CD-Quick Cache™ for Windows 95/98

Introduction

CD-ROM drives are wonderful pieces of technology.   By using optics instead of magnetics, vast amounts of data can be stored in a small amount of space on a plastic disc.   But as with most technology, there are always design tradeoffs made.   In the case of a data storage system, the tradeoff is between the amount of data that can be stored and the speed with which you can access that data.   Even with 24x CD-ROM drives, the average time it takes to reposition a drive's read head to a new location and start reading data is at least **100** milliseconds.   Compare that with the under **10** millisecond access times of today's hard drives.   Due to the nature of CD-ROM drive mechanics, this situation will not be changing any time soon.   In a word, CD-ROM drives are **slow**.

Data caching has been used for years to speed up the performance of magnetic disk drives.   Caching is a memory management technique that reads and stores frequently used data in a memory buffer for fast access.   With caching, every time you request data from your drive, this data is also placed in a buffer. The next time the data is needed it can be found in RAM, so actual disk reads are saved.   This results in a tremendous increase in performance.   Until recently, effective CD-ROM caching has been unavailable.

Presenting CD-Quick Cache for Windows 95/98

CD-Quick Cache will dramatically improve the performance of your CD-ROM drive.   By storing frequently read data in either RAM, or on your hard drive, disc reads are almost instantaneous.   CD-Quick Cache uses an intelligent caching algorithm and dynamic read-ahead buffering to insure top performance.

CD-Quick Cache is compatible with virtually all CD-ROM drives supported by Windows 95/98.   It's important to note that not all CD-ROM drives are fully supported by Windows 95/98.   If your CD-ROM drive uses an older 16-bit real mode driver, you need to either obtain a new 32-bit driver from your drive's manufacturer or use the DOS/Windows 3.x version of CD-Quick Cache.   The Windows 95/98 version of CD-Quick Cache is a 32-bit application and can't be used with 16-bit drivers.   98% of CD-ROM drives used with Windows 95/98 do use the new 32-bit drivers.

CD-Quick Cache for Windows 95/98 is tightly integrated into the operating system and is actually an extension to it.   As such, the software works seamlessly with all applications using your CD-ROM drive. CD-Quick Cache will operate with as many CD-ROM drives as Windows 95/98 supports (up to 32).

The unique ability of CD-Quick Cache to use either RAM or a combination of RAM and hard disk storage allows you to configure the software for the very best performance with your applications.   If disk storage is used for the cache, it will be possible in many cases to go with a "minimal install" of your CD-ROM applications.   Normally there is always a tradeoff between the amount of hard drive space used by CD-ROM software and performance.   You can do a "normal" or "maximal" install, get good performance but use a lot of hard drive space.   You can also do a "minimal" install, get poor performance, but use a lot less disk space.   With CD-Quick Cache, you no longer have to make this tradeoff.   If you use hard disk storage for CD-Quick Cache's cache, you can have great performance and use a minimal amount of disk space for your CD-ROM applications!   If you have several CD-ROM applications installed this way, the saving will soon become very apparent.

CD-Quick Cache has the ability to track up to 256 different CD-ROM titles.   This allows it to remember data when you change discs.   So, if you change CDs and then go back to an earlier one, your data will still be able to be retrieved from the cache.

In addition, if you use your hard drive for cache storage, CD-Quick Cache has the ability to save your cached data and volume information **between** sessions.   This means you can shut down your computer, come back to it days later, insert the same CD-ROM that you used a few CD-ROMs back, and have it's data instantly!

Included with CD-Quick Cache are two CD-ROM utilities, CD-Test and QuickMon. CD-Test will evaluate the performance of your CD-ROM system by measuring the time it takes to walk through a CD's directory structure and read data.   You can run this test with or without CD-Quick Cache installed to benchmark your CD-ROM drive's performance.

QuickMon is a Microsoft Windows 95/98 application that will give you statistical information on CD-ROM and CD-Quick Cache reads.   This utility will show the total reads requested by your application, how many reads CD-Quick Cache has saved and what this percentage was.

In addition, QuickMon is used to change the way CD-Quick Cache is configured.   You can change the cache size, choose between RAM and hard drive cache storage, and have all changes take effect without restarting your computer each time.

CD-Quick Cache loads as a Windows 95/98 Virtual Device Driver (VxD) and becomes part of the Windows 95/98 layered block file system.   CD-Quick Cache is full 32-bit protected mode implementation that works with all protected mode CD-ROM drivers.

Features

- Will work with any CD-ROM drive using a 32-bit protected mode driver.
- Cache is persistent and will remember data between sessions.
- Uses Dynamic Read Ahead Buffering with Fuzzy Logic Control.
- Has intelligent caching for all types of Full Motion Video clips (AVI, QuickTime, MPEG).
- Can use up to 32MB of RAM or 256MB of hard disk for a CD-ROM cache.
- Easily handles multiple CD-ROM drives.
- Easy installation in less than a minute.

System Requirements

- An IBM or compatible computer with an 80386 or higher processor.
- At least one CD-ROM drive using a 32-bit protected mode driver.
- Windows 95 or Windows 98.

License

CD-Quick Cache is distributed as Shareware.   It is **NOT** public domain or free software.

Non-registered users of this software are given the opportunity to evaluate the complete CD-Quick Cache software package for 30 days with no obligation.   If, after the evaluation period, you find CD-Quick Cache to be suitable for your needs, you must register your copy or discontinue using CD-Quick Cache.

What we're saying is if you use this program, then you should pay for your copy.   That way Circuit Systems will be able to provide updates, support, and generally stay in business.

When you register CD-Quick Cache you will receive a personal KeyCode and the latest version of all the software that comprises the CD-Quick Cache package.   Your KeyCode will disable the opening shareware screen and may be used with all future versions of CD-Quick Cache for Windows 95/98.   This means once you've registered, you're registered for life.   You may use any new versions of CD-Quick Cache for Windows 95/98 as they become available, free of charge.

Your KeyCode is derived from your name and may not be distributed in any manner.   CD-Quick Cache is LICENSED TO THE SINGLE PERSON WHO REGISTERED THE PROGRAM.

All users are granted a limited license to copy the UNREGISTERED version (this means everything except your KeyCode) of CD-Quick Cache for the trial use of others.   Please feel free to give copies of CD-Quick Cache to your friends and associates.   That's what shareware is about.

This license does NOT include distribution or copying of this software:

- In conjunction with any other product or service.
- In general use within a company or school.
- For any "disk fee" other than a small (generally $2.00 to $5.00) copying charge.
- For distribution in any modified form.   The file containing this license information MUST be included along with full documentation and all the files that make up this software package.

The data record in the included VENDINFO.DIZ file contains detailed license information governing distribution.

Ordering Information

A CD-Quick Cache registration licenses you to use the product on a regular basis.   Registration also entitles you to lifetime technical support and allows you free use of all future versions of CD-Quick Cache for Windows 95/98.

An individual registration costs $29.   Upon receipt of your paid registration form, we will send you the latest registered version of CD-Quick Cache with full documentation on the disk.   New Jersey residents should include 6% sales tax.

Site licensing is also available.   Prices are based on the estimated number of users.   Please write for more information.

A CD-Quick Cache registration form is included in the distribution package for your convenience.   You may print an order form when CD-Quick Cache loads by selecting "**How to order**" and then "**Print an order form**".   You may also print the file ORDERFRM.TXT anytime.   Please take time to fill this out and return it.   If you would like high-quality software to continue to be made available on a try-first basis and for a reasonable cost, it is up to YOU to support such programs.

Please send your registration form, suggestions and any
comments that you might have to:

Peter Volpa	or	For questions only,
Circuit Systems, Inc.		no orders. Call
418 Church Road		(609) 875-5433
Sicklerville, NJ 08081-1727		12 - 6 PM EST

Questions may also be sent by Email on CompuServe to 72202,3043 or via the Internet to
circuitsys@compuserve.com

Registering CD-Quick Cache by Credit Card

You can order with Master Card, Visa, Amex, or Discover from Public Software Library, Inc. in the following ways:

Online: Go to our Web site at http://ourworld.compuserve.com/homepages/circuitsys/cdq95.htm and click on "Order Online".

FAX: To 713-524-6398 and please type or block print very plainly.

Email: To PsL at "11726@pslweb.com"

Mail credit card orders to PsL at P.O.Box 35705, Houston, TX 77235-5705.

Phone: PsL's operators are available from 8:30 a.m. to 5:30 p.m. CST, Monday-Friday at 800-242-4775 Ext. 11726 or at 713-524-6394 Ext. 11726

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Any questions about the status of the shipment of the order, refunds, registration options, product details, technical support, volume discounts, dealer pricing, site licenses, non-credit card orders, etc, must be directed to Circuit Systems, Inc. at circuitsys@compuserve.com or 609-875-5433.

To insure that you get the latest version, PsL will notify us within one business day of your order and we will ship the product directly to you.

PsL's order number for CD-Quick Cache is **11726**.

The people at PsL are very nice, but they will not be able to answer ANY questions you may have. If you want to check on your order, or have technical questions (or **any** other question), please don't call them.   Please contact us (Circuit Systems, Inc.), and we will help you.

Registering via CompuServe

If you are a CompuServe member, you can register CD-Quick Cache online.   CD-Quick Cache's registration fee will be included in your monthly CompuServe bill.   After you logon, just type 'GO SWREG' for CompuServe's shareware registration service.   CD-Quick Cache's registration number is **10604**.

Disclaimer

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Installing CD-Quick Cache

CD-Quick Cache includes a Setup program to make installation very easy. The Setup program will copy all needed CD-Quick Cache files to your computer and configure it for caching CD-ROM data.

When you start Setup, you will first be asked for the install directory (where you want CD-Quick Cache to be copied to), drive and path.

When this information is provided the Setup program will create a subdirectory on your hard drive called "\ CDQUICK". This may be changed to any other drive or directory as needed. Setup will copy all the needed CD-Quick Cache files from your floppy drive to that subdirectory. Setup will also add an entry for the QuickMon Cache Monitor to your Windows Startup menu in the Programs StartUp group.

If you have over 40MB of free space on your hard drive, CD-Quick Cache will default to using your hard drive for cache storage. If hard drive storage is used, you will next be asked if you want to run the Windows 95/98 utilities ScanDisk and Defrag. These utilities will test and optimize your hard drive and we strongly recommend their use before using CD-Quick Cache.

Any default options used by CD-Quick Cache can easily be changed later by running QuickMon. For more information on using QuickMon to change these settings, please refer to the section Changing CD-Quick Cache's Configuration later in the manual.

To run the Setup program, insert your copy of CD-Quick Cache into your floppy drive and select Run from the Windows 95/98 Startup menu. Then type: A:SETUP
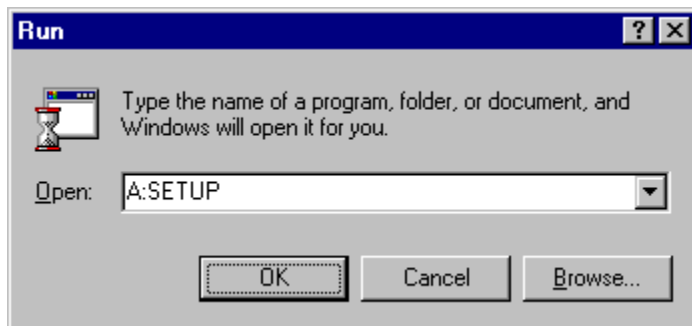
You may also run Setup from the Windows 95/98 Explorer.

Follow the directions and before you know it, you will have CD-Quick Cache installed, speeding up your CD-ROM drive.

If you are using the Setup program to upgrade your software, and you need to reenter your Name and KeyCode, an option has been added to prompt you for this information. Just start Setup with the '/R' switch. e.g. SETUP /R This should normally not be necessary. It's also possible to enter this information from the opening splash screen.

Uninstalling the Software

If for any reason you want to return your system to the way it was before you installed CD-Quick Cache, start QuickMon and use your left mouse button to click on QuickMon's icon in the upper left hand corner. From the drop down menu choose "Uninstall CD-Quick Cache".
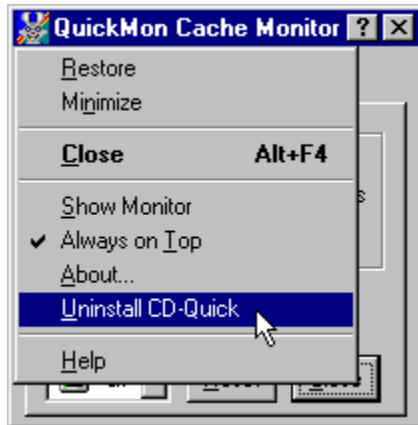
Choosing Between a RAM or Disk Cache

CD-Quick Cache has the unique ability to use either RAM or a combination of RAM and your hard drive for cache storage.   Which is best for you depends on the type of software you run.   Of course if you have an great deal of RAM (64 MB would be nice), RAM is always the fastest choice.   RAM can be accessed in microseconds.   On the other hand, in most cases a fast hard drive coupled with a smaller amount of RAM can also perform very well.   If you have at least 40MB of free disk space, CD-Quick Cache's Setup program will configure a 32MB hard drive cache.   If you have less free disk space, a 2MB RAM cache will be allocated.   You can easily change between a RAM or disk and RAM cache by using the Settings page in QuickMon.   Please note, if you select your hard drive for cache storage, the amount of RAM also used can not be specified.   Its size is dynamic and will vary depending on the amount of free memory available.

Choosing a Cache Size

You may also decide to set the cache size yourself.   In setting a cache size, you should realize that larger cache sizes will increase performance because more data is available.   With the cache holding more data, the chances of finding the data you need increase and the much slower reads of your CD-ROM drive are avoided.

If you're using RAM for your cache, you should keep in mind that the amount of memory you allocate to CD-Quick Cache must be balanced against the needs of other applications in your system.   It's possible to improve the performance of the cache but slow down an application that runs faster with more memory. You won't have this problem if you select a disk cache, although the amount of free disk space available may be an issue.   The statistics that CD-Quick Cache provides may be helpful in selecting a cache size and optimizing overall performance.

See <u>Suggestions for Configuring</u> for more information.

Using Multiple CD-ROM Drives

When CD-Quick Cache loads it actually becomes part of Windows 95/98.   As such it supports as many CD-ROM drives as the operating system (32).   A possible problem can arise when using a mixture of CD-ROM drives where some use 32-bit Protected mode drivers and others use the older 16-bit Real mode drivers.   In this case the Windows 95/98 version of CD-Quick Cache will only cache the drives using 32-bit Protected mode drivers.   For the drives using the older 16-bit Real mode drivers you need to either update your driver software to 32-bits (the best option) or use the DOS/Windows 3.x version of CD-Quick Cache on any drives using Real mode drivers.   The registered version of CD-Quick Cache for Windows 95/98 includes a licensed copy of the DOS/Windows 3.x version for use on your Windows 95/98 system. This way you can use CD-Quick Cache on your Windows 95/98 system either way.

QuickMon Cache Monitor

CD-Quick Cache's QuickMon utility lets you monitor and control the operation of CD-Quick Cache. Running QuickMon is completely optional, the cache will run the same with or without it.   When loaded, it will appear as an icon in your System Tray.   Anytime you'd like, you can see the **Percent saved** on your system by holding your mouse cursor over CD-Quick Cache's icon.

If you click on the icon with your left mouse button you'll activate it.   QuickMon will display status information in a small pop-up window.   This allows you to view cache operation in real time.   As you're using an application to access your CD-ROM, you'll see the cache statistics as they update!   This is another way to get a feel for the improvement CD-Quick Cache provides.   Anytime after CD-Quick Cache is loaded, you can start QuickMon to display status information.   QuickMon is added to your Windows 95/98 Startup Menu under the Programs heading.
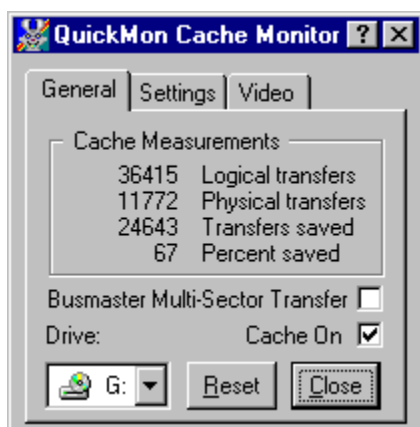
Displayed will be:
The CD-ROM drive cached, Logical transfers (the total number of 2048 byte blocks requested), Physical transfers (the total number of blocks that had to be read from the CD-ROM), Transfers saved (the total number of blocks read from the cache), and Percent saved (the percent of cache transfers vs. physical transfers).

Because of CD-Quick Cache's read-ahead buffering, your actual time savings will almost always be better than what is represented here.   With read-ahead buffering,   CD-Quick Cache will read more data than is requested, saving all of it in the cache.   When that data is later requested (and your CD-ROM's read head is usually somewhere else) this data will be retrieved from the cache.   Performance is improved because the drive didn't have to reposition its read head.   Unfortunately the numbers can't reflect this action.   Transfers weren't saved because data was requested only once and read from the CD only once, but **time** was saved because the drive head didn't have to move.   Any time you avoid moving the drive head you save time.

If you're using a Busmaster driver for your CD-ROM drive, the "**Busmaster Multi-Sector Transfer**" choice will be active.   If checked, CD-Quick Cache will transfer more than one sector for each read request.   Some Busmaster drivers do not support this and errors will result if enabled.   If not enabled, CD-Quick Cache can **not** do any readahead.   This should be on if possible, but for maximum compatibility, the default is off.

Shutting down QuickMon

When you press QuickMon's Close button, the utility's window will be closed but the application will still be running in the System Tray.   If you'd like to shutdown QuickMon and remove it from the System Tray, click your right mouse button on its tray icon and select Exit QuickMon from the popup menu.

Changing CD-Quick Cache's Configuration

QuickMon also allows you to change CD-Quick Cache's cache size, whether RAM or your hard drive is used, and various other options of CD-Quick Cache's operation.   Once QuickMon is started, selecting the **Settings** tab will display all configuration information.   After you change any settings, click the **Apply** button to have them take effect.   If you use your hard drive for CD-Quick Cache's cache, and increase your cache size, you may want to run the Windows 95/98 Defrag utility for best performance.   QuickMon is initially set to be **Always on top** so it can easily be seen.   This operation can be changed by a choice on its pull down menu.   This menu is activated by using your left mouse button to click on QuickMon's icon in the upper left corner.
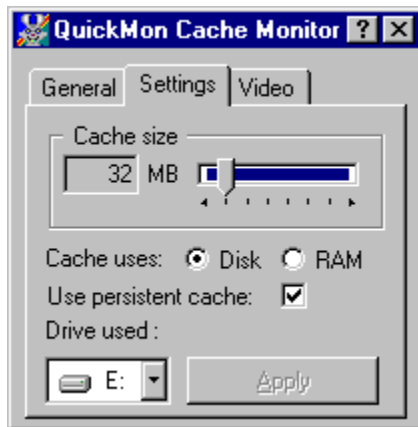
CD-Quick Cache will track up to 256 different CD-ROM titles and is able to remember data when you change discs.   So, if you change CDs and then go back to an earlier one, your data will still be retrieved from the cache.

If you use your hard drive for cache storage, CD-Quick Cache has the ability to save cached data between sessions.   So if you shut down your computer and come back to it days later, you can insert the same CD-ROM that you used a few CD-ROMs back, and have it's data instantly.

If you want to disable this persistent cache feature, uncheck the box labeled, "Use persistent cache".

Full Motion Video Clip Caching

CD-Quick Cache offers complete control over the caching of Full Motion Video clips.   Most video clips are quite large and play straight through.   So not having them cached allows other files to remain in the cache longer.   On the other hand, some games and multimedia applications will "loop" a small video clip over and over.   These **will** benefit from caching.   So CD-Quick Cache has the option to cache video clips of up to a particular size.   You can set the maximum cacheable file size up to 8MB.   CD-Quick Cache supports AVI, QuickTime and MPEG formats.
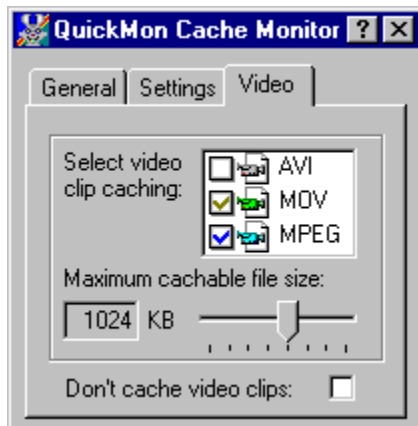
For each type of video clip you have the option of No Caching, Partial Caching or Full Caching.   If the type's check box is unchecked ☐, there will be no caching of this type.   If checked with a gray check ☑, this type will be partially cached up to the size set by the slider.   If the box is checked with a blue check
☑, full caching will be done regardless of size.

To easily disable caching of all types of video clips, there is a checkbox marked, "Don't cache video clips".   This is useful if you're not sure what format your CD-ROM application uses to store its video clips.

CD-Quick Cache recognizes video clips from their file extension.   For AVI files, these are .AVI. QuickTime files have .MOV or .QT.   MPEG may have .MPEG, .MPG, .ENC, .M1V, .MP2, .MPA or .MPE.

For some crazy reason, some CD-ROM's use a file extension other than .AVI for AVI files.   CD-Quick Cache is also able to determine if a video clip uses the AVI file format from the file's header information.

CD-Test CD-ROM performance testing

It's always helpful, when you're doing things to increase the performance of your system, to have some way of quantifying this improvement.   To make this easier, and to show the effectiveness of CD-Quick Cache, we have included a testing utility called CD-Test.
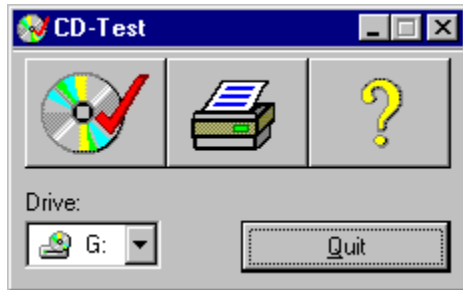
If CD-Quick Cache is installed when you run CD-Test, the tests will be done first with CD-Quick Cache disabled and then with CD-Quick Cache enabled.

CD-Test will perform two timed tasks on a CD-ROM.   The first test will walk the directory structure of your CD-ROM.   By walking the directory structure, we mean this test will visit every subdirectory and look at each file.   As it's doing that, it will search for the largest file on your CD-ROM.

CD-ROM's differ in the number of subdirectories and also in the way these are laid out.   Some CD-ROM's have very few if any subdirectories and only a few very large files.   This type of CD won't give you very meaningful results for this test.   With so few files and directories, it only takes a fraction of a second to read them all.

A CD-ROM that has many subdirectories and files is what you need for this test.   If CD-Test finds you have too few directories and files, it displays a message warning of this fact.

Since the way CD-ROM's are laid out varies from CD to CD, it's best to have a few CD-ROM's to use when testing.   Some CD's will have all their subdirectories in the root directory.   Others will have a real tree structure with many levels of subdirectories.   With CD-Quick Cache loaded, you will notice varying degrees of improvement (depending on file layout) when doing a directory walk.

The second test CD-Test will perform is a read test.   The program will read the largest file on your CD-ROM (found while doing the directory walk).   This file is first read sequentially and then randomly.   For the sequential read, 384 blocks are read from the beginning of the file.   Each block on a CD-ROM is 2048 bytes (2KB), so the test reads 768KB.   A CD-ROM block is the same thing as a sector.   CD-Test will display the time it takes to do this read.

Next a random read will read 384 blocks (768KB) from the same file.   These blocks will be scattered all over the CD.   Since it's important for the random test to access data that is widely dispersed, the file to be read must be at least 2MB in size.   Actually it should be as large as possible.   As with the sequential read test, the time taken will be reported.

These read tests are repeated for three trials.   Each time the same data is read and the time reported. After all tests are completed, the total time taken is also displayed.

With CD-Quick Cache loaded, you will notice a dramatic difference between the first read test and the following tests.   For the first test, the CD-ROM must be read directly.   When it's time to read the data again, the cache can quickly find the data in memory.   It should be noted that since the total amount of data read is 1536KB, you must have at least that much RAM allocated to the cache for this test.

Otherwise the cache will not be large enough to hold all the data and your CD-ROM will have to be read directly.   Remember, direct reads are slow.   Cache reads are *FAST!*

Windows 95/98 System Monitor

CD-Quick Cache has the ability to report performance data to the Windows 95/98 System Monitor utility. System Monitor can graphically display a number of system performance statistics. You can use System Monitor to display CD-Quick Cache's cache hit rate on a real time basis.

You can find System Monitor in your **\Windows** folder (SysMon.exe). It may also be listed on your "Start" menu under Programs▶Accessories
▶System Tools. Once you've started System Monitor, just click on "Add Item" and select "CD-Quick Cache Performance Data
▶Cache Hits".

While it's running, you'll see something like this:
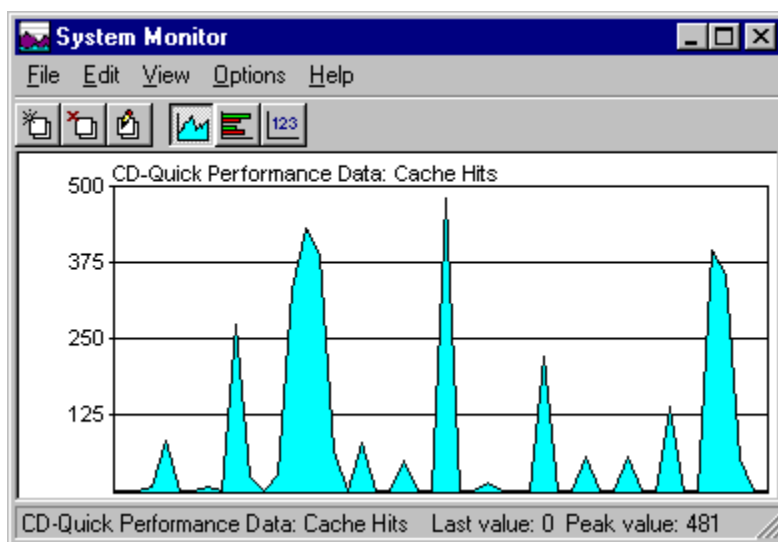
Suggestions for Configuring

Along with the versatility built into CD-Quick Cache can also come some confusion as to what will work best on a given system.   In this section we will try to give some guidance.

The defaults that CD-Quick Cache uses when it is installed are, in most cases, a good starting point for most people.   If you have average amounts of RAM (8-16MB) and uncompressed hard drive space (> 50MB free), usually very little change is necessary.   CD-Quick Cache will set up a 32MB disk cache by default.   If your system differs substantially from the average, you may get better performance by changing CD-Quick Cache's configuration.

If you play a lot of games, and disk space is no problem, you would do better to set a disk cache larger than the 32MB default.

If your disk drive is compressed, you will do much better to set CD-Quick Cache to use your uncompressed host drive.   Since disk compression takes time, using a compressed drive can slow down CD-Quick Cache.   Every compressed drive has an uncompressed host drive.   In most cases, you can adjust the amount of free space on the host drive to accommodate CD-Quick Cache's swap file.

If you're limping along with only 4MB of RAM, *don't use RAM for cache storage*.   If you must, be sure to configure the cache to use less than the default of 2MB.   And buy more RAM as soon as you can afford it!

CD-Quick Cache offers complete control over the caching of Full Motion Video clips.   The default setting is to use partial file caching, up to 1MB in file size, for all types of video clips.   In some cases you may get better performance by adjusting these settings, but the default should be a good choice for most configurations.   For more information, see Full Motion Video Clip Caching.

In the end, since everyone has their own unique mix of software, it's best to try the different settings to see which works best for you.

A word about Windows 95/98 drivers

Microsoft has gone to great lengths to make Windows 95/98 compatible with most high level applications (word processors, spreadsheets, database software and even most DOS programs).   They have, however, completely changed the low level file system from the one previously used under DOS and Windows 3.1.   In addition to the change in file system architecture, they have also changed most 16-bit Real mode drivers to 32-bit Protected mode drivers.   Gone are MSCDEX and SmartDrive among others.

In most cases Windows 95/98 will install a protected mode driver for your CD-ROM drive.   If it does, the Windows 95/98 version of CD-Quick Cache is just what you need.   If your CD-ROM drive has an interface not supported by Windows 95/98, your Real mode driver is used as before and you need to use the DOS/Windows 3.x version of CD-Quick Cache.   This version works just fine under Windows 95/98 if your system uses a Real mode CD-ROM driver.   Drives with an unsupported interface seem to be the exception rather than the rule.

You should also keep in mind that if you boot directly into DOS instead of Windows 95/98, you need to run with a Real mode CD-ROM driver.   Since Windows 95/98 is not running in this case, its 32-bit Protected mode drivers are not being used.

The registered version of CD-Quick Cache for Windows 95/98 includes a licensed copy of the DOS/Windows 3.x version of CD-Quick Cache for use on your Windows 95/98 system.   This way you can use CD-Quick Cache on your Windows 95/98 system either way.

Common Questions and Answers

Q.   After installing CD-Quick Cache, I set the cache to use RAM.   Although my CD-ROM seems faster, the overall operation of my computer is slower!   What's wrong?

A.   The problems you are having are related to the way you have apportioned your memory.   If you set CD-Quick Cache to use RAM for its cache, this RAM is not available for other applications. Windows 95/98 does a very good job of managing memory, so you will almost never get an out of memory message.   When memory gets low, Windows will swap out some of your data that was in memory to disk.   This frees up memory and is the basis of Windows 95/98's virtual memory system.   The paging out to disk is a relatively slow operation, however.   If your system is forced to do this frequently, system performance will suffer.   The answer here is to either reduce the amount of RAM set aside for CD-Quick Cache or set the cache to use your hard disk instead of RAM.   QuickMon will enable you to change these settings.

Q.   If I go into the Windows 95/98 Control Panel under System and look at the CD-ROM settings under File System under the Performance tab, the setting always shows a small supplemental cache size set and no read ahead.   Every time I change these settings and reboot, they go back to a small cache size with no read ahead.   What's going on here.

A.   These setting are for the CD-ROM caching that Windows 95/98 provides.   They are **not** settings to control your CD-ROM drive.   Since CD-Quick Cache completely replaces the function of the Windows 95/98 CD-ROM cache, it needs to set these parameters to what **it** requires.   As long as CD-Quick Cache is installed it will reset these settings upon system startup.

Q.   When I play video clips they skip.   This didn't happen before I installed CD-Quick Cache.

A.   The playing of video clips is very demanding for a system.   They require good performance from several components in your system.   If any one of them isn't up to the task, you can have problems.   On your system, the addition of CD-Quick Cache simply puts it "over the edge".   All is not without hope however.   To lighten the load on your CPU, first make sure you're not using a compressed hard drive for CD-Quick Cache's data storage.   If so, change it to use the non-compressed host drive.   If you have a busmaster driver, you should try turning on "**Busmaster Multi-Sector Transfer**".   If that doesn't help, try turning CD-Quick Cache's video clip caching off altogether.   As a last resort, you may need to set CD-Quick Cache to use RAM instead of the default disk storage.   See <u>Changing CD-Quick Cache's Configuration</u> to change these settings. One thing worth mentioning: some systems will connect both your hard drive and CD-ROM drive to the **same** IDE port.   If both are used simultaneously (as CD-Quick Cache requires), performance will suffer.   Most motherboards (and IDE controller cards), have **two** IDE ports.   All that is required is an inexpensive ribbon cable to connect your CD-ROM drive to the secondary port instead of the primary one.

Q.   In QuickMon, I can see a grayed out choice for "**Busmaster Multi-Sector Transfer**".   How do I enable this?

A.   If this choice is grayed, it simply means you're not using a busmaster driver for your CD-ROM drive.   There's nothing wrong with this.   If your hardware supports busmastering, you may be able to obtain a busmaster driver for it from your hardware manufacturer.

Q.   I've been using QuickMon to monitor cache statistics.   On most CD-ROMs I see a good bit of improvement, but on my Mayo Clinic Family Health Book CD, QuickMon shows that no time was saved at all.   What's going on here?

A.   There are a few CD-ROM applications that do their own caching.   That is, they read the data

they need only once and save it in memory.   The next time you access the same information the application itself has it.   It never goes to the CD-ROM twice for data.   When an application does its own caching, CD-Quick Cache never has a chance to speed things up and QuickMon will report that no reads were saved.   CD-ROM applications that do this are rare.   With the vast majority of CD-ROMs CD-Quick Cache will be able to create a noticeable improvement.

Q.   I want to set CD-Quick Cache to use my hard drive to store its cache.   Can I use it with a compressed disk drive?

A.   Yes you can use CD-Quick Cache with a compressed disk drive, but it's not recommended. There are two concerns here.   The first is the issue of performance.   When CD-Quick Cache saves your CD-ROM data to a compressed hard drive, Windows 95/98 steps in and does the compression.   This requires some processor time and may affect the overall performance of your CD-ROM system.   The other concern is the difficulty of knowing the amount of free disk space a drive contains if it is compressed.   This may cause problems if you set a cache size too close to the reported maximum for a compressed drive.

Q.   I thought Windows 95/98 already included a CD-ROM cache.   Why do I need CD-Quick Cache?

A.   Yes, Windows 95/98 does do CD-ROM caching on its own, but there's certainly room for improvement here.   The cache that comes with Windows 95/98 has a maximum size of a little over 1MB.   That's it.   Although this might be large enough for some applications, others will certainly benefit by a larger cache.   If you have enough memory, CD-Quick Cache can set a RAM cache as large as 32MB.   If disk space is available, the cache can be as large as 256MB! And unlike the Windows 95/98 CD-ROM cache, CD-Quick Cache's cache is persistent.   It remembers your CD-ROM data from CD to CD and also **between sessions**!   Another difference is the Windows 95/98 cache uses fixed read ahead buffering.   You can select the amount of read ahead (or even turn it off), but once you set it it stays that way.   Some applications will benefit by doing read ahead while others will suffer for it.   The only way to optimize operation for a wide variety of applications is by using dynamic read ahead buffering as CD-Quick Cache does.   For more information on cache read ahead, see the section How CD-Quick Cache does Caching.

Q.   Every time I start up my computer, I've lost 32MB of hard drive space.   Where's it going?   How do I get it back?

A.   When Windows 95/98 starts up CD-Quick Cache loads and opens its swap file (VCDQD.SWP). When Windows 95/98 shuts down, CD-Quick Cache closes this file.   If Windows 95/98 doesn't shut down properly, CD-Quick Cache never has a chance to close its swap file.   This results in lost clusters, the amount is equal to the size of the swap file (in your case 32MB).   **It's very important that you shut Windows 95/98 down properly**.   Never turn your computer off unless you've shut Windows down from the Windows 95/98 Start menu.   You can get back your lost disk space by running the Windows 95/98 Scandisk utility.

What determines CD-ROM drive performance

Two factors are involved in a CD-ROM drive's performance.   The first is the data transfer rate of the drive.   This parameter is widely touted by manufacturers and has been given a good deal of "press".   We've gone from single speed drives, with a data transfer rate of 150 Kb/S, to 32x drives at 4800 Kb/S.   Speeding up the data transfer rate of a drive is a relatively easy thing to do.   A drive's manufacturer designs a drive that simply spins the CD-ROM faster.   That's why there's been such a big increase in the data transfer rate of drives in the past few years.   It's just not that big a feat to design a drive that spins faster.

The other factor affecting a CD-ROM drive's performance is access time, also called seek time.   This is the average time it takes to reposition a drive's read head to a new location and start reading data.   Access time has improved relatively little in the course of developing new drives with faster and faster data transfer rates.   It's not that the drive manufacturers wouldn't like to greatly increase access time, it's just not an easy thing to do.   The hard fact of the matter is you're up against the laws of physics.   Because drive access time hasn't improved all that much, it's role in drive performance has often been downplayed.   You'll hear someone brag about their new 32x drive, but these same people probably don't know the access time of this "speed demon".   You can be sure, however, that it's **slow**.   Access time is the other piece of the CD-ROM drive performance puzzle.   It's interesting to contrast this situation with that of hard drives.   With hard drives, the performance criteria people talk about **is** access time!   It's the data transfer rate they have no idea about.

By eliminating duplicate drive accesses, CD-Quick Cache will decrease the average access time of **any** CD-ROM drive.

CD-ROM Drive Mechanics and Why CD-Quick Cache Cache Helps

For those of you who are interested, I'd like to give you a brief explanation of the inner workings of CD-ROM drives.   After you understand some of what goes on behind the scenes you'll see why a CD-ROM cache is really a necessity with today's computers.

Data on a CD-ROM is recorded in equal length sectors on a single spiral track that starts at the inner edge of the disc and finishes at the outer edge.   This track is on the order of .6 microns wide, with a turn spacing of 1.6 microns.   A micron, if you don't happen to remember, is equal to a millionth of a meter.   A human hair is about 100 microns in diameter.   A CD-ROM has a track density of about 16,000 turns per inch if you measured across the disc.   If you stretched this track out into a straight line it would measure over 3 miles in length!

A drive's read head assembly consists of a solid state laser, lenses, a beam splitting mirror and a photo diode to detect the reflected light.   In relative terms this assembly is massive.   The magnetic heads used in hard disk drives are tiny by comparison.

CD-ROM drives lower than about 12x, utilize a principle called constant linear velocity (CLV).   With CLV the data must pass across the read head at the same speed, no matter where on the disc it is positioned. Because data sectors on the outer and inner edges are the same length, the rotational speed of the disc must constantly change as the read head changes position.   If it didn't, the bits on the outer edge of the disk would pass by almost 3 times faster than those near the center.

CD-ROM drives of 12x or higher, give up CLV operation to improve access times.   But this means that for a 12x drive, 12x is really the **top speed**.   This rated speed is only attainable on the outermost tracks of your CD-ROM.   Depending on where the read head is positioned,   the data transfer rate will be lower than 12x.   In fact, since data starts at the inner edge of a CD-ROM, it almost always will have a data transfer rate **slower** than its rated speed!   Your actual data transfer rate may be as much as half the speed that it's rated for.   This means your 20x drive may only really transfer data at 10x!

So to summarize the mechanical problem we face, we must precisely follow a very narrow track of data using a relatively massive laser assembly.   At the same time (for drives rated less than 12x), we must constantly vary the rotational speed of the disc so the data passes at a constant linear speed when we move the read head.   And we want to be able to reposition this read head and be ready to access new data as quickly as possible.

As you can imagine, it's just not possible to do this very quickly.   The more mass something has, the slower you can whip it around.   If in addition, you have to position it with sub-micron accuracy, this takes more time.   And if you also have to readjust to a new rotational speed every time you move, you need more time still.

This is why CD-ROM access times are slow and it's not going to change any time soon.   Although 24x and 32x speed drives have increased the raw data rate (by increasing the rotational speed), access times have not dropped proportionally.

The key to speeding up CD-ROM performance is to minimize the number of times we reposition the read head.   Because every time we move this head, we waste time.   The way to reduce head movement is to use a cache like CD-Quick Cache.   Once data is read into the cache, it will be accessed from RAM (or disk) instead of the CD.   If we can anticipate data to read when we are positioned at this data, we can minimize head movement.   CD-Quick Cache uses advanced caching techniques to help ensure that the data you need most will be found in the cache.

Using a Cache to increase CD-ROM drive Performance

Since we can only bend the laws of physics so far, how can a given CD-ROM's access time be increased?   The truth is it can't.   But we can do something almost as good.   If we can reduce the number of times a CD-ROM needs to be accessed, we can effectively decrease the average access time!   We can reduce the number of CD-ROM accesses by eliminating unnecessary reads of the CD-ROM.   This technique, called caching, has been used for years to improve the performance of hard drives.

How CD-Quick Cache does Caching

When CD-Quick Cache is loaded on your computer, every time you read data from your CD-ROM drive CD-Quick Cache also saves it to RAM or your (comparatively) faster hard drive.   The next time this same data is needed, CD-Quick Cache intercepts the request and retrieves the data from its cache.   The time to access and move a block of CD-ROM data from RAM memory is microseconds.   Even if you use your hard drive for cache storage, access time is measured in several milliseconds.

It's not enough to just store CD-ROM data in a fast cache.   It's very important to manage this data in an intelligent manner.   The reason caching works is due to probability.   It's likely that you'll need the data you've just read some time in the future.   Most applications work this way, and as mentioned, it's the basis for caching.   It's certainly possible to write a program that reads a CD-ROM's data only once from start to finish, but it's not at all likely that any useful application would ever work this way.

After the amount of data read is equal to the size of CD-Quick Cache's cache, some data in the cache must be discarded to make room for new data.   CD-Quick Cache uses a "Least Recently Used" (LRU) algorithm when it's time to decide which data gets overwritten.   As you might expect from the name, with LRU the oldest data gets replaced first.   CD-Quick Cache's LRU scheme is very effective at keeping the data you'll most likely want in the cache rather than on the CD.

If data is requested that's not in the cache, it's important that CD-Quick Cache discover this quickly.   CD-Quick Cache uses a hash table to quickly locate data stored in its cache (or not).

Read Ahead Buffering

An additional technique used by some caching software is sector read ahead buffering.   This system is also based on probability.   When reading data from a CD-ROM it's most likely that the next block of data you'll want is the block following the one you've just read.   This certainly won't always be the case. We're just going with the odds here, but the odds are right often enough.

It's important here to note that you can have a cache that does not do read ahead buffering.   This is a separate feature from the cache itself.   If implemented properly, it's another way to increase performance.

When a cache does read ahead buffering, it reads more data than you've requested.   The requested block of data is read from the CD-ROM, but so is the next sector or two (or three).   The requested data is passed to the application that requested it, and it's also stored in the cache along with the read ahead data.   When and if your application wants data from these additional sectors, it's available in the cache.

So, doing read ahead buffering is a good thing right?   Well that all depends.   If we're reading data sequentially, it's another trick we can use to boost performance.   But what if we're reading data from the CD randomly?   Reading a block, jumping to a new location, reading some more, moving again, reading again, etc.   If we always read ahead the same amount, a cache can quickly fill up with data you'll never want.   This can greatly reduce your effective cache size.   If two out of every three reads is wasted, you're using a cache that's actually only one third the physical size.   For example, say you've got a 1.5 Mb cache set.   If you're reading randomly and you read two additional sectors for each sector read, your working cache size is really only 512K.   You're wasting 1 Mb of memory!

CD-Quick Cache does do read ahead buffering, but in an intelligent manner.   CD-Quick Cache's read ahead is adaptive.   It constantly monitors the actual pattern of your application's reads and then dynamically adjusts the amount to read ahead.   So if data is being read sequentially (reading ahead is a good thing), CD-Quick Cache reads ahead.   If data is being read randomly (reading ahead is a very bad thing), CD-Quick Cache **doesn't** read ahead.   The software actually uses fuzzy logic to determine the degree of randomness and set the amount to read ahead.   This dynamic read ahead insures CD-Quick

Cache will make the very best use of your precious RAM (or disk space).

Persistent cache storage

From phone directories to games, more and more CD-ROM applications are requiring multiple CD sets. To deal with this situation, CD-Quick Cache has the ability to track up to 256 different CD-ROM titles. It does this by computing a unique signature for each CD-ROM from a combination of its Volume Name and Serial Number. This allows it to remember data when you change discs. So, if you change CDs and then go back to an earlier one, your data will still be able to be retrieved from the cache. Volume titles are tracked on a most recently used basis, so it is the **last** 256 CD-ROMs that are tracked.

In addition, if you use your hard drive for cache storage, CD-Quick Cache has the ability to save your cached data and volume information **between** sessions. This means you can shut down your computer, come back to it days later, insert the same CD-ROM that you used a few CD-ROMs back, and have it's data instantly!

Revision History

Version 3.10 - 7/8/98
Added support for Windows 98.   On rare occasion, CD-Quick Cache was unable to read its registry settings upon startup.   This would cause the software to default to use RAM even if disk was selected.   Fixed.   Some Busmaster drivers don't support multi-sector transfers.   The busmaster fix added in v3.01 is now an option.   The Norton System Doctor fix added in v3.01 caused problems with Disk Minder from Nuts & Bolts when used with FAT32.   Fixed.   CD-Test's priority has been increased to give more accurate results when other programs are running.   Maximum cache size for disk has been increased to 256MB.   Maximum cache size for RAM has been increased to 32MB.

Version 3.01 - 3/26/98
Busmaster drivers that do not support scatter-gather prevented CD-Quick Cache from doing any readahead.   Fixed.   The Norton System Doctor from the Norton Utilities v3.0 periodically does a volume lock on the hard drive CD-Quick Cache uses for cache storage.   CD-Quick Cache would detect this and shut down for the duration of the lock.   The lock detect algorithm has been changed to allow CD-Quick Cache to remain active during these kinds of locks.   If CD-Test did a random read on a file larger than 64MB, only the first 64MB would be read.   Fixed.   All documentation and program windows have been reviewed to insure that the software is only referred to as CD-Quick Cache.   This was done to make the lawyers happy.

Version 3.00 - 11/17/97
Added a persistent disk cache feature, so the cache will remember from disc to disc and session to session.   Greatly enhanced control over full motion video caching.   Now has full support for AVI, QuickTime and MPEG.   AVI caching would not be disabled if the program thread that read the file was not the same thread that opened the file.   Fixed.   Made QuickMon a trayicon application.   CD-Quick Cache now has the ability to report performance data to the Windows 95 System Monitor utility.   Keycodes can now be entered from the opening splash screen.   Now allows an uninstall if in "Safe Mode".   QuickMon can now adjust for on-the-fly screen resolution and color palette changes.   Setup now sets the non-compressed hard drive with the most free space as the default for cache storage.   Now displays a warning if installation is attempted on Windows NT.   Now warns if a Keycode for the DOS/Windows 3.x version is entered.   Added a running day count to the opening splash screen.   Fixed some minor user interface issues such as the use of the wrong text color with a black background.

Version 2.01 - 1/8/97
A long-standing compatibility problem was discovered that could occur with any low level disk utility that does volume locking.   After such a utility was run, Windows 95 would no longer allow CD-Quick Cache to access its swap file.   Known utilities that exhibit this problem are the Windows 95 ScanDisk and Defrag, and the Norton Utilities Speed Disk.   This version of CD-Quick Cache fixes the problem.

Version 2.00 - 12/28/96
Added the new utility, CD-Test to demonstrate CD-Quick Cache's effectiveness.   All graphics have been updated to Windows 95 conventions throughout as well as new ones for CD-Quick Cache.   CD-Quick Cache's timing has been changed to improve operation with some CD-ROMs.   Read-Only file sharing is now allowed for CD-Quick Cache's swap file (VCDQD.SWP). This improves compatibility with some tape backup software.   Maximum cache size for disk has been increased to 128MB.   QuickMon's "Cache On" selection will now remember it's setting between sessions.   A direct link to our Web Site has been added to CD-Quick Cache's splash screen and help file.   CD-Quick Cache no longer displays a warning if no CD-ROM is found at startup (done for Laptops with removable drives).   Uninstall can now remove the CD-Quick Cache directory as well.   Install will no longer mark files as "Read-Only" if installed from a CD-ROM.   Setup is now able to add QuickMon to the StartUp group even if Start Menu entries aren't in English.

Version 1.20 - 6/10/96

Some Windows 95 CD-ROM drivers still had compatibility problems with CD-Quick Cache.   This has now been fixed for good.   Added the ability to disable caching of .AVI video clips.   CD-Quick Cache no longer requires CTL3D32.DLL.   QuickMon now displays the percent saved when minimized in the Windows 95 task bar.   Setup is unable to add a ShortCut for QuickMon if the Start Menu isn't in English.   Added a warning message.   Added a text file to aid in uninstalling CD-Quick Cache for those people who won't read the manual.

Version 1.10 - 4/16/96
Some Windows 95 CD-ROM drivers had problems with CD-Quick Cache, causing the software to lock. Fixed!   If QuickMon was started without first accessing a CD-ROM drive, a page fault could occur. Fixed!   CD-Quick Cache wouldn't delete its old swap file if the drive used for the swap was changed. Fixed.

Version 1.00 - 3/19/96
First release.

Error Messages

Can't load VCDQD32.DLL.   Please reinstall.
Upon startup, CD-Quick Cache needs to load VCDQD32.DLL.   This file is part of the CD-Quick Cache package and must be located in the \Windows\System directory. You've most likely deleted this file.   Do what it says and reinstall the software.

Can't use selected hard drive for cache storage.   Try another drive.
CD-Quick Cache was unable to open its cache file on the drive you have selected.   Use QuickMon to change settings to use another drive. You might also want to try running ScanDisk on your drive.

CD-Quick Cache has not been installed yet!
You're trying to run QuickMon before you've installed CD-Quick Cache.   Run CD-Quick Cache's Setup program and install CD-Quick Cache.

Cache is not installed for drive X:
You have a mix of CD-ROM drives.   Some are using 32-bit protected mode drivers but at least one (drive X:) is using a 16-bit real mode driver.   The Windows 95/98 version of CD-Quick Cache works only with 32-bit protected mode CD-ROM drivers.   You must either obtain an updated driver or use the DOS/Windows 3.1 version of CD-Quick Cache.

CD-Quick Cache can't start up with a cache this large.
You've selected RAM to be used for your cache, but this much RAM isn't available when Windows 95/98 starts up.   CD-Quick Cache will set it's cache size as large as possible.

Not enough memory to allocate cache index table.
Insufficient memory was found to allocate CD-Quick Cache's cache index table.   This error should not occur.

Not enough memory to allocate cache read ahead buffer.
Insufficient memory was found to allocate CD-Quick Cache's cache read ahead buffer.   This error should not occur.

Not enough memory to allocate cache.
You've set CD-Quick Cache to use RAM for its cache but not enough memory was found to allocate it. This error should not occur because CD-Quick Cache will reduce its cache size to fit available memory at start up.

Unable to load CD-Quick Cache - Can not read from the System Registry.
CD-Quick Cache needs to read its settings from the Windows 95/98 Registry when it starts.   Windows has not allowed it to do so.   Restart Windows.   If the problem persists, let us know.

You don't have enough free disk space for a cache this large.
You've set CD-Quick Cache to use your hard drive for its cache but not enough free disk space was available to allocate it.   CD-Quick Cache will set its cache to the largest size allowable.

CD-Quick Cache's executable has been corrupted.   Please reinstall.
Someone or something (another program perhaps) has changed your copy of VCDQD.VXD.   CD-Quick Cache checks itself every time it runs and this check has failed.   Reinstall the program.

Distribution Points for CD-Quick Cache

The latest versions of all our products can always be found on our web site.
If you have Internet access, visit us on the World Wide Web!

http://ourworld.compuserve.com/homepages/circuitsys

Click here to go to our Web Site.

You can also find CD-Quick Cache on either the Author Direct web site, at:

http://www.a-direct.com

or any of the several SIMTEL mirror sites.

CD-Quick Cache may also be found in the Windows Shareware forum on CompuServe (**GO WINSHARE**) in Lib 15.   Look for the filename **CDQ95.ZIP**.

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