



Service Note 1014-826

Quantum Design Maintenance and Troubleshooting Guide for Customer's Computers

Quantum Design (QD) instruments incorporate computer systems that require maintenance and/or repair. This guide covers general guidelines and suggestions for maintaining the performance of these computers well as methods to improve their performance and diagnose problems.¹ However, it is not a comprehensive repair manual. If you have problems with your computer after you have followed the suggestions in this guide, contact your local Information Technology (IT) department or Quantum Design Customer Service.

This document covers the following topics:

- Section I. Basic Troubleshooting
- Section II. Computer System Maintenance
- Section III. Windows Desktop Maintenance
- Section IV. Operating System Restoration
- Section V. Advanced Troubleshooting
- Section VI. Information on Peripherals

In the event that you do not have detailed information about a problem or it is an uncommon problem, begin the troubleshooting process at the most general level.

I. BASIC TROUBLESHOOTING

Check Cables and Connections

The first step in troubleshooting should always be to verify that all the cables are connected properly (including the power cable) and the connections are tight.

¹ Many of the Windows processes and operations can be performed in several ways. We have attempted to use the simplest for the examples.

Perform a "Hard" Reboot

A "hard" reboot (turning the computer off and on) might resolve problems that you cannot address using Windows (e.g., if a program has stopped responding to commands).

1. Shut down (or close) all active programs, if possible.

Note: If the operating system or programs are not responding to commands, turn off the power to the computer and go to Step 4 below.

2. Open the **Start** menu: Click on the **Start** button in the lower left of the Windows tool bar.
3. Shut down the computer: Select the **Shut Down** option (**Start >> Shut Down**).
4. Leave the computer power off about two minutes.
5. Turn on the power to the computer and restart your programs.

If the hard reboot does not resolve the problems, continue working through the other suggestions in this section.

Remove Extra Software and Hardware

When you have measurement problems that appear to be related to the computer, begin the troubleshooting and repair process by uninstalling any software or hardware that you have added to the Quantum Design system. The computers that Quantum Design supplies with its systems are configured for the instruments they control. These computers are not intended for unrelated activities.

Quantum Design cannot predict how externally obtained software applications will interact with MultiVu or affect its performance. Compatibility, resource, or driver problems can also arise when hardware is added to the QD system. For example, a user-installed peripheral might compete for resources that the QD software requires, and the resource competition could cause instrument errors. As an example of a compatibility issue, the Dell computers could become unstable if a user happened to add memory by using generic RAM, because Dell computers require specific RAM to operate properly.

Check for Viruses

If your computer is performing poorly², it might have been infected with a virus. To check for and remove viruses, perform a virus scan. In the event that you do not have virus-scan software, you should be able to obtain it from your local Information Technology (IT) department. In addition, some vendors of antivirus programs (e.g., Trend, www.antivirus.com) offer free scans (for occasional use) that you can access on the Web.

² Poor performance could include when the programs begin crashing more frequently than before, the operating system takes longer than usual to complete tasks, and the computer stops responding to commands, so you have to keep restarting it.

Change Virus-Scan Settings

Antivirus programs can degrade computer performance if they are set to check every action. If such a setting was used, the performance of the computer is likely to improve if you set the antivirus program so that it checks only the high-profile events (actions with a high potential for virus activity). Many antivirus products include a list of high-profile events. If you do not have institutional guidelines regarding virus scans, search through your virus-scan program for an example list of high-profile events to use as your baseline for virus checking.

II. COMPUTER SYSTEM MAINTENANCE

Sluggish performance often indicates that a computer needs maintenance, whether the performance problems are recent or they have developed over time. The following suggestions should help improve the performance of your computer.

Adjust Hard-Drive Space

For optimal performance, a computer hard drive needs at least 20–25% of its space unused or "free." If the drive is getting full, remove files from the computer until it has, at a minimum, 25% free disk space. The following procedures explain how to check the amount of free space on the computer drive and several ways to increase its free space.

Check Free Space

The steps below explain how to access the main disk drive and check the amount of free space on computers that have Windows 98 or Windows XP operating systems. In Figures 1A and 1B, the main drive is labeled **C:** (Win 98) or **Local Disk (C:)** (Win XP), but your drive might have a different label.

1. Double-click on the **My Computer** icon on your computer desktop.

The window that opens will display (or list, depending on your settings) the main disk drive and other devices that are part of your system (e.g., a printer or a floppy drive).

2. Access the popup "options" menu: Right-click on the **Local Disk** icon.
3. Access the main drive **Properties** dialog: Select **Properties** from the popup menu.

The **Properties** option opens the **Local Disk (C:) Properties** dialog shown in the far right of Figure 1A (Win 98) and Figure 1B (Windows XP). As you can see in the figures, the **General** tab displays the **Used space** and **Free space** on your computer and its **Capacity** (total space).

4. If the **Free space** is less than 25%, you can increase the percentage of free space by removing old files. Other ways to increase free space—reducing the size of the **Recycle Bin**, performing a **Disk Cleanup**, and clearing out files left by the Internet browser—are explained in the following sections.

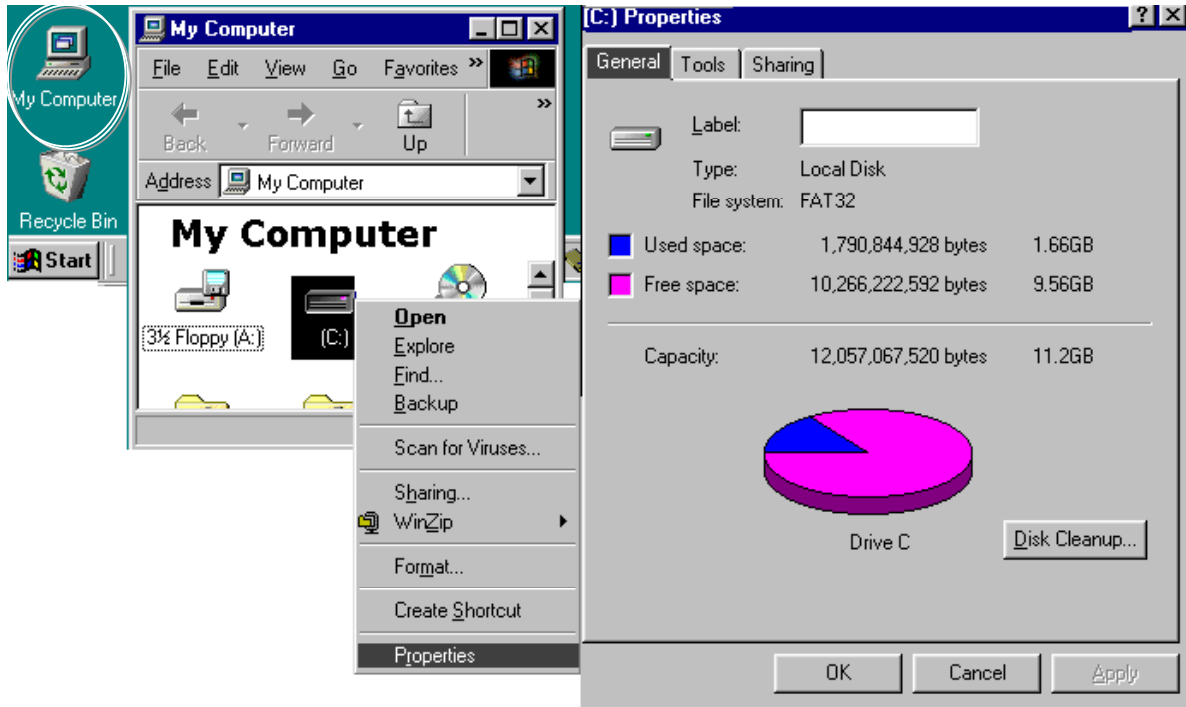


Figure 1A. Win 98: Checking the amount of free space by using the Local Disk (C) Properties dialog

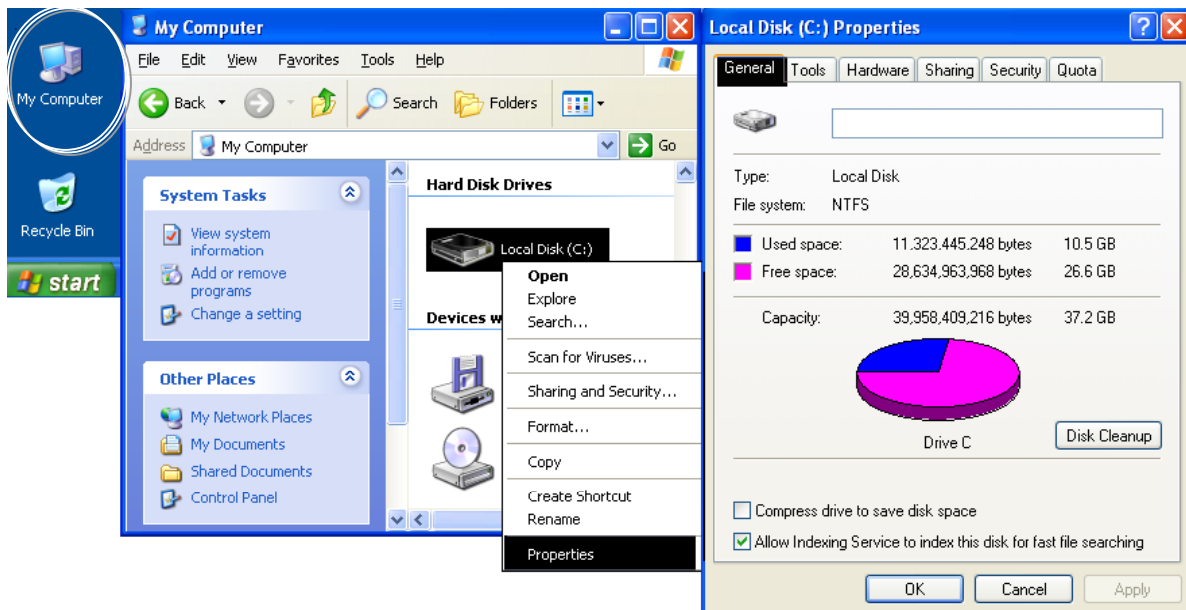


Figure 1B. Windows XP. Checking the amount of free space by using the Local Disk (C) Properties dialog.

Reduce Size of Recycle Bin

You can reclaim a small amount of hard-drive space by reducing the size of your **Recycle Bin**. Figures 2A and 2B illustrate the procedures in Win 98 and in Win XP, respectively.

1. Right-click on the **Recycle Bin** icon on the computer desktop.
2. When the popup menu opens, select the **Properties** option. The **Recycle Bin Properties** dialog will open.
3. In the **Recycle Bin Properties** dialog, find the setting for reserved space and set the **Maximum Size** to 3%.
4. Click on the **Apply** button.
5. Click on the **Close** button.

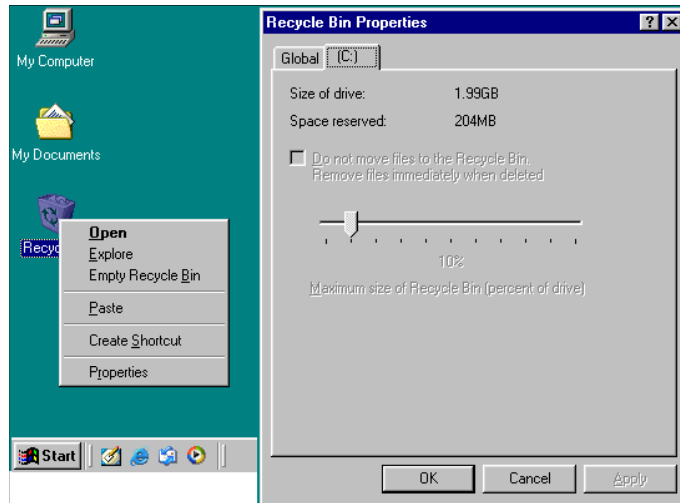


Figure 2A. Win 98: Recycle bin menu and Properties dialog

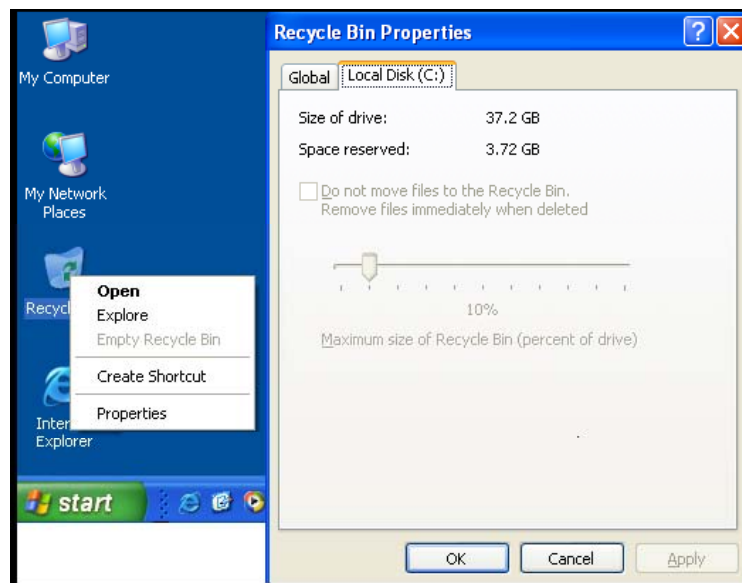


Figure 2B. Win XP: Recycle bin menu and Properties dialog

Run Disk Cleanup

The **Disk Cleanup** utility removes unnecessary content from the hard disk. Note that the **Disk Cleanup** utility can take significant time (e.g., one-half hour or more) to check and clean the drive, depending on the length of time since the utility was last used. As illustrated in Figure 3A (Win 98) and Figure 3B (Windows XP), you will access the **Disk Cleanup** utility by opening a series of menus, beginning with the **Start** menu.

1. Click on the **Start** button and select **Programs >> Accessories >> System Tools >> Disk Cleanup** from the **Start** menu. The figures illustrate the menu that opens for each selection.
2. The **Disk Cleanup** utility is automated. When it opens, follow the instructions as you are prompted.

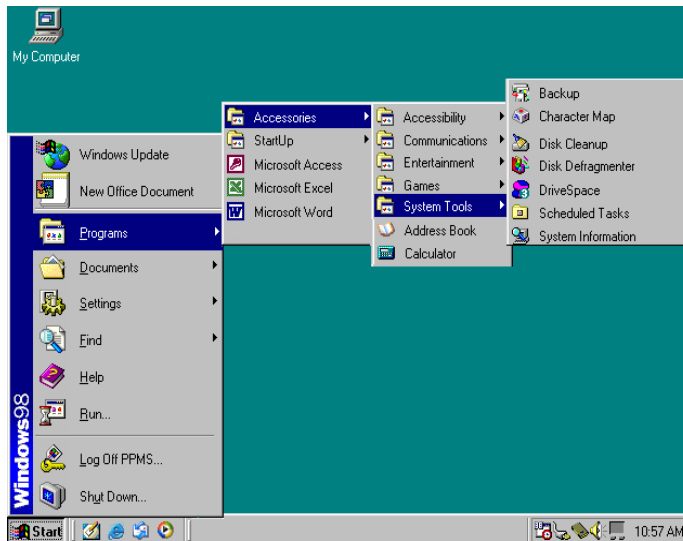


Figure 3A. Win 98: Using the Start button to access the Disk Cleanup utility

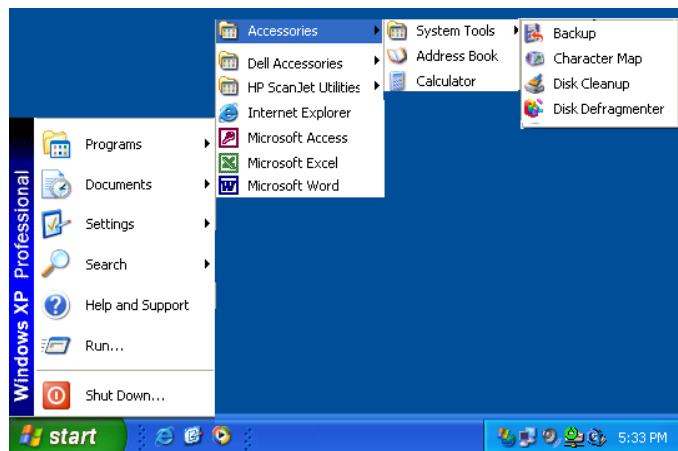


Figure 3B. Windows XP: Using the Start button to access the Disk Cleanup utility

Maintain the Browser

Quantum Design does not support Internet browsing with the system computers. Internet browsers place extra files on your system (e.g., **Temporary Internet Files**, **Cookies**, and **History**) that use space and other resources. The impact of this material is compounded by the fact that the Windows operating system must track and manage it all. Therefore, you should periodically remove this extra material.

Important: Passwords for Internet sites and accounts are sometimes saved in **Cookie** files, so you (and other users) can avoid some frustration by making a note of your passwords before the **Cookies** are removed.

The removal process varies for the different browsers (and versions), and there are often several ways to perform the same tasks. Here we present the most common and direct procedures.

INTERNET EXPLORER

In Win 98 and Windows XP, you can use the **Internet Explorer** icon on your desktop (not the shortcut icon on your menu bar) to access the **Internet Properties** dialog and clean up the extra materials (e.g., **Temporary Internet Files**, **Cookies**, and **History**).

Note: There are many different property menus and dialogs—you are looking for the **Internet Properties** dialog.

1. Right click on the desktop **Internet Explorer** icon. As you can see in Figures 4A and 4B, a popup menu will open, offering options related to the **Internet Explorer** program.
2. In the popup menu, select **Properties**.

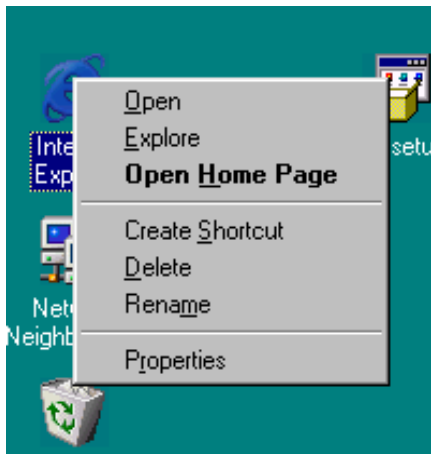


Figure 4A. Win 98: Accessing the Internet Properties dialog

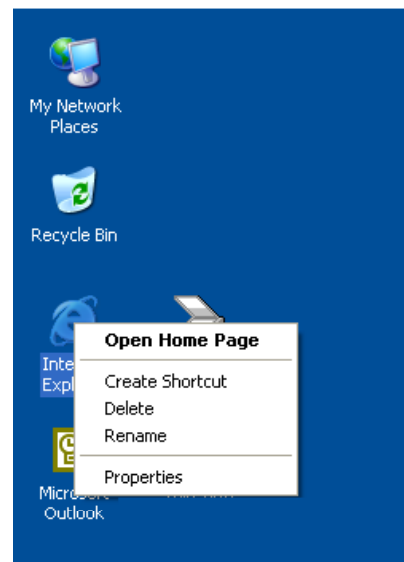


Figure 4B. Windows XP: Explorer icon and popup menu

3. The **Internet Properties** dialog (Figures 5A and 5B) will open, with six tabs of setting options. Click on the **General** tab to bring it to the front (if it is not already there).



Figure 5A. Win 98: Internet Properties dialog with buttons for deleting excess files and Cookies

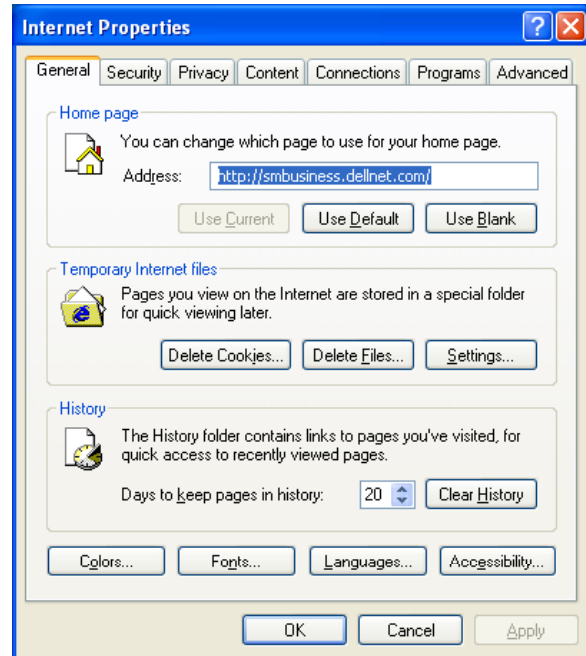


Figure 5B. Windows XP: Internet Properties dialog with buttons for deleting excess files and Cookies

4. In the **General** tab, locate the **Temporary Internet files** and **History** subsections. If your **General** tab does not have these sections or buttons but there is a **Settings** button or tab, open it and go to Step "d" below.
 - a. Save your passwords and warn other users to do the same, if you have not already done so.
 - b. In **Temporary Internet files** subsection, click on the **Delete Cookies** button and the **Delete Files** button.
 - c. In the **History** subsection, click on the **Clear History** button. You can also change the number of days that your system tracks web pages to a number appropriate for your usage patterns.
 - d. If you are using a **Settings** dialog, save your passwords and warn other users to do the same, if you have not already done so. Now look for and click on the **View Files** button. This button opens the **Temporary Internet Files** folder, where you can manually delete files and cookies.
5. Click on the **Apply** button.
6. Click on the **Close** button.

NETSCAPE, OPERA, AND OTHER BROWSERS

The **Disk Cleanup** utility will not remove files left by browsers (e.g., Netscape and Opera) that were not provided by the manufacturers of the original equipment. If you use such a browser, you will need to investigate its **Help** program to learn how to locate and remove extra materials from their **Cache**, **Cookie**, and **History** folders and files.

III. WINDOWS DESKTOP MAINTENANCE

Clear the Documents Menu

When you clear the documents menu, the system removes the list of recently accessed files that you see when you select **Documents** from the **Start** menu.

Win 98

1. Right-click in a clear area of the menu bar at the bottom of your computer screen. This opens the popup menu shown in Figure 6A, which has links to dialogs for adjusting how items appear and behave.
2. Click on **Properties**. This will open the **Taskbar Properties** dialog (Figure 6B), which has two tabs: **Taskbar Options** and **Start Menu Programs**.
3. If the **Start Menu Programs** tab is not at the front, click on it to bring it forward.
4. Find the **Clear** button next to the **Documents** icon and click on it.
5. When the system has finished clearing out the old documents, click on the **OK** button.

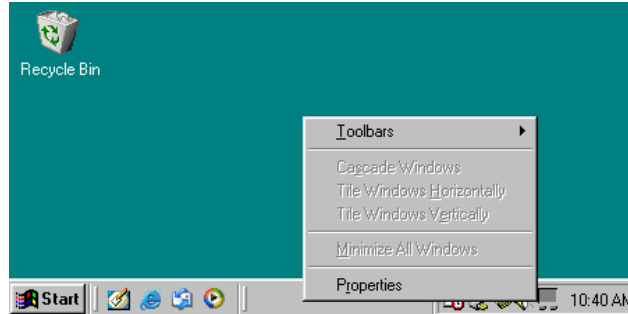


Figure 6A. Win 98: Popup menu for changing your taskbar and start menu properties

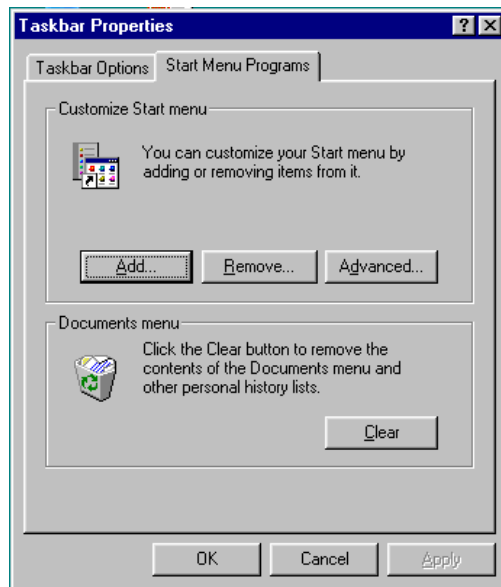


Figure 6B. Win 98: Taskbar Properties dialog

Windows XP

1. Right-click in a clear area of the menu bar at the bottom of your computer screen. This opens the popup menu on which you can adjust how taskbar items appear and behave (Figure 7A).
2. Select **Properties** from the **Taskbar** popup menu.

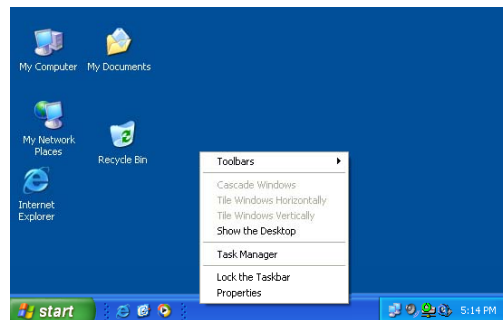


Figure 7A. Windows XP: The popup taskbar menu for

changing the taskbar and start menu settings.

3. The **Properties** option opens the **Taskbar and Start Menu Properties** dialog (Figure 7B), which has a **Taskbar** tab and a **Start Menu** tab.
4. Click on the **Start Menu** tab to bring it forward. When you are given options for the style of the **Start** menu tab, click in the radio button for the **Classic Start Menu**, which is the default that Quantum Design has installed.
5. Now click on the **Customize** button at the right of the dialog.
6. The **Customize Classic Start Menu** dialog (Figure 7C) will open, showing a button to clear the record of recently accessed documents as well as one to customize the **Start** menu.
7. Click on the **Clear** button next to the recently accessed documents area.
8. When the system has finished clearing out the old documents, click on the **OK** button.
9. Click on the **Apply** button, then click on the **OK** button.



Figure 7B. Windows XP: Using the Taskbar and Start Menu tab to clear the document list in the Windows Start Menu

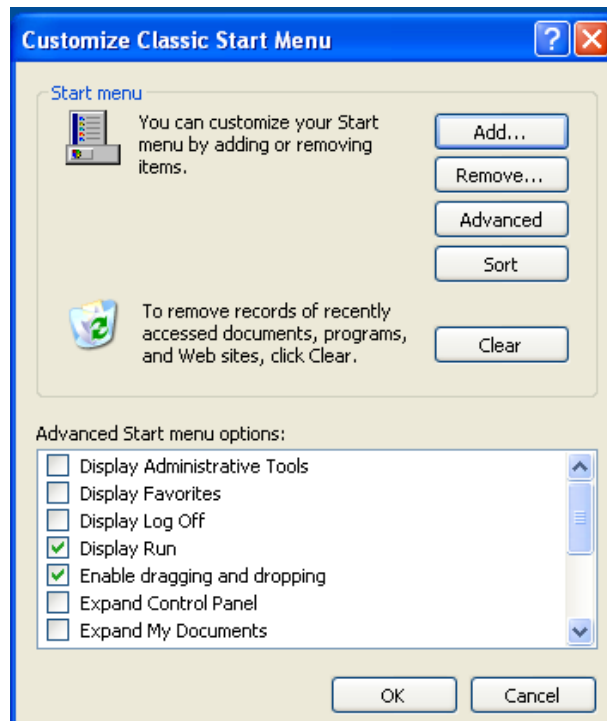


Figure 7C. Windows XP: The popup taskbar menu for clearing the document list

Edit the Startup Process

When the system starts, it sometimes automatically opens nonessential applications without the user's knowledge or direction. You should remove such programs from the automatic startup process (unless you want them opened at that time).

Win 98

1. Right-click on the Windows **Start** button to open the popup menu (see Figure 8A).
2. Select **Explore**. This opens a view of the computer system and folders. The **Start Menu** should be highlighted. Click on the plus (+) sign next to the **Start Menu** folder to expand it and see the files below (Figure 8B).
3. Find the **Programs** folder located just under the **Start Menu**.
4. Click on the plus (+) sign next to the **Programs** folder to expand it. When it opens, you will see the **Startup** folder.
5. Click on the **Startup** folder. A small window will open on the right side showing the folder contents. If the computer system has not been changed since it was configured by Quantum Design, there should be nothing in the folder except possibly `Desktop.ini`. However, many applications, for example, Microsoft Office or AOL, will leave start files in this area.
6. Look for and remove any programs that might be starting without your knowledge or design. If you have doubts about whether a program should be in the **Start Menu**, discuss it with your local IT department.

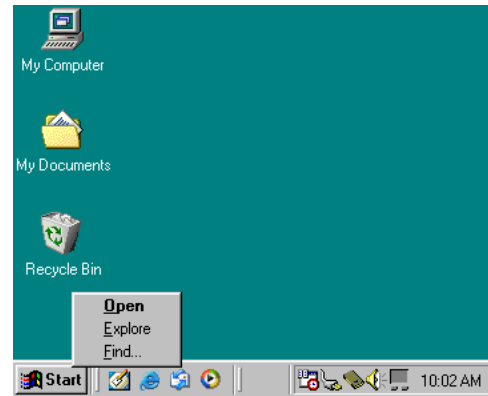


Figure 8A. Win 98: Popup menu from right-clicking on the Start button

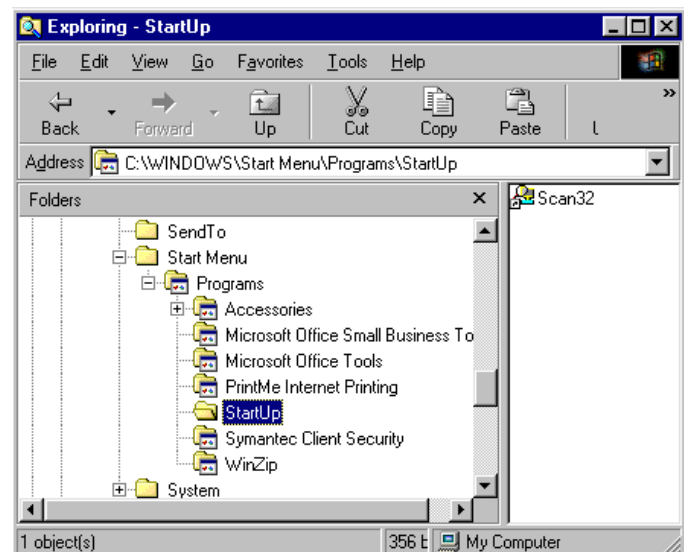


Figure 8B. Win 98: Checking the Startup folder for unwanted programs

Windows XP

1. Right-click on the Windows **Start** button to open the popup menu, as shown in Figure 9A.
2. Select **Explore All Users**. This opens a view of the computer system and folders (Figure 9B). The **Start Menu** should be highlighted.

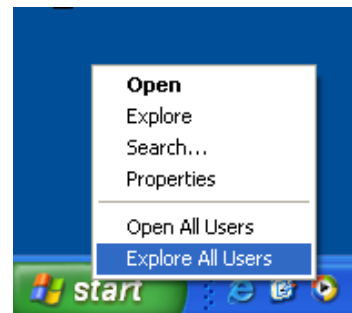


Figure 9A. Windows XP: Popup menu from right-clicking on the Start button

3. Click on the plus (+) sign next to the **Start Menu** to expand it and see the files below
4. Find the **Programs** folder.
5. Click on the plus (+) sign next to the **Programs** folder to expand it.
6. Click on **Startup**. If the computer system has not been changed since it was configured by Quantum Design, the **Startup** folder should only contain `Desktop.ini`. However, many applications, for example, Microsoft Office or AOL, will leave start files in this area.
7. Look for and remove any programs that might be starting without your knowledge or direction. If you have doubts about whether a program should be in the **Start Menu**, discuss it with your local IT department.
8. Look for and remove any unwanted files that might be in the other users' **Startup** directories in **Documents and Settings**.

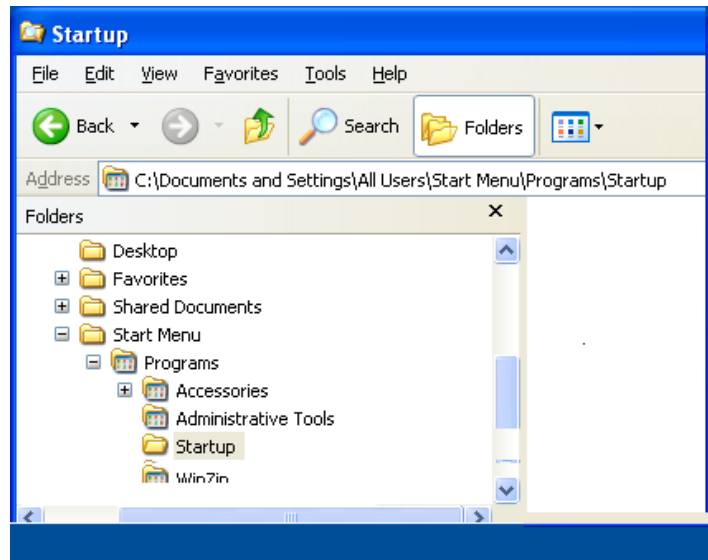


Figure 9B. Windows XP: Checking the Startup folder for unwanted programs

Clear the System Tray

The lower right-hand corner of the **Desktop** contains an area called the **System Tray** (Figures 10A and 10B).

- Check the shortcuts in the **System Tray** to see if any are for old, unused applications: Right-click or double-click on an icon to open the popup menu or access the properties.
- If any shortcuts are for unused applications, right-click on their icons to see if you can uninstall them.

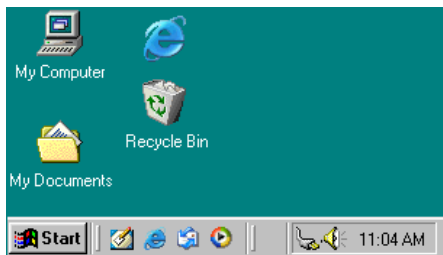


Figure 10A. Win 98: Checking the system tray for unused applications

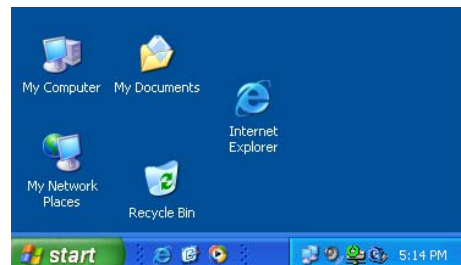


Figure 10B. Windows XP: Checking the system tray for unused applications

Defragment the System

Now that the system has been cleaned, it is a good idea to organize it by using the **Disk Defragmenter** utility. As the defragment can take a substantial amount of time (overnight or longer) if it has not been run recently, Quantum Design staff recommend that you first change the monitor and energy settings. This procedure will facilitate the defragment process.

Reset Screen Savers and Energy Saving

Win 98

The screen savers and energy-saving settings for the monitor are set in the **Display Properties** dialog.

1. To access the **Display Properties** dialog, right-click on an open area of the computer **Desktop**. The popup menu shown in Figure 11A will open.
2. Select **Properties**. The **Display Properties** dialog (Figure 11B) will open, showing six option tabs for personalizing a monitor and its display.
3. Click on the **Screen Saver** tab to bring it forward (Figure 11B).
4. Find the **Screen Saver** settings on the left side of the tab, under the illustration of the monitor, and set the dropdown menu to **None**.
5. Click on the **Settings** button in the lower right side of the **Screen Saver** tab. The **Power Management Properties** dialog (Figure 11C) will open, with four settings tabs.
6. Click on the **Power Schemes** tab to bring it forward.
7. In the section labeled **Settings for Home/Office Desk power scheme**, set the dropdown menu to **Never** for each of the options (**System standby**, **Turn off monitor**, and **Turn off hard disks**).
8. Click on the **Apply** button.
9. Go to the "Perform the Defragment" section.

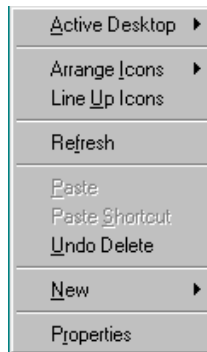


Figure 11A. Win 98: Desktop popup menu

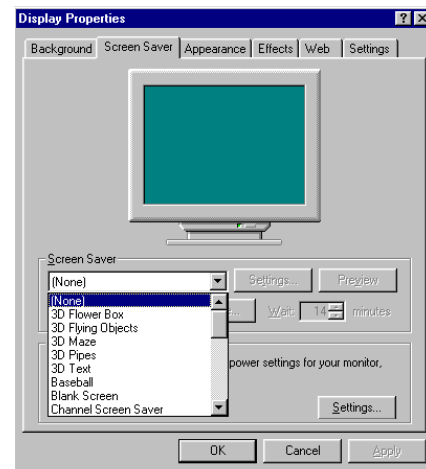


Figure 11B. Win 98: Screen Saver tab and Screen Saver dropdown menu

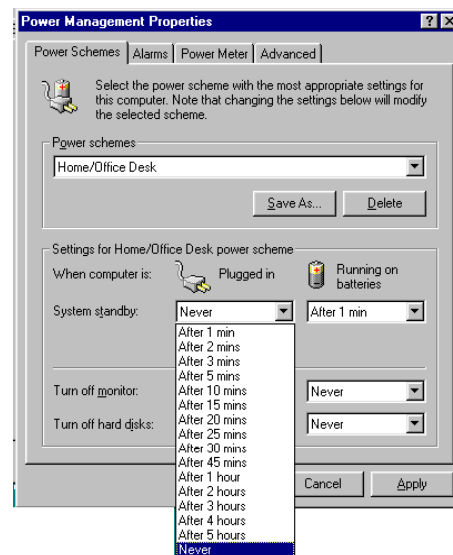


Figure 11C. Win 98: Power Option Properties dialog

Windows XP

Use the **Display Properties** dialog to change the screen saver and energy-saving settings for the monitor.

1. Access the **Display Properties** dialog by right-clicking on an open area of the computer **Desktop**. The popup menu shown in Figure 12A will open.
2. Select **Properties**. This will open the **Display Properties** dialog (Figure 12B), which has six tabs of options for personalizing a monitor and its display.
3. Click on the **Screen Saver** tab to bring it forward.
4. Find the **Screen saver** settings on the left side of the tab, under the illustration of the monitor, and set the dropdown menu to **None**.
5. Click on the **Settings** button next to the **Screen saver** menu. The **Power Options Properties** dialog (Figure 12C) will open, with four settings tabs.
6. Click on the **Power Schemes** tab to bring it forward.
7. In the section for **Settings for Home/Office Desk power scheme**, set the dropdown menu to **Never** for each of the options (**Turn off monitor**, **Turn off hard disk**, **System standby**, and **System hibernates**).
8. Click on the **Apply** button.
9. Go to the "Perform the Defragment" section.

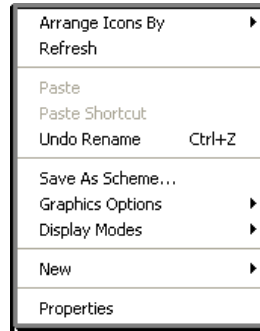


Figure 12A. Windows XP: Desktop popup menu

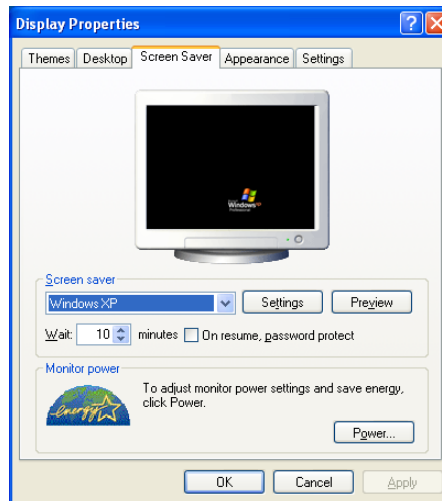


Figure 12B. Windows XP: Screen Saver tab and Screen Saver dropdown menu

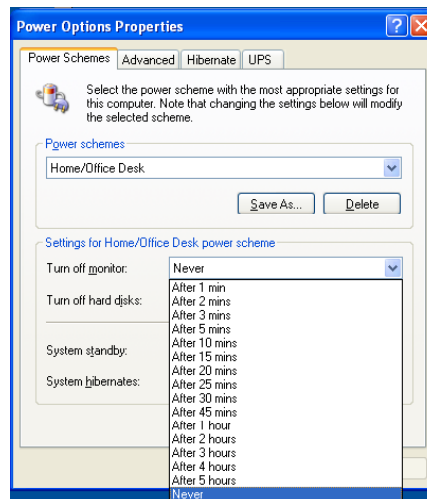


Figure 12C. Windows XP: Power Option Properties dialog

Perform the Defragment

Now that the system is prepared, start the defragmenter. The process is similar in Win 98 and Windows XP.

1. Click on the **Start** button and select **Programs >> Accessories >> System Tools >> Disk Defragmenter**, as illustrated in Figures 13A and 13B.
2. The **Disk Defragmenter** is an automated utility. Follow the instructions you are given, as prompted.

Note: If you have never performed a defragment or it has been a long time since you did one, the utility might stop and direct you to first run the **Error Checking** utility, which is covered in the next section.

3. After the software has finished the defragment, you can change the screen and energy settings back to your original selections.

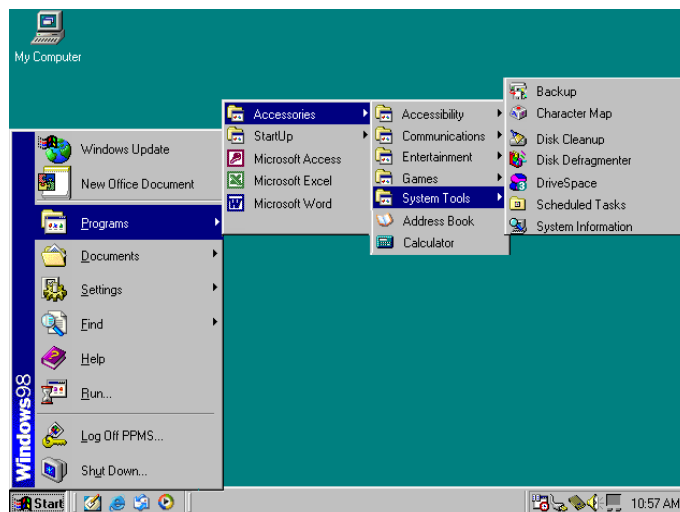


Figure 13A. Win 98: Starting Disk Defragmenter

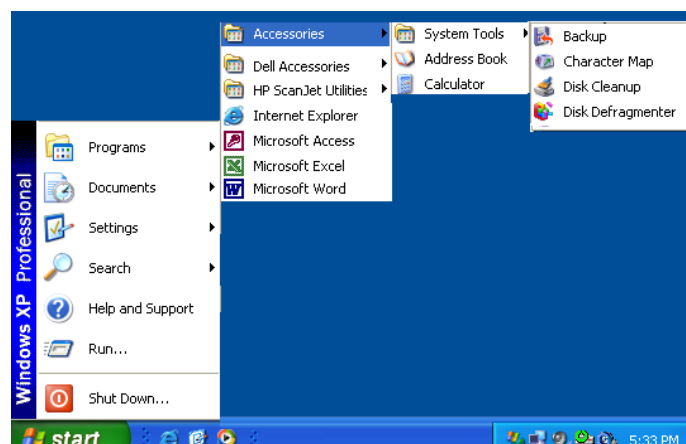


Figure 13B. Windows XP: Starting Disk Defragmenter

Win 98: Known Issues for the Defragment

If the Win 98 **Disk Defragmenter** does not run, start it in **Safe Mode**, which runs with limited resources.

1. Perform a hard reboot (see Section I), pressing **F8** as the computer starts—do it while the screen is still dark but there is a cursor at the top left.
2. When the "boot menu" appears, choose **Safe Mode**.
3. Select **Programs >> Accessories >> System Tools >> Disk Defragmenter**.

Run Error Checking

It can take one-half hour or more to run an error check and the procedure is often done for the first time as part of a specific procedure (e.g., the **Disk Defragmenter** might require that you run an error check). You will access the **Error Checking** utility via the "**Disk**" **Properties** dialog. The name of the properties dialog will reflect the name of the disk or equipment that is being checked—**Local Disk (C:)** is being checked in the examples.

Win 98

1. On the **Desktop**, double-click on the **My Computer** icon. This will open the **My Computer** window, which shows the drives and peripheral equipment (Figures 14A).
2. Right-click on the drive icon that you want to check. The popup menu will open.
3. Select the **Properties** option.

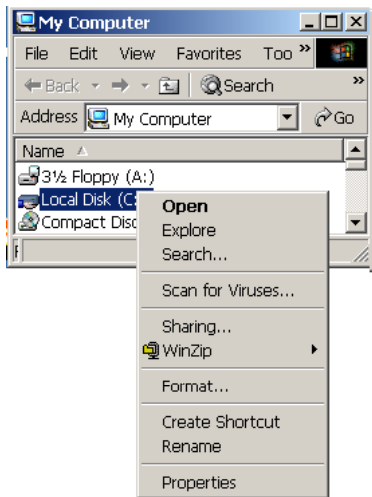


Figure 14A. Win 98: My computer popup menu

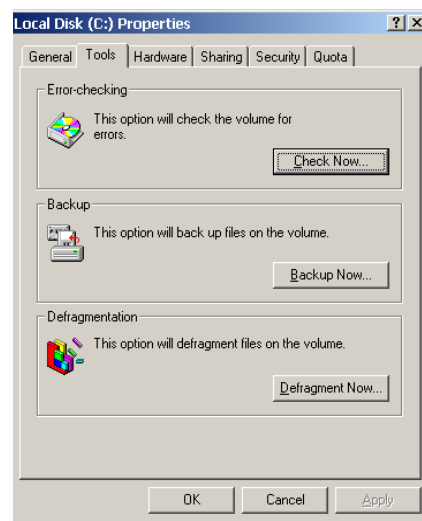


Figure 14B. Win 98: Local Disk Properties dialog and Tools tab

4. The "**Disk**" **Properties** dialog will open (Figure 14B), displaying six tabs.
5. Click on the **Tools** tab to bring it forward.
6. In the **Error Checking** section of the **Tools** tab, click on the **Check Now . . .** button. Follow any instructions the automated utility gives.
 - If the **Error Checking** utility approves the status of the system (the system "passes" **Error Checking**), you can now return to the section about using the **Disk Defragmenter** (assuming that you previously started the defragmenter).
 - If the **Error Checking** utility does not approve the status of the system after repeated tries (i.e., the system does not pass **Error Checking**), have a member of your local IT department examine the computer drive.

Windows XP

1. On the **Desktop**, double-click on the **My Computer** icon. This will open the My Computer window, which shows the drives and peripheral equipment (Figure 15A).
2. Right-click on the drive icon that you want to check. The popup menu will open.
3. Select the **Properties** option.
4. The "**Disk**" **Properties** dialog will open (Figures 15B), displaying six tabs.
5. Click on the **Tools** tab to bring it forward.
6. In the **Error Checking** section of the **Tools** tab, click on the **Check Now . . .** button.
7. The **Check Disk** window will appear, as shown in Figure 15C.
8. Select the options consistent with your local IT policies and click on the **Start** button.
 - If the **Error Checking** utility approves the status of the system (the system "passes" **Error Checking**), you can now return to the section about using the **Disk Defragmenter** (assuming that you previously started the defragmenter).
 - If the **Error Checking** utility does not approve the status of the system after repeated tries (i.e., the system does not pass **Error Checking**), have a member of your local IT department examine the computer drive.

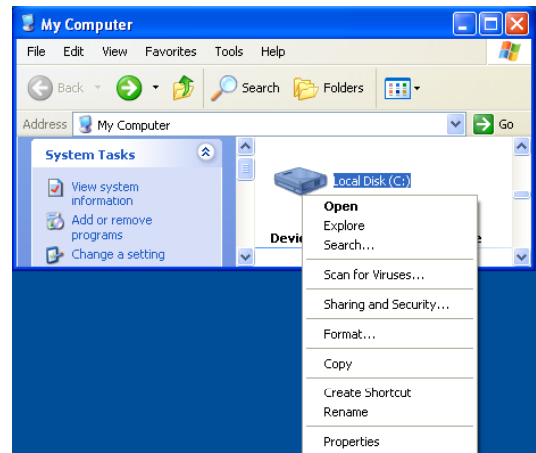


Figure 15A. Windows XP: My computer popup menu

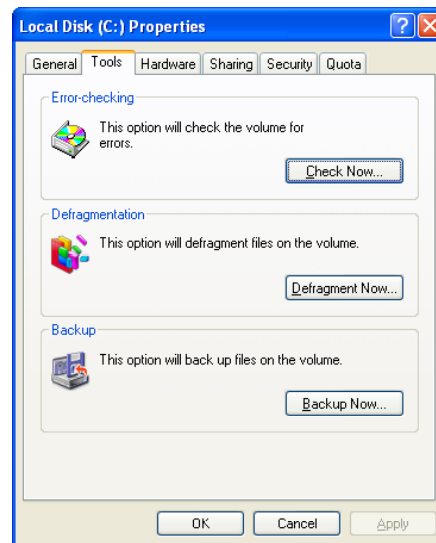


Figure 15B. Windows XP: Local Disk Properties dialog and Tools tab

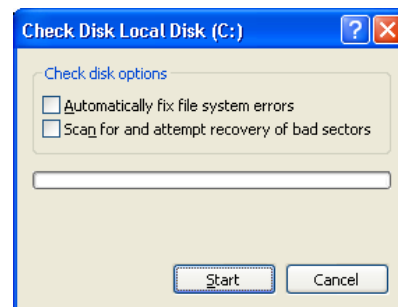


Figure 15C. Windows XP: Check Disk Local Disk dialog

Win XP: Known Issue for Error Checking

Important: Windows XP Pro will sometimes hang-up at the end of the error-checking cycle, meaning that the system will simply refuse to restart. To recover from this, perform the following procedures.

1. Restart the system by pressing the power button just long enough so that the computer restarts.
2. After the **Bios Screen** appears but before Windows XP starts, press the **F8** key. This will bring up the "boot menu" or **Windows Advanced Options Menu**.
3. Use the arrow keys to select **Last Known Good Configuration**.
4. Press the **Enter** key. This selection should bypass the problem and start Windows XP.

V. OPERATING SYSTEM RESTORATION

If the operating system must be restored to the original Quantum Design configuration and options, first back up any data that the instrument users want to save. It is also a good idea to back up any instrument calibration factors that might have changed since the unit was shipped, for example, changes that have resulted from troubleshooting or repairs.

When you are working with a pre-existing installation, you should always choose to perform a fresh Windows reload (restoration) rather than a reinstallation over the existing programs. As an implied convenience, the Windows installation program tries to retain as much of the pre-existing installation as possible. Unfortunately, this approach tends to retain the corrupted sections that the reinstallation is intended to fix. Therefore, Quantum Design staff recommend that you repartition the hard drive and do a complete reload of the operating system.

Many Quantum Design measurement systems incorporate Dell computers. The original shipment includes a "Windows Reinstallation" CD and a "Drivers and Utilities" CD. When you install the operating system by using these CDs, start with the "Windows" CD and follow up with the "Drivers" CD. Generally, the overall reloading process is automated: the "Drivers and Utilities" CD will install its own applet, restart the computer, and scan your system for the suggested drivers when it relaunches the CD.

Pointers for Restoring Operating Systems

- Dell Computer Corporation staff suggest that you install the Intel drivers first (before you install any other driver).
- After you have restored the operating system and programs and they are adequately protected according to local antivirus policies, Quantum Design staff recommend that you run the **Windows Update** program. At the time of writing (September, 2003), Quantum Design installs all **Windows Updates** except .NET.
- Quantum Design staff recommend that you run the **Disk Defragmenter** after you have restored the system. The defragment will help ensure that the computer is running as efficiently as possible.

V. ADVANCED TROUBLESHOOTING

The Dell "Diagnostics Suite" is included on the "Drivers and Utilities" CD. (The diagnostics may come on floppy disks with some older Dell models.) The diagnostics can help you in several ways:

- The software can help you troubleshoot failures that are hard to trace by observation.
- The software generates error codes for failures. Dell warranty adjusters will generally accept the error code as sufficient justification for replacement parts.

Running Diagnostics

Use the procedures below to run the diagnostics software.

1. Use the **Bios** to change the boot order.
 - Verify that the computer is set to boot from the CD and the CD is in the drive.
 - Boot from the "Drivers and Utilities" CD.
2. After the diagnostics have been loaded, you can test the entire unit or section of the machine that you suspect is broken.

VI. INFORMATION ON PERIPHERALS

Printer History

Hewlett Packard DeskJet 6122, with Windows XP Pro embedded driver. This model is being shipped with Quantum Design instruments as of June 2003. Units are being shipped with USB cables, but some units in the field are using parallel cables.

Hewlett Packard DeskJet 940, with HP provided corporate driver. These units are being shipped with parallel cables, but they can be converted to USB cables if it is necessary.

Hewlett Packard DeskJet 930/932, with HP provided corporate driver. As of June 2003, these units are being shipped with parallel cables. There has been no request to evaluate using them with USB cables.

Lexmark 5700/3000. This printer was used during a period of HP driver/MultiVu incompatibility. These units were shipped with parallel cables.

Monitor Types

As of June 2003, only LCD monitors are recommended for use with Quantum Design measurement systems, which produce magnetic fields. CRTs are severely affected by magnetic fields from the instruments.

Serial Ports

The Optiplex GX50 was the last Dell computer to have two serial ports installed by the factory. Subsequent models have only one serial port installed by the factory. Quantum Design accommodates the single serial port by using the IOGEAR GUC232A USB to Serial adapter. You will need to reinstall the driver if you change the adapter to a different USB port. Contact your local IT department if you need assistance with reinstallation.