Installing The Turbo 040 Software

If you are using System software prior to 7.5, we recommend that you update your networking files for optimal networking performance.

Follow these steps to install Apple's Networking files onto the hard (startup) disk:

- Start the Macintosh from the hard drive.
- 2. Insert the Network Software Installer disk into the floppy disk drive.
- 3. Run the Installer and restart your Mac.

Note: If you are using a networking card that does not use Apple's drivers and experience networking problems, contact the vendor for the latest driver for your card.

The OuadControl Control Panel must be installed to turn on PowerMath, AutoCache and the secondary cache. (See next page for benefits.)

Follow these steps to install the QuadControl file onto the hard (startup) disk:

- Start the Macintosh from the hard drive.
- Insert the DayStar disk into the floppy drive.
- Copy the QuadControl file from the DayStar floppy disk to:



- the System Folder of your Startup hard drive if running system 6.x.
- the Control Panels Folder of your Startup hard drive if running System 7.x.
- 4. Restart the Mac. If the Macintosh does not restart from the hard disk, see the troubleshooting section at the end of this chapter.

Updating your networking software

Installing QuadControl

NOTE: Check the Last Minute Additions & Info file on the DayStar disk for late breaking news or changes.

Using QuadControl

NOTE: System 6.x users should have 32-bit Color OuickDraw installed to properly display OuadControl.

To access the QuadControl software, select Control Panels from the Apple pull-down menu. Select or double click on the QuadControl icon. The following screen will appear:





Figure 68 - QuadControl CDEV



Balloon Help - to make it easier to access Balloon Help, DayStar provides a button in QuadControl that turns Balloon Help on and off.

QuadControl allows you to choose between AutoCache and manual cache modes. The icon to the right of the cache mode in the CDEV displays the currently selected mode for caching.

Cache Mode: -



Enable AutoCache - When this mode is selected, the word "Auto" appears next to the icon and the current cache mode is shown. The 68040's cache mode is changed according to the settings in AutoCache setup for the currently-running applications. This allows easy use of some older applications that ordinarily don't run on 68040 equipped Macs.

040-

Copy Back (040 Mode) - This mode provides the fastest performance, but is incompatible with older applications that don't support the 68040. When this mode is selected, information is copied to the internal 040 cache, then at a later time, copied to motherboard memory.

030 🕶

Write Through (030 Mode) - This mode slows down all currently open applications, but allows a lot of software that does not work with the 68040 to run properly. When this mode is selected, information is copied straight through the internal 040 cache to motherboard memory.

(B) V

Application Caching Off - This mode drastically reduces performance of all open applications, but allows most 68040 incompatible software to run on the 68040. Most applications do not require this mode. When this mode is selected, no application information is cached to either the internal 040 cache or the secondary cache.

AutoCache Setup... - The icon to the left of each application in the list is a pull-down menu that allows you to select the cache mode to be used when that application is launched. The options for each application include the three settings mentioned above: 040 Mode, 030 Mode and Application Caching Off.

AutoCache Setup



Figure 69- AutoCache controls

Add - Adds applications or desk accessories to the list using an "open" type dialog box. (System 6 users can add desk accessories by holding down the option key while selecting the Add button.)

Remove - Removes the application from the list. Cancel - Leaves the list of applications unchanged. OK - Saves changes to the list.

Secondary Cache Control

Secondary Cache 128K - Allows you to turn the 128K Static RAM cache on and off.

The capability to turn off the cache is provided. With the cache off, the Mac still runs at the accelerated clock speed, but performance is significantly reduced.

PowerMath

Note: PowerMath is not available on the Turbo 040i or if other enhanced SANE software such as RadiusMath is installed.

PowerMath (Turbo 040 only, not available on

Turbo 040i) - Allows you to turn DayStar's PowerMath on and off. QuadControl provides two versions of PowerMath. The first, normal PowerMath, replaces Apple's SANE (Standard Apple Numeric Environment) routines, which do all floating point operations in software, with versions which use the math coprocessor. The second, Enhanced PowerMath, provides greater performance by decreasing the amount of overhead necessary to get to a coprocessor-based SANE routine. Enhanced PowerMath is functionally similar to Apple's Omega SANE, which was released with System 7.0.1. Both versions of PowerMath maintain Apple's high level of numerical accuracy.

Even though Enhanced PowerMath provides better performance, there may be rare cases where it may fail when normal PowerMath will work. For this reason, QuadControl's default setting has PowerMath turned on and Enhanced PowerMath off.

To enable Enhanced PowerMath, click on the PowerMath button so that PowerMath is on. Press OPTION and click on the PowerMath button. The text will change to Enhanced PowerMath, showing that Enhanced PowerMath is in operation.



Figure 70 - Enhanced PowerMath On

To disable Enhanced PowerMath press
OPTION and click on the Enhanced
PowerMath button. The text will change to
PowerMath, showing that normal PowerMath
is in operation.

The rule of thumb is that the OPTION-click sequence will change the current state of Enhanced PowerMath.

Turbo 040 Info

Turbo 040 Info provides important technical information for quick reference.



Figure 71 - Turbo 040 Info

Turbo 040 displays the speed of the Turbo 040 and the version number of the Turbo 040's ROM.

Supports the following machines: provides a complete list of which Macs your Turbo 040 supports. (If you wish to move your Turbo 040 to a Mac that is not listed here, see "Upgrading the Turbo 040" on page 127.)

Full Speed Memory Locking is Off/On displays the current setting for the 68040 Data Cache. (See "Advanced QuadControl Options" for more information on page 110.)

Memory is Locked tells you whether the motherboard memory has been locked. (See "Advanced QuadControl Options" for more information on page 110.) Virtual Memory is On is displayed if you have turned Virtual Memory on in Apple's Memory Control Panel.

MacsBug Typing Fix is On is displayed if you have turned this feature on. (See "Advanced QuadControl Options" for more information on page 110.)

68040 Data Cache is Off is displayed if the data cache is disabled. Important: The data cache should only be off if you have Apple's A/ROSE software or a certain NuBus board installed that disables the data cache. (See "Advanced QuadControl Options" for more information on page 110.)

68040 Instruction Cache is Off is displayed if the instruction cache is currently disabled. Important: The instruction cache should only be off if you have an extension or control panel which has turned it off. If the cache is off, performance will be significantly decreased.

Advanced System Information

QuadControl can provide a display of your current system information. Press COMMAND-CON-TROL and click on the DayStar logo. A dialog box similar to the one below will be displayed:



Figure 72 - System Info

ROM Version: indicates the type of ROM installed in your machine.

ROM Checksum: differentiates between machines with the same ROM Version.

AppleTalk Version: the version of AppleTalk installed. It will display 0.0.0.0 if AppleTalk is inactive or not installed.

Processor: shows the type of CPU the system thinks it has installed.

CPUFlag: is another way of telling the type of CPU.

FPU Type: shows the kind of math coprocessor installed. Machine Type: is the kind of machine.

MMU Type: is the kind of memory management unit installed.

Physical RAM: displays the amount of memory installed on the motherboard.

ROM Size: shows the size of the Macintosh ROMs on your machine.

System Version: is the version of System software you are running.

Virtual Memory: tells you whether Virtual Memory (either by Apple or Connectix) is on or off.

32/24-bit mode: shows whether the system is running in 32 or 24 bit mode.

Instruction Cache: displays whether the instruction cache (internal to the 68040) is on or off. It should be on for normal operation. Note: the instruction cache is different from the 128K secondary cache.

Data Cache: displays whether the data cache (internal to the 68040) is on or off. It should be on for normal operation. Some system extensions, such as A/ROSE, can disable the data cache and lower the performance of your system. If your Mac does not require the use of the A/ROSE software, we recommend that it be removed from your hard drive. Note: the data cache is different from the 128K secondary cache.

Disk Spinup: displays the number of seconds that the Macintosh will wait at power up for your hard disk(s) to spin up. A value of 0 (the default) will cause the Macintosh to wait for 15 seconds. A maximum of 31 seconds can be specified.

Advanced QuadControl **Options**

In certain cases, users may need to access the Advanced Features of QuadControl. The Advanced Features window can be accessed by holding down the option key once QuadControl displays its main panel and selecting Advanced Features.



Figure 73 - Advanced Features button

The following screen will appear.



Figure 74 - Advanced Features



Full Speed Memory Locking - (The Default is on.) The Mac ROM on the SE/30, Mac II, IIx, IIcx, IIci, and IIsi provides a feature which allows add-in hardware to lock sections of motherboard memory so that they can write to it directly for greater I/O speed. On newer machines (the Mac IIvi, IIvx, Performa 600 and the Quadra series), this function causes only a page (8K) of memory to be marked as not cacheable. All other parts of RAM are still cacheable and still operate at full speed. The locked page of memory, however, will always remain uncacheable and thus will not benefit from the internal (on-chip) or secondary (on the Turbo 040 board) caches.

On the the SE/30, Mac II, IIx, IIcx, IIci, and IIsi, however, the memory locking is very inefficient. If any block of memory is ever locked, the Mac will turn off the 68040's internal data cache while the Macintosh is running. Since the majority of the speed increase of the 68040 is due to the on-chip caches, there will only be a very small performance increase when any memory is locked and the Turbo 040 is installed. The instruction cache is still enabled, so programs will EXECUTE faster, but all data operations will be uncacheable and will not even benefit from the secondary caches.

Full Speed Memory Locking - Gives SE/30, Mac II, IIx, IIcx, IIci, and IIsi owners the same capabilities as those with newer Macintoshes. When this feature is enabled. it leaves the data cache on for all parts of memory except the memory that was specifically locked. This option takes effect immediately, so rebooting is not required.

Note: Owners of the Apple 8-24 GC must remove the GC software from their System Folder in order to use Full Speed Memory Locking.

Possible Problems

The vast majority of users experience no problems with Full Speed Memory Locking turned on. There is a chance, however, that some system configurations will cause the Mac to crash or have reliability problems with this option enabled. The symptoms are usually random crashes - the Mac will lock up, display a "bomb" box because of a system error or jump into the debugger if one is installed. Generally, if you are going to have trouble with Full Speed Memory Locking turned on, you'll notice it immediately.

In the cases where Full Speed Memory Locking causes the machine to crash, there are a couple of things you can try. It could be an INIT conflict, so try booting with all third-party extensions disabled except those necessary for add-in cards (video accelerators, Ethernet, etc.). If the system still has problems, remove the remaining third party extensions. This may not be a viable option in the case of networking cards, since the networking card usually needs the INIT in order to work at all. For video acceleration, you can usually get by without the INIT. If you still experience problems once all of the corrections have been attempted, please contact DayStar Technical Support at 404-967-2077.



MacsBug Typing Fix – There is a bug in Apple's debugger, MacsBug, which makes typing very sluggish when the Turbo 040 is installed. The MacsBug Typing Fix solves this problem, but it will slow down system performance on some operations by about 5%. This option is provided for users that must use MacsBug and are not concerned about slightly slowing down their system.

Advanced User Note: We have provided a software patch that can be added to the Debugger Prefs file. This patch solves the speed problem without forcing the 5% performance penalty in all of your other applications. MacsBug searches the Debuggers Prefs file for debugger commands which it calls dcmds. There is a dcmd resource in the OuadControl file which can be moved into the Debugger Prefs using Apple's ResEdit program. All you have to do is cut the resource from the file and paste it into the Debugger Prefs file. Only perform this operation on backup copies of QuadControl and Debugger Prefs.



Quadra Compatibility - The Turbo 040 provides an added performance enhancement similar to that found on the Quadra 840AV which may cause a very small number of applications to experience problems. This option disables the enhancement to allow problematic applications to run. DayStar has found that versions of CompuServe's CIM prior to 2.2 require this option to be enabled.



Disable Memory Test - Provides the option for disabling Apple's extensive, but time consuming, memory test. A quick and simple test is performed in its place.

Indicator... Allows you to add an icon to the menu bar to show the 68040 CPU's current cache mode. (See page 102 for further information on cache modes.)

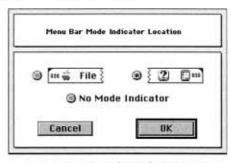


Figure 75 - Menu bar indicator screen

Troubleshooting

If you experience the following:

The Mac plays a failure tone or will not boot with the Turbo 040 installed.

OF

Virtually every application crashes the machine,

Try: Disabling the Control Panels and Extensions. (If you are running System 7, simply hold down the Shift key at boot-up. If you are running System 6, boot from a bootable floppy disk and drag all third party CDEVs and Extensions out of the System Folder and reboot.) Open the Quad Control file from your normal boot drive and disable Full Speed Memory Locking (see page 111).

Fixed?

No - continue on

Try: Disabling the Control Panels and Extensions.

Fixed?

Yes- see "Control Panel and Extension conflicts", page 116.

No - continue on

Try: Booting from a bootable floppy disk.

Fixed?

Yes- see "System software contamination", page 117.

No - continue on

Try: Booting from a bootable floppy disk, with all external SCSI devices turned off and the Command, Option, Shift and Delete keys held down.

Installing The Turbo 040 Software

Fixed?

Yes- see "Incompatible formatting software", page 118.

No - continue on

Try: Check with the manufacturer of any NuBus cards you have installed to be sure the board has the latest ROMs for 68040 machines.

Fixed?

No - Contact DayStar Digital Technical Support at 404-967-2077.

Control Panel and Extension conflicts

- Remove all third party Control Panel and Extension files from the hard disk's System Folder.
- Restart the Macintosh from the hard disk. (If the Macintosh does not start up properly at this point, it is probably due to a contaminated System Folder. See "System software contamination", page 117.)
- 3. Starting with the QuadControl file, reinstall the Control Panel and Extension files into the System Folder one at a time. Restart the machine after adding each file until you encounter the problem. After this happens, restart from a floppy disk (or hold down the shift key at boot-up if using System 7) and remove the last file loaded. Proceed again with this systematic check until you have removed all conflicts.

NOTE: Some conflicts can be overcome by changing the first character of the trouble-some file's name. Since these files load alphabetically, this will also alter their loading order.

It is also possible that the troublesome file is not '040 compatible. Contact the author for the latest version.

NOTE: If you have a National Instruments GPIB board, you must use NB Handler Control Panel version 4.3 or higher. If you have disabled all of the non-Apple Control Panel and Extension files and are still having problems, you are probably experiencing system contamination. In order to fix this problem, you will need to do the following:

 Boot from an Apple installation disk or other bootable floppy disk. Move third party Control Panels, Extensions and Printer fonts to a new folder outside the System Folder. Remove the System Folder on the hard disk by placing it in the trash.

NOTE: You must throw away the System file instead of installing a new one on top of the old one. DayStar recommends you use Apple's System Installer rather than dragging software over to the hard drive.

- Using the Apple Installer, reinstall the System software on the hard disk. Copy the QuadControl file to the newly installed System Folder.
- 3. Restart the Macintosh.

System software contamination

Incompatible formatting software

There are two possible problems that can occur with hard drive or removable disk formatters.

Blind Transfers. Many third party (non-Apple) formatters provide a "blind transfers" option that can cause compatibility problems when upgrading your Mac. For this reason, we suggest that you disable the blind transfers feature before installing the Turbo 040.

Note: Blind transfers ties the SCSI transfer rate to the speed of the CPU. When an accelerator is added to your system, or when you move your drive to a different speed Mac, you can experience SCSI problems. If you wish to use blind transfers with the Turbo 040, turn on blind transfers with the Turbo 040 installed and update your drivers and it should operate properly at the new speed.

Not-68040 compatible. Some older formatters are not compatible with the 68040 CPU. Upgrading to the latest release of your formatting software and updating your disk's driver will solve the problem.

If you experienced problems just after installing the Turbo 040, the easiest way to update your disk's driver is to remove the Turbo 040, update the disk driver and then reinstall the Turbo 040. If you do not know which software was used to format your troublesome disk, contact the vendor that sold it to you. If you cannot find out which formatter was used or you don't have access to it, you can try to update the driver with a different formatter, but be sure to back up your data first. If this fails, you will need to reformat the disk, again making sure you use a 68040 compatible version of the formatter.

Performance Notes

Now that you have supercharged performance with the Turbo 040, here are some software tips to get the most from your accelerator.

- Check the Turbo 040 Info section of the QuadControl CDEV. If the 68040 Data Cache and Full Speed Memory Locking are both off, turn on Full Speed Memory Locking. (See Advanced QuadControl Options p. 110.)
- Keep the number of Control Panel and System Extension files that you have in the System Folder to a minimum. If you find that you are not using the features of these files, remove them from the System Folder. Not only can these files cause conflicts with one another, they can also rob the system's performance.
- Vary the size of the Apple RAM Cache (or Disk Cache in System 7) to find an optimum setting for your system. The cache is located in the General Control Panel under System 6.x, or in the Memory Control Panel under System 7.x. Setting the cache above 128K with System 6.x often degrades performance. Ilsi owners using on-board video under System 7.x should set the Disk Cache to 384K for optimal performance. This forces the Ilsi to use the entire soldered-on 1MB for video, System heap and disk cache, and can result in a significant performance improvement.
- Quit out of any '040 incompatible applications as soon as you are finished. Even when applications requiring '030 cache mode are in the background, they will slow the Mac down.
- Check to see if the Apple Real-time Operating System Environment (A/ROSE) software is installed on your Mac (usually located in the System Folder, or the Extension Folder if running System 7). If your networking card does not require A/ROSE, you should remove it from your hard drive for optimal performance.

Performance tips

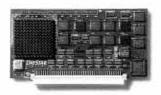
68040 compatible software

 Use versions of software that do not require you to turn off the data cache, such as:

> A/ROSE 1.19 up Acius 4th Dimension 2.2.2 up Adobe ATM 2.03 up Adobe Illustrator 3.0 up Adobe PageMaker 4.0 up Adobe Persuasion 2.0 up Adobe Photoshop 1.06 up Adobe TouchBase 2.01 up Aladdin Systems StuffIt Deluxe 2.0.1 up Apple AppleLink 6.0 up Apple AppleShare 2.0.1 up Apple HyperCard 2.1 up CE QuickKeys 2.1.3 up CE QuickMail 2.23 up Claris FileMaker Pro 1.0 up Claris HyperCard 2.1 up Connectix RAM Doubler 1.4 up Deneba Canvas 2.1 up HP DeskWriter 3.1 up MacroMedia Director 3.0 up MacroMedia FreeHand 3.0 up MacsBug 6.2.2 up MacWrite II 1.1v1 up Microsoft Excel 3.0a up Microsoft Word 4.0e up Microsoft Mail 3.0a up Norton Utilities 2.0 up Now Software Startup Manager 3.01 up Quark XPress 3.0 up Symantec Suitcase II 1.2.8 up Symantec Fastback II 2.5 up T/Maker WriteNow 3.0 up WordPerfect 2.01 up

If you experience problems with an application not listed, contact the developer to ensure that you have a 68040 compatible version.

Product Support



· System Requirements

 Apple[®] Macintosh SE/30, II, IIx, IIcx, IIsi, IIvx, IIvi, Performa 600, IIci

· External Cache Architecture

128K direct mapped Static RAM cache

· Internal 68040 Cache Architecture

- 4K byte physical instruction cache and
- 4K byte physical data cache (accessible simultaneously)

Processor

Turbo 040i (without math functions)

- 33 MHz Motorola 68LC040

Turbo 040 (with built-in math functions)

- 33 MHz Motorola 68040
- 40 MHz Motorola 68040

Software

- QuadControl Control Panel for cache management
- PowerMath to speed up Apple SANE math

Compatibility

Compatible with System 6.x,
 7.x up and standard Macintosh software and hardware

Product specifications