIOS error.

- **Retry:** pressing R will retry the same disk request.
- **Skip:** pressing S will skip this disk write and continue with the next write.
- **Abort:** pressing A will remove the active drive data from the HyperDisk buffers without updating the disk. Use this response only for floppies you are going to discard because of defective and unacceptable media. This response is not the same as multiple Skips.

If the error code is AB *xx* then *xx* is the EMS error code in hexadecimal (see your EMS manual error definitions). For an EMS error (AB *xx*), the EMS software has been corrupted, and the Retry option most likely will continue to fail.

If the error code is ED *xx* then *xx* is the extended memory error code in hexadecimal (see the IBM-AT Technical Reference [1502243] BIOS Listing, Section: BIOS 1, Error Code Definitions). For an extended memory error, the memory has been corrupted and the Retry option most likely will continue to fail.

If the error is a disk BIOS error on a diskette drive, the error condition usually indicates that the diskette latch is open. If this is the case, replace the diskette and/or close the diskette latch before giving the Retry response.

## **Part 8: Troubleshooting**

### **Introduction to Troubleshooting**

If you are having problems with any of the SpeedKit products, first read through this section. If you continue to have problems after reading this section, please have the following information ready before calling technical support:

- Computer manufacturer and type;
- amount of memory;
- size and type of hard disk;
- DOS version;
- copy of CONFIG.SYS and AUTOEXEC.BAT files;
- HyperDisk version number and serial number, both of which can be found on your diskette.

We prefer that you be at the machine you are having problems with when you call technical support. A technician can be reached at (415) 882-1740 during normal business hours, Monday through Friday, 9 a.m. to 5 p.m., Pacific Time. Often, a technician is on duty after business hours as well and will answer your questions if available. If a technician is not available, you can leave a message on our bulletin board, (415) 882-1735, or email at support@fht.com.

### **Troubleshooting Tips**

If you are unable to boot your machine because HyperDisk causes system crashes, try pressing [Ctrl][LeftShift][Alt] to boot your machine without loading HyperDisk.

If you want to test to see if HyperDisk is causing your problem, try booting your machine with HyperDisk installed but disabled, using the [Ctrl][Alt]D key combination. If you continue to have the same problem, it is probably being caused by something other than HyperDisk.

If your problem persists, try turning off your machine, wait 30 seconds, and try again.

### **Copy Protection**

Some products that use copy-protected media may require that the caching function be disabled during the media verification period. Press [Ctrl][Alt]D to disable HyperDisk and [Ctrl][Alt]E to enable it.

### **Commonly Asked Questions**

#### **Can I run HyperDisk with another disk cache?**

NO! You must always run only a single software cache. You are going to have problems if you run two programs that are performing the same function simultaneously. Never run two caches at the same time, regardless of which ones they are.

The only exception is caching controllers. HyperDisk has been tested with many hard disk controllers with built-in caches, and the combination works just fine. But never run two software caches together; it will only lead to problems with your hard disk.

HyperDisk automatically prevents conflicting configurations by detecting other disk-caching software, such as SmartDrive or PC-Kwik, and stopping installation.

#### **Do I have to remove SmartDrive when using HyperDisk?**

Yes. SmartDrive is a disk cache, and you cannot run two software disk caches at the same time without causing problems.

**I'm getting an Internal Stack Overflow message.**

Set your stacks line to: Stacks=0,0 in your config.sys file. Beware of programs that will alter your stacks setting during installation.

**Is it okay to use FASTOPEN?**

No. We don't recommend ever running FASTOPEN. FASTOPEN is a special type of program that caches file structures. It has proven to be very unreliable and only marginally enhances system performance. FASTOPEN was designed to be used without a disk cache before Microsoft included Smart Drive with DOS. Most recent versions of FASTOPEN work with SmartDrive but continue to cause problems with third party caches, such as HyperDisk.

**Why don't I notice any difference between HyperDisk and SmartDrive?**

Make sure that HyperDisk's Staged Write options are turned on. This is the most noticeable difference when comparing HyperDisk to other caches.

**HyperKey isn't working in Windows. What's wrong?**

Because of the way Windows works there is no way for HyperKey to function under Windows. We are working on a version specifically for Windows, but currently you cannot benefit from HyperKey while running Windows.

**Hotkey Controls**

Use the following hotkey combinations to speed your processing with SpeedKit utilities.

**ABORT INSTALLATION — [Ctrl][LeftShift][Alt]**

Suspends installation of HyperDisk. When booting your computer, but before HyperDisk loads, you can suspend the installation by holding down [Ctrl][LeftShift][Alt] . You will be prompted to choose whether to continue or stop installation.

**WARM-BOOT — [Ctrl][Alt][Del]**

Warm-boots the computer system. HyperDisk first writes any modified data to disk. If the disk requires updating, you will hear two tones and HyperDisk will begin writing to your disk. After the updates are complete, press [Ctrl][Alt][Del] again, and the system will warm-boot.

If you have other TSRs that also monitor [Ctrl][Alt][Del], they may restart the computer without allowing HyperDisk to update your disk. If so, first disable caching by using [Ctrl][Alt]D and then warm-boot the computer.

If you are unsure of the behavior of other resident programs, you can test your system by copying files to a test floppy diskette. First, activate HyperDisk's Staged Write feature by pressing [Ctrl][Alt]A. Insert a newly formatted disk in drive A and copy a large number of files to it by typing copy \*.\* A:.

When your screen indicates that the copying is finished (or has failed because of insufficient disk space), immediately issue the warm-boot command, [Ctrl][Alt][Del]. If you hear two tones and your system begins to write to the floppy, you can issue warm-boots without fear of losing any data.

If your system immediately restarts, you will have lost data being copied to drive A. Your disk integrity will be in question while using the other TSRs together with HyperDisk's Staged Write options and issuing the [Ctrl][Alt][Del] warm-boot key combination.

Possible remedies are to:

- remove the other offending TSR;
- always disable HyperDisk before you warm-boot; or
- use the Write Through feature in your installation of HyperDisk, which is the default setting and requires no extra parameters.

## Troubleshooting

### **FORCE UPDATE BEFORE PROGRAM LOADS — [Ctrl][Alt]F**

Updates all changes to disk/diskette before running the next program load request. Provided for development and testing systems. You can also use the parameter OF:-.

### **RESUME STANDARD UPDATE — [Ctrl][Alt]R**

Resumes normal update conditions. Provided for development and testing systems. You can also use the parameter OF:+.

### **MANUAL DISKETTE CHANGE — [Ctrl][Alt]C**

Changes diskette media indication. If two diskettes have identical file allocation tables, HyperDisk cannot detect that the diskette has changed. Use this command to force HyperDisk to recognize the new diskette.

## **Appendix A: Compatibility Notes**

### **OnTrack Disk Manager, SpeedStor Hard Disk Packages**

Currently HyperDisk directly supports hard drives formatted with Disk Manager and SpeedStor. If you have a hard drive using DOS 3.3 or later then you must use Disk Manager version 3.1 or Speed Stor version 5.14. If you use older versions of these products then you might run into compatibility problems with HyperDisk.

### **Stacker, Doublespace, Drivespace, and SuperStor Hard Disk Compression Programs**

HyperDisk should be loaded after these drivers. Load HyperDisk after stachigh.sys in your config.sys file. If you experience any compatibility problems then you should load HyperDisk into your autoexec.bat file.

Doublespace and Drivespace users should load HyperDisk after the dblspace.sys or drvspace.sys line, load HyperDisk after st-dbl.sys if you are using QEMM stealth doublespace. You do not need to exclude any logical volumes from being cached.

## **Appendix B: HyperDisk Limitations**

HyperDisk supports disk and diskette drives accessed by BIOS INT 13h services. Up to 20 drives can be cached, 10 hard disks and 10 floppies. To be cached, disk and diskette media must be formatted as 512 bytes per sector with 8 to 63 sectors per track.

HyperDisk supports hard drives with up to 256 heads and 1,024 cylinders maximum, or 64 heads maximum and 4,096 cylinders, accessible with special software such as SpeedStor, Disk Manager, or AMI/OMTI BIOS-compatible controllers.

Supported floppy diskette systems include: 5.25-inch single and double sided, double- and high-density formats (8, 9, and 15 sectors per track); 3.5-inch drives single and double sided, double- and high-density formats (9 and 18 sectors per track).

HyperDisk supports partitioned hard disk systems (multiple logical drives per physical drive) and should be installed after the device driver provided by the disk supplier. PC-DOS versions 3.30 and later directly support multiple logical drives. No additional device drivers are required.

If a diskette is removed from a drive and placed in another PC where it is changed slightly — but no change occurs in the file allocation table — and then returned to the first PC, HyperDisk may not detect the media change and fail to update the buffers to reflect the new changes. Therefore, if you remove, alter, and replace a diskette, take notice if HyperDisk issues a media change tone. If you don't hear a tone, use the hotkey combination [Ctrl][Alt]C to change the media indication manually and force HyperDisk to recognize the new diskette. For more information see Manual Diskette Change in “Hotkey Controls,” in Part 6.

## **Appendix C: HyperDisk Notes for Windows Users**

HyperDisk 4.32 and later revisions have been made with specific enhancements to provide optimum performance under Windows. Generally you will not have to change any of the parameters in HyperDisk for Windows to function at optimal speed. There are two tips that you should be aware of when using HyperDisk with Windows.

### **1. Make sure to use the Staged Write features.**

Windows is a large and complex environment, which requires that a lot of temporary data be stored to disk. By having Staged Write turned on, most of this temporary disk writing can be eliminated, since the data will be redundant and will write to the area of the disk that falls into the cache buffer.

### **2. Beware of Windows memory requirements.**

Windows is a memory intensive environment. You should always leave at least 50 percent of your total system memory available for Windows and its applications. For example, on an 8 MB machine, never use more than 3.5 MB (8 MB - 640K for DOS / 2 = 3.5 MB) for the disk cache or any other programs such as print spoolers or RAM disks. If you notice sluggish performance under Windows verify that you are not using all of the extended memory for the disk cache.

### **3. Windows Control Panel**

HyperDisk now includes a control panel for Windows that allows you to view the current status information of HyperDisk and modify the parameters that can be changed while running Windows. Just add the program HYPERCP.EXE to any program group in Windows and double click on the program.

### **4. Windows for Workgroups 3.11**

Make sure to disable 32 bit file access in Windows for Workgroups.

## **Appendix D: Manual Installation**

1. Copy all files with an .EXE extension from the diskette to your hard disk. Place the files in the root directory or in any subdirectory.
2. Make sure no other disk caching software is installed. HyperDisk works fine with hardware cache controllers, but it may conflict with other software caches . The following table lists the most popular software caching products and the associated program names that might be called from either AUTOEXEC.BAT or CONFIG.SYS files .

<b>Caching Product</b>	<b>Program name</b>
Super PC Kwik	SUPERPCK, PCKWIK.SYS
Flash	FLASH
Speed Cache	SCPLUS, SC
Vcache	CACHE, CACHE-AT, CACHE-EM, VKETTE
SmartDrive	SMARTDRV.SYS, SMARTDRV.EXE
PC Cache	PCACHE
FAST!	FAST???.EXE
NetWare Cache	NLCACHE
Lantastic	LANCACHE

If any of these programs are installed, you must remove them before attempting to install HyperDisk. Running two or more caching programs simultaneously may result in the loss of or damage to your data and program files.

3. Choose whether to install HyperDisk as a device driver or as a TSR. We recommend installing as a device driver unless you want to uninstall HyperDisk later in your session. If you will want to uninstall HyperDisk, use the TSR method.

As a device driver, HyperDisk should be installed after any special disk device drivers, such as :

<b>Disk driver</b>	<b>Program name</b>
Disk Manager	DMDRVR.BIN
SpeedStor	HARDRIVE.SYS, SSTOR.SYS
DOS	DRIVER.SYS

Each SpeedKit product can be installed as a DOS device driver or as a TSR program. Most commonly, they are installed as device drivers, but for some near-compatibles it may be necessary to install them after a TSR that makes your system keyboard IBM compatible. If you choose the device-driver method, you must include the installation specification in your CONFIG.SYS file. Use an editor to update the CONFIG.SYS file on your boot drive root directory.

The device-driver definition is normally installed immediately after an extended or expanded memory manager, but before any other device-driver definition. Install them in this order: HyperDisk, HyperKey, and finally HyperScreen. If you placed the SpeedKit files in a subdirectory, you should specify a fully qualified path in the DEVICE = statement.

If you choose the TSR method, you also can run HYPERDKX.EXE at the command prompt. Alternatively, you can place the HYPERDKX.EXE specification in your AUTOEXEC.BAT file on your root directory.

The following example of lines in the CONFIG.SYS file installs HyperDisk with a 512K cache, Staged Write enabled for the hard drives only, and Verify Read enabled for all disk writes; installs HyperKey with a Typematic Delay of 180 milliseconds and a repeat rate of 18 milliseconds and disables the installation report; and installs HyperScreen with a blanking and restoring hotkey of [LeftShift]. Each product is installed as a device driver, and the files are placed in the root directory of drive C:

```
DEVICE=C:\HYPER\HYPERDKX.EXE /C:512 /S /Q /V  
DEVICE=C:\HYPER\HYPERKEY.EXE /R:18 /D:180 /OR  
DEVICE=C:\HYPER\HYPERSCR.EXE /K:L /K:-
```

4. If you are using the TSR installation method, place all SpeedKit products at the beginning of the AUTOEXEC.BAT file :

```
C:\HYPER\HYPERDKX.EXE /C:512 /S /Q /V  
C:\HYPER\HYPERKEY.EXE /R:18 /D:180 /OR  
C:\HYPER\HYPERSCR.EXE /K:L /K:-
```

5. Reboot your machine to complete the installation of SpeedKit.

Note: Install HIMEM.SYS and EMM386.EXE (or QEMM) before HyperDisk.

Install HyperDisk before Windows.

## **Appendix E: Technical Notes**

Extended memory is only available in 80286 (IBM-AT), 80386, and 80486 computers. This memory is above 1 MB and is normally not accessible from MS-DOS real mode applications. HyperDisk uses special BIOS functions (INT 15h, extended memory block move) to access this memory.

If your system uses QEMM, 386Max, EMM386, HIMEM.SYS, etc., the following two warnings do not apply. If you are not using one of the better-known extended memory managers, the extended memory BIOS functions have some side effects that you should be aware of:

- Interrupts may be lost. Interrupt processing is suspended while the extended memory is being accessed. High-speed communications programs are the most likely to encounter problems.
- Pfix and Pfix-Plus (possibly others) may hang when using INT 15h extended memory block move functions with the Intel Inboard 386/AT. This problem is related to the PC-AT ROM BIOS . Test your system carefully. Intel's Inboard 386 Utility Software version 1.2 corrects this problem. Disable caching with [Ctrl][Alt]D while these products are being used.

## **Appendix F: More About Caches**

### **History of Caching**

Although the idea of caching is ancient, the science of caching is quite recent, with most of the fundamental work dating from the 1960s. The Belady replacement algorithm, published in 1967, provides the baseline by which all caching techniques can be measured and compared. This algorithm, known as The Greatest Forward Distance, is not realizable. Due to its noncausal nature it requires perfect knowledge of the future!

Consequently, the Belady algorithm can only be applied to systems that have already completed operations or are perfectly cyclic in behavior, which is not very useful in a PC application environment. Once a realizable algorithm is implemented, Belady's algorithm can be applied to the request list or reference string history to assess how close to optimum the test algorithm performs. It is this comparison upon which the fundamental science of caching rests.

Many caching algorithms have been published and compared to the Belady baseline. Leading are the Least Frequently Used (LFU) algorithms, followed closely by the Least Recently Used (LRU) algorithms. Differences in performance are less than 8 percent on the average. However, LFU algorithms are more complex to implement, and most systems perform better using LRU algorithms, since executing complex algorithms requires time and space. Common algorithms for central processing unit (CPU) instruction caches are Direct, Two-Way Associative, and Four-Way Associative. Programming systems that support overlay loading commonly use Least Recently Loaded (LRL) algorithms.

HyperDisk uses a modified LRU algorithm, which is simple and executes quickly. Weak points in general LRU performance appear when data is retrieved from the disk in such a fashion that the data is replaced after being used only once. This type of behavior is termed overcommitment or thrashing. To avoid overcommitment, HyperDisk uses a proprietary combination of linear and random access predictors to identify the onset of the condition.

For more information on caching in computing systems, see the journals of the Association for Computer Machinery or the Institute of Electrical and Electronics Engineers.

### **Disk Controller Caches**

Many manufacturers now offer disk controllers that feature onboard caching functions. These controllers generally provide excellent performance. However, because of cost and space limitations, most controllers provide only a small buffer to hold data, typically less than 512K. In addition, access to the controller buffer is slower than access to normal system RAM. If your system is an 80386 or 80486 32-bit system, the I/O-channel speed is very slow when compared to system RAM. Another limitation of disk controllers is that the buffer memory is dedicated to the caching function and cannot be used in any other way.

For maximum system performance when using a caching disk controller, we recommend a modest buffer size on the controller (16K to 128K). Install HyperDisk as you would with a normal controller, using either extended or expanded memory. The combination of HyperDisk and a caching controller is unbeatable.

### **Other Caching Systems**

Caching techniques were invented long before the use of personal computers. Mainframe computer systems have been implementing caching techniques for some time, and now caching is available for PCs as well. There are many types of caches, all unique and different.

Memory caches usually allow the use of slower memory chips on new high-speed machines. Many 80386 and 80486 computers on the market today implement a memory cache design. They place a small amount of high-speed memory in the system (usually 64K of static RAM) and then use that memory to cache up to 16 MB of slower dynamic RAM chips. This system allows the machine to use the full speed of the processor while maintaining a very economical memory system.

## **More About Caches**

CPU caches are implemented to allow the stacking of instructions waiting for the processor, thus increasing the speed of the system.

Print spoolers are another type of cache. Print spoolers use memory or disk to cache the information being sent to the printer, freeing the machine to continue with other work.

None of these types of caches is the same as a disk cache. Often computer users assume that if they have one type of cache in a system, they don't need any other. In fact, system performance is best when a cache is built into every area of the machine.

## **Appendix G: Uninterruptible Power Supply Support**

### **UPS Monitor**

HyperDisk can monitor the status of any Uninterruptible Power Supply (UPS) that has a serial port. This feature is especially useful for machines that are run unattended, such as file servers and communication workstations. By monitoring the UPS, HyperDisk can help prevent data loss by shutting down whenever the computer is not running on normal power. This helps prevent loss of data that would be in a “staged write” buffer by turning off the Staged Write options whenever normal power is not being used.

This flexible UPS monitoring function can monitor any I/O port for active signals. Multiple signals can be monitored as well as signals with different polarity. It can work in conjunction with other monitors, such as the monitors built into Lantastic and Novell.

Use the UP: parameter to set up the UPS monitoring function. Items enclosed in curly brackets are required; items enclosed in square brackets are optional:

```
UP:{IoPort}:{IoPolarity}:{IoMask}:{CacheMask}[:{PollSeconds}[:{PollCount}]]
```

*IoPort*: Input port address. This is the address of the port to be monitored. This number must be in hexadecimal format.

*IoPolarity*: Inverts sense of input port bits. Normally the monitor looks for a “high” signal for a true occurrence of a state. By switching the polarity, the monitor will look for a low occurrence of the state. Zero (0) does not change value. One (1) inverts bits sense.

*IoMask*: Determines which bits to test for non-zero conditions:

- 0 drops bit from test;
- 1 retains IoPort bit value;
- Non-zero results indicate active UPS (AC power off);
- Zero results indicates inactive UPS (AC power on).

*CacheMask*: A bit field:

- 1 disables function if this bit occurs;
- 0 no change to function if this bit occurs.

Bit	BitName:	A one (1) will disable the function:
0	StagedFloppy	Staged Write floppy disk
1	StagedHard	Staged Write hard disk
2	VerifyFloppy	Verify floppy writes
3	VerifyHard	Verify hard writes
4	Reserved0	Reserved always 0
5	Reserved1	Reserved always 0
6	FloppyEnable	Enable floppy caching
7	CacheEnabled	Enable all caching functions

*PollSeconds*: Sets the period in seconds to sample IoPort value. The I/O port will be checked every *nn* seconds for changes in status.

*PollCount*: Sets the number of identical IoPort samples before changing the cache state. This tells the monitor how many times it should wait after seeing a change in the state of the UPS before changing the status of the cache. This helps keep the cache from changing states if the UPS goes onto battery power for a very short period of time, such as during a brownout.

## UPS Support

### IoMask values for COM port based UPS monitoring system

To set the IoMask values you must determine which pin on the I/O port you are going to use to monitor the UPS. Most UPS use the Carrier Detect Pin on a PC serial port to monitor the UPS status.

To calculate the *IoPort* address you must first determine which port you are going to be monitoring, then calculate the offset to the port register that you will be using. In most cases you will be using a serial port at either COM1 or COM2 and monitoring the Modem Status Register. To monitor the Modem Status Register on COM1 you would calculate the following address:

COM1 is generally located at 3F8.

COM2 is generally located at 2F8.

Modem Status Register is 6 bytes from the port address.

The *IoPort* address would be 3F8 (COM1) + 6 (MSR) = 3FE for COM1.

The *IoPort* address would be 2F8 (COM2) + 6 (MSR) = 2FE for COM2.

The following table lists the common pins used to monitor UPS functions.

9-Pin	25-Pin	Signal Name	IoMask	IoPolarity
Pin 1	Pin-8	Carrier Detect	80	00
Pin 6	Pin-6	Data Set Ready	20	00
Pin 8	Pin-5	Clear To Send	10	00
Pin 9	Pin-22	Ring Indicator	40	00

To make your own cable for the American Power Conversion (APC) UPS follow the pin-out details below:

APC 9 pin interface

Cable end: Male (Pins)

Pin 2 - AC Power Fault

Pin 4 - Signal Ground

Computer 9 pin interface

Cable end: Female (Sockets)

Pin 1 - Modem Data Carrier

Pin 5 - Signal Ground

### Example:

Monitor COM2, Modem Status port: Bit 7, Carrier Detect, normal polarity. If power fails disable Staged Write functions on both hard and floppy drives. Thirty second sample period. Three matching samples indicates active/inactive UPS.

```
HYPERDKX UP:2FE:0:80:3:30:3
```

## **Appendix H: Product Information**

### **Limited Warranty**

In the event of notification of defects in material or workmanship of the diskette media or manual, within the warranty period of 45 days from the date of the purchase of the license fee, HyperWare will, at its option, replace the diskette or manual, or refund the license fee. If you need to report a defect, call the HyperWare Customer Service Department. The remedy for breach of this warranty shall be limited to replacement or refund and shall not encompass any other damages, including but not limited to loss of profit, and special, incidental, consequential, or other similar claims.

HyperWare specifically disclaims all other warranties, expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose with respect to defects in the diskette and documentation, and the program license granted herein in particular, and without limiting operation of the program license with respect to any particular application, use, or purpose. In no event shall HyperWare be liable for any loss of profit or any other commercial damage, including but not limited to special, incidental, consequential, or other damages. This statement shall be construed, interpreted, and governed by the laws of the State of California.

### **Product Return Policy**

You may return any HyperWare product as long as the seal of the distribution envelope has not been broken and the product is in a resaleable condition. Resaleable means the condition you would want to receive the product in if you just bought it new. Call our Customer Service Department for a Return Merchandise Authorization number before shipping the merchandise to us. No refunds will be given for merchandise returned with the envelope seal broken or if the diskette inside has been copied.

### **Upgrade Policy**

You can get a free upgrade to all HyperWare products from HyperWare's BBS for one year from the date of purchase of the license. Thereafter, an annual subscription fee entitles you to an unlimited number of upgrades from the BBS during the following 12 months. You can obtain a new manual and program diskette at any time for a minimal cost. Prices and terms are subject to change without notice. Please call for current information before ordering or subscribing.

### **Ordering Information**

Call your local computer store or order directly from:

HyperWare, 185 Berry Street, Suite 4807, San Francisco, CA 94107, USA

PHONE: (415) 882-1740  
FAX: (415) 882-1733  
BBS: (415) 882-1735  
Email: orders@fht.com  
CompuServe ID 71333,3657

We are also on the Internet:

<http://www.fht.com/hyper.html>  
<ftp.fht.com/pub/hyper>

## Product Information

## Technical Support

Each SpeedKit product is meant to be installed as a set-it-and-forget-it utility. The benefit of the programs will be readily apparent in the day-to-day improvement of your system performance. We have taken every step to ensure the compatibility and reliability of our product. However, it is impossible to test every combination of hardware and software. For this reason, our technical support department is ready to assist you, at no charge, with any questions, comments, or installation problems.

You can call for technical support for this product Monday through Friday, 9:00 a.m. to 5:00 p.m., Pacific Time. Please be prepared to leave a name and number where you can be reached. Before calling, please read the sections of this manual pertaining to your question. We'll also need to know the version and serial numbers of the product about which you are calling. We can also be reached by Email at support@fht.com.

## HyperWare Products

### Safety Disk (tm)

Safety Disk saves all of your systems vital information and will solve most problems due to: Loss of battery power, loss of CMOS information, accidental deletion of boot files, virus damage to boot disk.

"Use Safety Disk and your PC is Safe.", Computer Shopper

"Used in Conjunction with a conventional backup utility, Safety Disk, for \$59.95 will provide as bulletproof a backup as you're likely to find in the PC marketplace.", InfoWorld

"Safety Disk is so deceptively easy to use that it makes hard-drive and computer maintenance seem impossibly easy.", PCM Magazine

"I have discovered the most unique and useful system maintenance utility since Spinrite came along.", MBUG PC Newsletter

### ExtraDOS Toolbox (tm)

A compilation of powerful and sophisticated tools for MS-DOS users. The programs offer functionality: some enhance programs already found in MS-DOS, other tools are familiar to the UNIX world and are now available in MS-DOS. ExtraDOS also compliments PC Tools and Norton Utilities by offering many features not found in these packages. The quality of our tools will allow you to work faster, smarter and better.

Featured in :

DOS Power Tools, 2nd Edition, Revised for DOS 5.0 book by Bantam Books.

Inside MS-DOS 6, New Riders Publishing.

Killer DOS Utilities, Que Corp.

### AreaCode for Windows (tm)

Find the areacode for a given city, state, or country. Find the location for a specified areacode.

### SpeedRam for Windows (tm)

A small, non-resident utility that will increase your systems performance by as much as 10% yet requires not resident memory to operate. Increases Norton 6.0 SI on a Compaq 386/33 from 34.7 to 35.6, AST 486 SI from 70 to 72!

### **HyperDisk SpeedKit (tm)**

HyperDisk is the finest disk caching utility available for your PC. Hard disk system performance will generally increase 300% to 1000% while simultaneously prolonging the lifetime of your drive by reducing the wear and tear caused by frequent and redundant access. HyperDisk minimizes the head movements required to update the disk, thereby lengthening the drive life. HyperDisk will improve the performance of any PC system. New computers based on the 80486 and Pentium microprocessors will be incomparable in performance after installing HyperDisk. Disk caches for your PC are not new. DOS itself uses "Buffers" to cache data for better performance. Most PC systems set the "BUFFERS=" statement in the CONFIG.SYS file to cache data for better performance. HyperDisk functions in much the same way only with far, far greater efficiency. It can also handle large cache sizes, up to 63MB.

Also included:

HyperCP - Windows status and control panel for HyperDisk  
HyperScreen - Improves video performance  
HyperKey - Improves keyboard performance  
HyperRam - Optimizes the RAM refresh rate

### **CleanUp for Windows (tm)**

With the ever increasing size and lowering cost of disk space, most PCs running Windows have large hard drives. Larger disk drives are more complex to manage. It is no longer feasible to remember the name, location and purpose of every file on your system. Often files and programs will be installed on a temporary basis only to be forgotten and either outdated or left behind. You can quickly devote more than 25% of your hard disk to unused or duplicate files. CleanUp provides a comprehensive way of dealing with this problem by quickly isolating unused and duplicate files and removing them, freeing up valuable hard disk space. CleanUp allows you to scan one or more disks to identify and remove unnecessary files. CleanUp will identify files with the same name in any directory and display them in the main window. You can also display a graph of the space used by your largest directories.

"should definitely be part of your system", Dr. Ed Hoffman, Windows OnLine Review

PC Computing Magazine "Best Bet", August 1993

### **TurboBAT (tm)**

TurboBAT Creates a .COM program file from a DOS batch file, eliminating the need to distribute batch files with source code. Compiled batch files not only run faster, but are secure from unauthorized modifications. Registered users do not need to pay royalties on programs created with TurboBAT.