

Computer Hardware Essentials III

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Preventive Maintenance and Troubleshooting

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Preventive maintenance

Preventive maintenance is a regular and systematic inspection, cleaning, and replacement of worn parts, materials, and systems. Preventive maintenance helps to prevent failure of parts, materials, and systems by ensuring that they are in good working order.

Troubleshooting

Troubleshooting is a systematic approach to locating the cause of a fault in a computer system. A good preventive maintenance program helps minimize failures. With fewer failures, there is less troubleshooting to do, thus saving an organization time and money. Preventive maintenance can also include upgrading certain hardware or software such as a hard drive that is making noise, upgrading memory that is insufficient, or installing software updates for security or reliability.

Troubleshooting is a learned skill. Not all troubleshooting processes are the same, and technicians tend to refine their troubleshooting skills based on knowledge and personal experience.

Purpose of Preventive Maintenance

Preventive maintenance reduces the probability of hardware or software problems by systematically and periodically checking hardware and software to ensure proper operation.

Hardware

- ☐ Check the condition of cables, components, and peripherals. Clean components to reduce the likelihood of overheating. Repair or replace any components that show signs of damage or excessive wear.

Use the following tasks as a guide to create a hardware maintenance program:

- ☐ Remove dust from fan intakes.
- ☐ Remove dust from the power supply.
- ☐ Remove dust from components inside the computer.
- ☐ Clean the mouse and keyboard.
- ☐ Check and secure loose cables.

Software

☐ Verify that installed software is current. Follow the policies of the organization when installing security updates, operating system updates, and program updates. Many organizations do not allow updates until extensive testing has been completed. This testing is done to confirm that the update will not cause problems with the operating system and software.

Use the tasks listed as a guide to create a software maintenance schedule that fits the needs of your computer equipment:

- ☐ Review security updates.
- ☐ Review software updates.
- ☐ Review driver updates.
- ☐ Update virus definition files.
- ☐ Scan for viruses and spyware.
- ☐ Remove unwanted programs
- ☐ Scan hard drives for errors.
- ☐ Defragment hard drives.

Benefits

- ❑ Be proactive in computer equipment maintenance and data protection. By performing regular maintenance routines, you can reduce potential hardware and software problems. Regular maintenance routines reduce computer downtime and repair costs.
- ❑ A preventive maintenance plan is developed based on the needs of the equipment. A computer exposed to a dusty environment, such as a construction site, needs more attention than equipment in an office environment. High-traffic networks, such as a school network, might require additional scanning and removal of malicious software or unwanted files. Document the routine maintenance tasks that must be performed on the computer equipment and the frequency of each task. This list of tasks can then be used to create a maintenance program.

The following are the benefits of preventive maintenance:

- ❑ Increases data protection
- ❑ Extends the life of the components
- ❑ Increases equipment stability
- ❑ Reduces repair costs
- ❑ Reduces the number of equipment failures

Identify the Steps of the Troubleshooting Process

- ☐ Troubleshooting requires an organized and logical approach to problems with computers and other components.
- ☐ A logical approach to troubleshooting allows you to eliminate variables in a systematic order.
- ☐ Troubleshooting is a skill that you will refine over time. Each time you solve another problem, you will increase your troubleshooting skills by gaining more experience.

The following troubleshooting process is a guideline that you can modify to fit your needs.

- ☐ Explain the purpose of data protection.
- ☐ Identify the problem.
- ☐ Establish a theory of probable causes.
- ☐ Test the theory to determine an exact cause.
- ☐ Establish a plan of action to resolve the problem and implement the solution.
- ☐ Verify full system functionality, and if applicable, implement preventive measures.
- ☐ Document findings, actions, and outcomes.

Preventive Maintenance

Preventive Maintenance

The act of a regularly scheduled check of the computer hardware or software to help ensure it continues to operate properly.

Creating Data Backup Discs

- ☐ You can use the CD or DVD burning software included on your PC to create backup discs of important information including personal files, e-mail messages, and Web site bookmarks. When writing data to a backup disc, you should use software that includes *write verification* functionality.
- ☐ This verification feature compares the data on your hard disk drive with the data copied to the disc to ensure it is an exact copy. Depending on your disc burning software, you may need to manually enable this feature.

Removing Unused Programs

- ☐ Click **Start**, and then click **Control Panel**.
- ☐ Double-click **Add or Remove Programs**. The Add or Remove Programs window opens.
- ☐ Select the program you want to remove, and click the **Change/Remove** button.
- ☐ Follow the onscreen instructions.

Running the Disk Cleanup Program

- ☐ The Disk Cleanup program frees up space on your hard disk drive by removing temporary and unused files .You can run Disk Cleanup manually, or you can set it up to run automatically.

Running Disk Cleanup manually

- ☐ Click **Start, All Programs, Accessories, System Tools**, and then click **Disk Cleanup**.
- ☐ Disc Cleanup searches for files to delete and calculates how much disk space can be saved.
- ☐ Choose the files to delete by placing a check mark in the check box next to the file types listed.
- ☐ Click **OK**, and then click **Yes** to finish deleting the selected files.

Scheduling Disk Cleanup to run Automatically

- ☐ Click **Start**, and then **Run**, and type the following into the open field (note there is a space between the *r* and the */*): *cleanmgr /sageset:100*
- ☐ Select the types of files that you want removed (for example, temporary files, Temporary Internet Files, and the files in the Recycle Bin).
- ☐ Click **OK** to save the settings.
- ☐ Click **Start, All Programs, Accessories, System Tools**, and then click **Scheduled Tasks**.

Scheduling Disk Cleanup to run Automatically Cont.

- ☐ Double-click **Add Scheduled Task** and then click **Next**.
- ☐ Select **Disk Cleanup** from the application list and then click **Next**.
- ☐ Accept the default task name or type a name for the task, select when the task is performed, and click **Next**.
- ☐ Select the time and reoccurrence (if available), and click **Next**. Disk cleanup may take a long time, so select a time when the PC is on but not in use.
- ☐ Enter your login name and password and click **Next**. If you do not have a password, leave the Password field blank and click **Next**.
- ☐ Select **Open advanced properties for this task when I click Finish** and click **Finish**.
- ☐ In the Run field of the Disk Cleanup window add */sagerun:100* at the end of the path.
For example: *C:\WINDOWS\system32\cleanmgr.exe /sagerun:100*
- ☐ Click **OK** and, if prompted, verify your password. Disk Cleanup runs at the time you have set.

Running the Disk Defragmenter Program

- ☐ When Windows stores files on your hard disk drive, it often divides them into multiple pieces (or *fragments*) so they fit into available space on the drive.
- ☐ When you attempt to open a fragmented file, it must be retrieved from more than one place, so the process takes more time.
- ☐ The Disk Defragmenter program groups the fragmented files together on your hard disk drive to improve PC performance.
- ☐ This does not affect the location of files and folders on your PC

NOTE: The Disk Defragmenter program may take a long time to complete. You can run it unattended overnight.

- ☐ Open the Windows Task Manager by pressing the Ctrl key, the Alt key, and the Delete key at the same time.
- ☐ On the Applications tab, select all the programs that are listed, and then click **End Task**. Close the Task Manager.
- ☐ Click **Start**, choose **All Programs, Accessories, System Tools**, and then click **Disk Defragmenter**.
- ☐ In the Volume column, select the hard disk drive you want to defragment (typically **C:**), and then click

Note: If Disk Defragmenter repeatedly starts, a hidden background program is still accessing the hard disk drive. Restart the PC in Safe Mode and run the Disk Defragmenter program again:

- ☐ Click **Start, Turn Off Computer**, and then **Restart**.
- ☐ Press the F8 key as soon as the first logo screen appears.
- ☐ On the Windows Advanced Options menu, use the arrow keys to select **Safe Mode** and press the Enter key.
- ☐ Press the Enter key again to select the operating system.
- ☐ Log on to Windows. When the Desktop message appears, click **Yes** to continue in Safe Mode.
- ☐ After Windows starts, use the previous procedure to run the Disk Defragmenter program.

Checking for Hard Disk Drive Errors

Perform the following procedure to check the integrity of the hard disk drive in Windows .
Close all open programs before beginning the disk check.

- ☐ Click **Start**, and then click **My Computer**.
- ☐ In the window that opens, right-click the hard disk drive that you want to check, and click **Properties**.
- ☐ In the Properties window, click the **Tools** tab.
- ☐ Under **Error-checking**, click **Check Now**.
- ☐ If desired, click the check box next to **Automatically fix file system errors** and **Scan for and attempt recovery of bad sectors**.
- ☐ Click **Start**. If prompted to restart, click **Yes** to restart the PC.

Maintenance Schedule

Daily

☐ *Manage e-mail*

- Delete e-mail from unknown sources.
- Do not open untrusted attachments.
- File e-mail.

Weekly

☐ *Protect against viruses, adware, and spyware*

- Update definition files or schedule a weekly automatic update.
- Run a full virus, adware, and spyware scan or schedule a weekly automatic scan.

☐ *Optimize performance*

- Run Disk Cleanup.(Running the Disk Cleanup Program
- Check for disk errors.
- Run Disk Defragmenter

☐ ***Optimize performance***

- Run Disk Cleanup.
- Check for disk errors.
- Run Disk Defragmenter.

☐ ***Optimize your browser***

- Delete cookies.
- Delete cache.
- Delete history files.

☐ ***Empty the Recycle Bin***

- This, and other cleanup tasks, can be performed with the Disk Cleanup program.

☐ ***Back up important files to CD or DVD***

Monthly

☐ ***Use Windows Update***

- Check for updates or schedule a monthly automatic update.

☐ ***Review the Start menu***

- Set to launch only needed applications.

☐ ***Clean up the desktop***

- Delete or uninstall unneeded icons and applications.

☐ ***Maintain overall condition***

- Check cleanliness.
- Make sure ventilation is unobstructed.
- Secure all connections and cabling.

☐ ***Create a Restore Point***

Quarterly (Seasonally)

- ☐ *Set new passwords*
- ☐ *Clean the PC, monitor, keyboard, and mouse*

PC Troubleshooting

Troubleshooting PC Problems

This section contains a series of tables that describe possible solutions to problems that may occur when using your PC. Each table contains:

Symptoms that describe the sign or warning message for the type of problem.
Possible solutions that describe what you should do to try to solve the problem.

The troubleshooting tables appear in the following order:

- Audio
- Video
- CD and DVD Drives
- Display (Monitor)
- Hard Disk Drive
- Hardware Installation
- Internet Access
- Keyboard and Mouse
- Power
- Performance
- Miscellaneous

Note: For additional information about monitor problems, or for problems relating specifically to your printer, refer to the documentation provided by the product's manufacturer.

Audio

Symptoms	Possible Solutions
No sound is produced.	Press the Mute button on the keyboard to see if the Mute feature is turned on. Or <ul style="list-style-type: none">▪ Click Start, and then click Control Panel.▪ Click Sounds, Speech, and Audio Devices, and then Sounds and Audio Devices.▪ Click the Mute check box to remove the check mark from the box.
	Click the task bar Volume icon, or use the keyboard controls to increase the volume.
	Ensure powered (active) speakers are turned on.
	Turn off your PC, and reconnect the speakers.
	Press the Standby button (select models only), or press the Esc key on the keyboard to resume from standby mode.
	Replace the passive speaker system with an active speaker system (sold separately). Active speakers have a power cord and On button and connect to the Audio Out (green) connector on the PC.
	Unplug headphones if they are connected to your PC.
Codec error messages appear when certain audio files are played.	<ul style="list-style-type: none">▪ Open the file in Windows Media Player. Ensure Windows Media Player is configured to automatically download codecs.▪ If the correct codec is available, the file will play. Note that you must be connected to the Internet to download the codec file.▪ If the correct codec is not available, check to see if there is an update available for Windows Media Player.▪ For more information, open Windows Media Player Help, and then search the online Help for codec.

Video

Symptoms	Possible Solutions
Some video files do not play.	Your file may be corrupt or in an unsupported format. Open the video file in a video editor such as WinDVD Creator, and then resave the file in a supported format.
Codec error messages appear when I play certain video files.	<p>Open the file in Windows Media Player. Ensure Windows Media Player is configured to automatically download codecs.</p> <ul style="list-style-type: none">▪ If the correct codec is available, the file will play. Note that you must be connected to the Internet to download the codec file.▪ If the correct codec is not available, check to see if there is an update available for Windows Media Player. For more information, open Windows Media Player Help, and then search the online Help for codec.
Files Needed To Display Video Are Missing or Corrupt error message appears.	<ul style="list-style-type: none">▪ Click Start, right-click My Computer, and then select Properties.▪ Click the Hardware tab, and then click Device Manager.▪ Click the plus sign (+) next to Sound, video and game controllers.▪ Double-click TV tuner (select models only).▪ Click the Driver tab, and then click Update Driver.▪ Select Install from a list or a specific location, and then click Next.▪ Remove the check mark from Search removable media.▪ Click Include this location in this search, and then click the Browse button.▪ Click the plus sign (+) in order, next to each of the following directories:<ul style="list-style-type: none">▪ My Computer▪ C:\▪ Drivers▪ Click OK, Next, and then click Finish after the drivers are updated.▪ Restart the PC.

CD and DVD

Symptoms	Possible Solutions
The CD or DVD drive cannot read a disc or takes too long to start.	Ensure the disc is inserted with the label facing up and centered in the tray.
	Wait at least 30 seconds to let the DVD drive determine the type of media.
	Clean the disc with a CD cleaning kit, available from most PC stores.
	The driver may be corrupted or outdated. Refer to Updating Drivers restoring and updating drivers.
I cannot remove a CD or DVD.	<p>Turn on your PC, and press the Eject button nearest the drive to open the tray.</p> <p>If you suspect a problem with the actual Eject button:</p> <ul style="list-style-type: none">▪ Click Start and then My Computer.▪ Right-click the CD or DVD drive you want to open.▪ Select Eject from the menu.
I cannot add data to a DVD.	Make sure you set the correct recording option (append or add data files) in your DVD burning software.
I cannot play a music CD on a home stereo.	Use a CD-R disc, not a CD-RW disc.
	Try a different brand of disc, or check to see if the brand of disc works with your stereo. Refer to the documentation that came with your stereo or CD player, and check the manufacturer's Web site.
	Use a CD instead of a DVD. Audio files on a DVD can be played on your PC, but you cannot create a music DVD to be played in a home CD player.
	Convert .mp3 or .wma audio files to .wav or .cda music files before burning them to a disc.

CD and DVD (Continued)

Symptoms	Possible Solutions
cannot create (burn) a disc.	Ensure the disc is inserted with the label facing up and centered in the tray.
	Verify that you are using the correct disc type (media) for the drive. Try a different brand of disc.
	Make sure the disc is clean and undamaged. If recording stopped during a recording session, the disc may be damaged; use a different disc.
	Use the correct type of disc for the type of files you are recording.
	When using a CD-R disc, make sure that it is blank when recording music and is blank or appendable (with space to add more data files) when recording data.
	Verify that you are using the correct disc type when making a copy of a disc. Some recording programs can record only to the same disc type as the source. For example, you can record a DVD only to a DVD+R/–R or a DVD+RW/–RW disc, and you can record a CD only to a CD-R or a CD-RW disc.
	Make sure the disc is in the correct drive and you specify the same drive in the CD or DVD recording software.
	Select a slower write speed for the recording drive, if it is available.
	The recording software may not let you add a track if it exceeds the available space on your disc. You can make space available by removing one or more tracks from the list before recording the files to disc.
	Close all software programs and windows before recording.

CD and DVD (Continued)

Symptoms	Possible Solutions
cannot create (burn) a disc.	Make sure you have enough space available on your hard disk drive to store a temporary copy of the content.
	If you are on a network, copy the files from a network drive to your hard disk drive first, and then record them to disc.
	Close all programs and windows and then restart your PC.
Titles of music tracks are not displayed for the CD.	The PC must be connected to the Internet for the artist, title, and track information to appear when playing music CDs. This information is not recorded on the disc. Track information may not be available for every CD.
An error message appears when capturing video.	You may need to select the capture device if your PC has both an analog and a digital video capture device. Refer to the Help menu in the video capture program to find out how to change the video device selection.
I cannot play a DVD movie on a DVD player.	Your DVD player cannot play video files recorded onto the DVD as data files. To play a movie properly, use a video recording program such as WinDVD. Some video files may be viewed on a PC, but not on a home DVD video player.

CD and DVD (Continued)

Symptoms	Possible Solutions
cannot create (burn) a disc.	Make sure you have enough space available on your hard disk drive to store a temporary copy of the content.
	If you are on a network, copy the files from a network drive to your hard disk drive first, and then record them to disc.
	Close all programs and windows and then restart your PC.
Titles of music tracks are not displayed for the CD.	The PC must be connected to the Internet for the artist, title, and track information to appear when playing music CDs. This information is not recorded on the disc. Track information may not be available for every CD.
An error message appears when capturing video.	You may need to select the capture device if your PC has both an analog and a digital video capture device. Refer to the Help menu in the video capture program to find out how to change the video device selection.
I cannot play a DVD movie on a DVD player.	Your DVD player cannot play video files recorded onto the DVD as data files. To play a movie properly, use a video recording program such as WinDVD. Some video files may be viewed on a PC, but not on a home DVD video player.

Display (Monitor)

Symptoms	Possible Solutions
Screen is blank, and monitor	Reconnect the power plug on the back of the monitor and the wall outlet.
	Press the On button on the front of the monitor.
Screen is blank.	Press any key or move the mouse to make the screen display visible again.
	Press the Standby button (select models only), or press the Esc key on the keyboard to resume from standby mode.
	Press the On button to turn on the PC.
	Inspect the monitor video connector for bent pins: If any of the pins are bent, replace the monitor connector cable. If no pins are bent, reconnect the monitor connector cable to the PC.
Images on the screen are too large or too small, or the images are fuzzy.	Adjust the monitor resolution setting in Windows: <ul style="list-style-type: none">▪ Right-click the desktop, and then select Properties.▪ Select the Settings tab.▪ Drag the Screen Resolution slider to adjust the resolution as needed.

Hard Disk Drive

Symptoms	Possible Solutions
PC seems to be locked up and not responding.	<p>Use the Windows Task Manager to close any programs not responding or to restart the PC:</p> <ul style="list-style-type: none">▪ Press the Ctrl key, the Alt key, and the Delete key on the keyboard at the same time.▪ Select the program that is not responding, and click End Task. <p>Or</p> <p>Click Shut Down, and then click Restart.</p> <p>If this does not work, press and hold the On button for 5 or more seconds to turn off the PC. Then, press the On button.</p>
Hard disk drive error message displays.	<p>Press the Help ? button on the keyboard to open the Help and Support Center, or refer to the Warranty and Support Guide to contact Support for replacement details.</p>

Hardware Installation

Symptoms	Possible Solutions
A new device is not recognized as part of the system.	Install the device driver from the CD provided with the device, or download and install the driver from the device manufacturer's Web site. You may need an updated driver for Windows. Contact the device vendor directly for an update.
	Ensure that the device is properly and securely connected and that the pins in the connector are not bent down.
	Ensure that all cables are properly and securely connected and that the pins in the cable or connector are not bent.
	Turn off the PC, turn on the external device, and then turn on the PC to integrate the device with the PC.
	Restart the PC, and follow the instructions for accepting the changes.
	Deselect the automatic settings in the operating system for the card, and choose a basic configuration that doesn't cause a resource conflict. You can also reconfigure or disable devices to resolve the resource conflict.
New device does not work.	You must be logged in as the computer administrator to install or uninstall a device driver. To switch users, click Start, click Log Off, and then click Switch User; choose the computer administrator user. (The computer administrator is usually the user Owner.)

Hardware Installation (Continued)

Symptoms	Possible Solutions
New or existing device does not work after installing a new device.	<p>To resolve a device conflict, you may need to disable one of the devices or uninstall an old device driver:</p> <ul style="list-style-type: none">▪ Click Start, and click Control Panel.▪ Click Performance and Maintenance.▪ Click the System icon, and select the Hardware tab.▪ Click Device Manager.▪ Click the plus sign (+) next to the problem device and check for exclamation points in a yellow circle near the device icon. The exclamation point means there is a device conflict or problem with the device. Exclamation points do not always appear when a device is not working properly.▪ If there is an old or unnecessary device driver listed in the Device Manager, this may be causing the device conflict. To uninstall the old driver for the new device driver to work properly, do the following: Right-click the device, click Uninstall, and then click OK.▪ Right-click the device, and select Properties.▪ If available, click the Resources tab to verify that there is a device conflict.▪ Click the General tab to see if your device is enabled and working properly. If it is available, click the Troubleshoot button, and follow the onscreen instructions in the device troubleshooter wizard.▪ Restart the PC. Click Start, click Turn Off Computer, and then click Restart.

Keyboard and Mouse

Symptoms	Possible Solutions
Keyboard commands and typing are not recognized by the PC.	Turn off the PC by using the mouse, reconnect the keyboard to the back of your PC, and then turn on your PC.
	Press the Help ? button on the keyboard to open the Help and Support Center, or refer to the Warranty and Support Guide to contact Support for replacement details.
Keyboard Print button does not work.	Use the Print menu item in the program (typically located on the File menu).
Wireless keyboard does not work after installation or is not detected.	<ul style="list-style-type: none">▪ Ensure the keyboard is within the range of the receiver.▪ Replace the batteries in the wireless keyboard.▪ Refer to the documentation that came with the keyboard.
Cursor does not respond to mouse movement.	<p>Restart your PC using the keyboard:</p> <p>Press the Alt and Tab keys on the keyboard at the same time to navigate to an open application.</p> <p>Press the Ctrl and S keys on the keyboard at the same time to save your changes in the selected application (Ctrl+S is the keyboard command for Save on most — not all — applications).</p> <p>After saving changes in all open applications, press the Ctrl and Esc keys on the keyboard at the same time to display the Start menu.</p> <p>Use the up arrow key to select Turn Off Computer, and then press the Enter key on the keyboard.</p> <p>Use the left and right arrow keys to select Turn Off, and then press the Enter key.</p> <p>After the shutdown is complete, disconnect and reconnect the mouse connector into the back of your PC, and then turn on your PC.</p>

Keyboard and Mouse (Continued)

Symptoms	Possible Solutions
Cursor responds slowly to mouse movement.	Use a mouse pad or other rough surface under the mouse.
Cursor does not move using the arrow keys on the keypad.	Press the Num Lock key. The Num Lock light should not be on if you want to use the arrow keys in the number keys group.
Cursor moves only vertically or horizontally (or does not move smoothly on the screen).	Remove the rollerball cover from bottom of mouse (rotate it counter-clockwise), remove the ball, and clean it with a damp, lint-free cloth (not paper). Also clean the rollers on which the ball moves.
Mouse does not work after installation or is not detected.	Unplug and reconnect the mouse cable to your PC.
Optical mouse does not track cursor well.	Place the mouse on a mouse pad or white sheet of paper, or gently wipe the light sensor lens on the bottom of the mouse with a lint-free cloth (not paper).

Keyboard and Mouse (Continued)

Symptoms	Possible Solutions
Cursor moves too fast or too slow.	Adjust the cursor speed: 1 Click Start, Control Panel, Printers and Other Hardware, and then Mouse. 2 Click the Pointer Options tab. 3 Adjust the Motion slider toward Slow or Fast to decrease or increase the speed at which the pointer (cursor) responds to mouse movement. 4 Click OK.

Power

Symptoms	Possible Solutions
PC will not turn on or start.	Ensure that cables connecting the PC to the external power source are plugged in properly.
	When the cables connecting the PC to the external power source are plugged in properly and the wall outlet is functioning, the green power supply light should be on; if the light is not on, refer to the Warranty and Support Guide to contact Support.
	Connect the monitor to the PC, plug it in, and turn it on.
	Set the line voltage selection switch to the correct setting for your country/region, or refer to the Warranty and Support Guide to contact Support.
	Test the outlet by connecting a different electrical device to the outlet.
	Reinstall the old memory to return your PC to its original state. Refer to the Upgrading and Servicing Guide for instructions.
	Press the Help ? button on the keyboard to open the Help and Support Center, or refer to the Warranty and Support Guide to contact Support for replacement details.
	Reseat drive power, data, and power supply cables. See the Upgrading and Servicing Guide for instructions.
PC does not respond or turn off when the On button is pressed.	Press and hold the On button until the PC turns off.

Power (Continued)

Symptoms	Possible Solutions
Invalid system disk or Non-System disk or disk error message displays.	When drive activity stops, remove the disk and press the spacebar. The PC should start up.
PC shut down automatically.	The PC is in an exceedingly hot environment. Let it cool down. Ensure PC air vents are not blocked and internal fan is running. Note that your PC may not have an internal fan.
	Refer to the Warranty and Support Guide to contact Support for replacement details. Note that your PC may not have an internal fan.
PC date and time display is incorrect.	The real-time clock (RTC) battery may need to be replaced. Battery life is approximately seven years. Before replacing the battery, try resetting the date and time in your operating system by using the Control Panel. If the problem persists, replace the battery. See the Upgrading and Servicing Guide for replacement instructions.

Performance

Symptoms	Possible Solutions
Applications and files take longer to open or respond.	<p>If you created multiple user accounts on your PC, make sure other users are not logged in. If there are multiple users logged in at one time, system resources must be shared among the multiple users.</p>
	<p>Run the Disk Cleanup program to delete unwanted files (including temporary Internet files, installed components and programs that you no longer use, and files in the Recycle Bin) from your hard disk drive:</p> <ol style="list-style-type: none">1 Click Start, All Programs, Accessories, System Tools, and then click Disk Cleanup.2 Select the drive on which you want to perform the cleanup.3 Choose the files to delete by placing a check mark in the check box next to the file types listed.4 Click OK, and then click Yes to permanently delete the files.
	<p>Run the Disk Defragmenter program to group fragmented files together on your hard disk drive and improve performance. This does not affect the location of files and folders on your PC.</p> <p>NOTE: The Disk Defragmenter program may take a long time to complete. It is a good idea to run it overnight. To run the Disk Defragmenter program:</p> <ol style="list-style-type: none">1 Open the Windows Task Manager by pressing the Ctrl key, the Alt key, and the Delete key at the same time.2 On the Applications tab, select all the programs that are listed, and then click End Task.3 Click Start, choose All Programs, Accessories, System Tools, and then click Disk Defragmenter.4 In the Volume column, select the hard disk drive you want to defragment (typically C:), and then click Defragment.

Performance (Continued)

Symptoms	Possible Solutions
Applications and files take longer to open or respond.	<p>Remove unused programs:</p> <ol style="list-style-type: none">1 Click Start, and then click Control Panel.2 Double-click the Add or Remove Programs icon. The Add or Remove Programs window opens.3 Select the program you wish to remove and click the Change/Remove or the Remove button. Follow the onscreen instructions.
Applications and files take longer to open or respond (continued).	<p>Check for hard disk drive errors:</p> <ol style="list-style-type: none">1 Close all open programs and windows.2 Click Start, and then click My Computer.3 Right-click the hard disk drive that you want to check, and then click Properties.4 In the System Properties window, click the Tools tab.5 Under Error-checking, click Check Now.6 If desired, select the buttons next to Automatically fix file system errors and Scan for and attempt recovery of bad sectors.7 Click Start. If prompted to restart, click Yes and allow the PC to restart.

Miscellaneous

Symptoms	Possible Solutions
Insufficient memory message displays.	Close all open programs, and then try the desired task again, or restart your PC (click Start, Turn Off Computer, and then Restart). If the message displays again, consider purchasing and installing additional memory.
Remote sensor is not receiving a signal from the remote control (select models only).	<div>1Click Start, right-click My Computer, and then select Properties.</div> <div>2 Click the Hardware tab, and then click Device Manager.</div> <div>3 Click the plus (+) sign next to Universal Serial Bus Controllers.</div> <div>4 If the eHome Infrared Receiver is listed under Universal Serial Bus Controllers, Windows is properly detecting the IR Receiver. If it is not listed, go to the next step.</div> <div>5 Unplug the end of the USB cable on the remote sensor from the PC and plug it into the same USB port.</div> <div>6 Disconnect all other USB devices, leave the remote sensor plugged in, and then restart the PC. Plug in other USB devices after the remote sensor appears in the Device Manager window.</div>

Miscellaneous (Continued)

Symptoms	Possible Solutions
Memory card reader (select models only) cannot read my memory card.	Do not insert or remove memory cards when the in-use light is flashing. To do so may cause data loss, or it may permanently damage the card reader.
	Some cards have a Read/Write or Security switch on the card. Make sure the switch is set to Write Enabled before attempting to write data to it.
	Make sure the amount of data you are storing has not exceeded the storage limit of the card.
	Make sure the memory card is one of the supported types: CompactFlash (1, 2, and Microdrive), Memory Stick, Memory Stick Pro, MultiMedia, Secure Digital, SmartMedia, or XD.
	Make sure the memory card is fully inserted into the correct slot.
	Inspect the ends of the memory cards for dirt or material closing a hole or spoiling a metal contact. Clean the contacts with a lint-free cloth and small amounts of isopropyl alcohol. Replace the memory card if necessary.

Internet Access

Symptoms	Possible Solutions
I cannot connect to the Internet.	Verify Internet settings, or contact your Internet Service Provider (ISP) for assistance.
	Reconnect the modem, verifying connections. Note that your PC may also have an Ethernet network interface (also called a network interface card, or NIC) that connects to a local area network (LAN). Although it looks similar to the modem connector, the RJ-45 Ethernet network connector is not the same. Verify that you are using the modem connector. Do not connect a telephone cable to the NIC. Do not plug a network cable into a telephone service line; doing so may damage the NIC.
	Verify that the Web browser is installed and set up to work with your ISP.
	Try to connect again later, or contact your ISP for assistance.
I cannot automatically start Internet programs.	Log in to your ISP, and start the desired program.
The AOL program comes up even when it is not being used.	You may want to remove the AOL program. To uninstall AOL: 1 Click Start on the taskbar. 2 Click Control Panel. 3 Double-click Add or Remove Programs. 4 Select America Online, click Change/Remove, and then follow the onscreen instructions. NOTE: Removing the AOL program will not cancel your account with AOL.

Internet Access (Continued)

Symptoms	Possible Solutions
Web pages load slowly.	<p>Verify that the correct modem speed and COM port are selected:</p> <ol style="list-style-type: none">1 Click Start, and then click Control Panel.2 Click Printers and Other Hardware, if it is present.3 Double-click Phone and Modem Options.4 Select the Modems tab, and then click the Properties button.5 In the Device status area, verify the modem is working properly.6 In the Device usage area, verify the modem is enabled.7 If there are further problems, click the Troubleshoot button, and follow the onscreen instructions. Note that Web pages do not always load as quickly as files stored on your PC. Web pages may also load slowly if there is a high demand for the Web site at that time.
Unwanted pop-up advertisements display on my PC when connected to the Internet.	<p>This is typically caused by adware or advertising-supported software. You can configure your Web browser to block pop-ups (available by clicking Tools and then Pop-up Blocker).</p> <p>To remove adware from your PC, use the antispyware/adware program included on your PC (select models only) or any number of available software programs that remove adware programs. Note that many of the popular antivirus programs have tools that scan for and remove adware from your PC.</p>

Internet Access (Continued)

Symptoms	Possible Solutions
My Internet browser home page changed to something I did not want.	<p>You may have spyware on your PC. Spyware is software that usually runs silently in the background on your PC, collecting and sending information about you and your use of the PC to another person or system on the Internet.</p> <p>You can find and remove spyware from your PC by using any one of a number of software programs available for this purpose. Many of the popular virus protection programs have some tools that scan for and remove spyware from your PC.</p> <p>To avoid getting spyware on your PC:</p> <ul style="list-style-type: none">• Do not install programs if you are not sure they come from reputable companies. Check the company's Web site very carefully for information about what is included with the program.• Do not automatically click Yes when a download window asks if it is OK to install a program on your PC. Read the message in the window and make sure it is a software program that you really want.

Repairing Software Problem

Repairing Software Problems

- ☐ Your PC uses the operating system and installed software programs during normal operation. If your PC works improperly or stops because of the software, you may be able to repair it.
- ☐ Some software repairs are as simple as restarting your PC, and others require performing a System Recovery from files on your hard disk drive.
- ☐ Your hard disk drive contains a System Recovery image that includes all the software files that were originally installed on your PC at the factory. In the unlikely event that you need to recover your system, it is easy to do so using this recovery image.
- ☐ Because all the necessary information is contained in the System Recovery image on your hard disk drive, recovery discs are not included in the accessory box.

NOTE: It is important that you perform the PC repair methods in the order described in this document.

Software Repair Overview

This section lists the available methods to fix your PC if you are experiencing software problems. Detailed instructions about each method are in the sections that follow. You must perform the procedures in the order listed here.

- ☐ Restarting your PC
- ☐ Turning off your PC
- ☐ Updating drivers
- ☐ Microsoft System Restore
- ☐ Application Recovery and Driver Recovery
- ☐ System Recovery

NOTE: If you are replacing a hard disk drive, you only have to run the System Recovery.

Software Repair Overview (Continued)

☐ Additionally, your PC may include a Software Repair Wizard (select models only). You can use this wizard to access many of the repair methods described in this chapter, including:

- ☐ Creating System Recovery discs
- ☐ Microsoft System Restore
- ☐ Application Recovery and Driver Recovery
- ☐ System Recovery

You can start the Software Repair Wizard by clicking **Start, All Programs, PC Help & Tools**, and then **Software Repair Wizard**.

Restarting Your PC

- ❑ Restarting is the simplest repair method for your PC. When you restart, the PC reloads the operating system and software into its memory.

To restart your PC:

- 1 Close all open programs and windows.
- 2 Click **Start**.
- 3 Choose **Turn Off Computer**.
- 4 Click **Restart**.

Turning Off Your PC

- ❑ When you turn off your PC and then turn it on again, you force the PC to reload the operating system into its memory, which clears some tracking information. This may eliminate some problems that can remain after performing a restart.

To turn off your PC:

- 1 Close all open programs and windows.
- 2 Click **Start**.
- 3 Choose **Turn Off Computer**.
- 4 Click **Turn Off**.
- 5 Start your PC by pressing the On button.

Updating Drivers

❑ A *driver* is a software program that allows your PC to communicate with an attached device, such as a printer, a hard disk drive, a mouse, or a keyboard. Complete the following procedure to update a driver, or to revert to an earlier version of the driver if the new one does not solve your problem:

1 Click **Start**, right-click on **My Computer**, and then click **Properties**. The System Properties window displays.

2 Click the **Hardware** tab, and then **Device Manager**. The Device Manager displays.

3 Click the plus sign (+) to expand the device whose driver you want to update or rollback, (for example, **DVD/CD-ROM drives**).

4 Double-click the specific item (for example, **HP DVD Writer 640b**), and then click the **Driver** tab.

5 Click **Update Driver** or **Rollback Driver**, and follow the onscreen instructions.

Microsoft System Restore

- ☐ Microsoft® Windows® includes a feature that allows you to restore your PC configuration to that of a previous time when a current software problem did not exist. The feature does this by creating a “restore point” where it records the PC settings at that time and date.
- ☐ When you add programs by clicking **Add New Programs** in the Add or Remove Programs window (accessed by clicking **Start, Control Panel**, and then **Add or Remove Programs**), the operating system automatically creates a restore point before it adds the new software. You can also set them manually.
- ☐ If you experience a problem that you think may be due to software on your computer, use System Restore to return the PC to a previous restore point.

WARNING: Always use this System Restore procedure before using the System Recovery program.

To start a System Restore

- 1 Close all open programs.
- 2 Click **Start**.
- 3 Choose **All Programs**.
- 4 Choose **Accessories**.
- 5 Choose **System Tools**.
- 6 Click **System Restore**.
- 7 Click **Next**.
- 8 Follow the onscreen instructions.

To manually add restore points

- 1 Close all open programs.
- 2 Click **Start**.
- 3 Choose **All Programs**.
- 4 Choose **Accessories**.
- 5 Choose **System Tools**.
- 6 Click **Create a Restore Point**.
- 7 Click **Next**.
- 8 Follow the onscreen instructions.

For more information about software restore points:

- 1 Click **Start**.
- 2 Click **Help and Support**. The Help and Support Center displays.
- 3 Type *system restore* into the Search box, and then click **Search**.

Application and Driver Recovery

- ❑ If an individual factory-installed driver or software program (also known as an *application*) accidentally gets erased or damaged, you can reinstall the software program using the HP Application Recovery program (select models only).

NOTE: To ensure your PC includes the program, perform steps 3 through 5 of the following procedure. If HP Application Recovery is listed in the PC Help & Tools folder, your PC includes the program.

NOTE: Do not use the Application Recovery program to reinstall software programs that came on CDs or DVDs included in the PC box. Reinstall these programs directly from the CDs or DVDs.

To start an Application Recovery or Driver Recovery

- ☐ Close all applications and folders (skip to step 3 if you are recovering a driver).
- ☐ Uninstall the damaged application:
 - Click **Start, Control Panel**, and then **Add or Remove Programs**.
 - Select the program you want to remove, and then click **Change/Remove**.
- ☐ Click **Start**.
- ☐ Choose **All Programs**.
- ☐ Choose **PC Help & Tools**.
- ☐ Click **HP Application Recovery**.
- ☐ Click **Application Installation** or **Driver Installation**, and then click **Next**.(7)
- ☐ Select the driver or application program to install, and then click **Install**.(8)
- ☐ Repeat steps 7 and 8 to install other drivers or applications.
- ☐ When you have finished recovering applications or drivers, close the Application Recovery program. Then click **Start, Turn Off Computer**, and then **Restart** to restart the PC.

WARNING: Do not skip this last step. You must restart the PC when you are finished recovering applications or drivers.

System Recovery Overview

- ❑ After you have tried the previously mentioned methods of repairing your system software, you can run the System Recovery program as a last resort to reinstall the operating system and the application software.

System Recovery provides two recovery options:

- ❑ **Standard Recovery** — This option recovers factory shipped programs, drivers, and the operating system without affecting any data files that you may have created since purchasing this PC. Some data files may be difficult to find after the System Recovery, so it is best to back up all hard disk drive files before performing a System Recovery.
- ❑ **Full System Recovery** — This option completely erases and reformats the hard disk drive — this includes deleting all data files you have created. The Full System Recovery reinstalls the operating system, programs, and drivers from the recovery image or discs. However, you must reinstall any software that was not installed on the PC at the factory. This includes software that came on CDs included in the PC accessory box, and software programs you installed since your purchase.

NOTE: If your PC has a blank or corrupted hard disk drive, you will see only the Full System Recovery option.

Creating System Recovery Discs

- ☐ Complete the procedure described in this section to create a set of system recovery discs from the recovery image stored on your hard disk drive. This image contains the operating system and software program files that were originally installed on your PC at the factory.
- ☐ You can create only one set of recovery discs for your PC. The recovery discs you create can only be used with your PC. After creating the recovery discs, you can delete the recovery image if you would like to make extra space available on your hard disk drive.

NOTE: Do not delete the recovery image unless you have made recovery CDs or DVDs.

Choosing Recovery Disc Media

There are several advantages to using DVDs instead of CDs when creating recovery discs:

- ☐ DVDs have a faster data transfer rate. DVD recovery discs restore the original data faster than CD recovery discs.
- ☐ DVD recovery discs take less time to create than CD recovery discs.
- ☐ DVDs have greater capacity than CDs, so there are fewer discs to record and store.

- ☐ To create recovery discs, your PC must have a CD or DVD writer drive, or other drive that can write to CDs or DVDs.
- ☐ The number of discs in the recovery disc set depends on your PC model. The program that creates the discs tells you the number of blank discs needed to make the set. The process takes some time, up to 15 minutes per disc, to verify that the information written on the disc is correct.
- ☐ You can quit the process at any time. The next time you run the program, it begins where you left off.

To create System Recovery discs

- 1 Close all open programs.
 - 2 Click **Start**.
 - 3 Choose **All Programs**.
 - 4 Choose **PC Help & Tools**.
 - 5 Click **HP PC Recovery CD-DVD Creator**. The Recovery CD/DVD Creator window appears.
 - 6 Follow the onscreen instructions. Label each disc as you make it (for example, Recovery 1, Recovery 2).
- Store the System Recovery discs in a safe place.

Creating a Recovery Tools CD

- ❑ In addition to System Recovery discs, you can create a Recovery Tools CD. The Recovery Tools CD can be used to:
 - Read instructions to use each utility on the Recovery Tools CD.
 - Start the System Recovery program from the recovery partition.
 - Remove the System Recovery partition from your PC hard disk drive to increase space for data.
 - Create a new data partition on your PC hard disk drive.
 - Start the Microsoft Recovery Console (a utility from Microsoft that can perform operating system diagnostics and repairs).

WARNING: Before using the PC Recovery Tools CD to change your hard disk drive, create System Recovery discs as described in the previous section. You cannot make System Recovery discs after you remove the System Recovery partition.

You must create a Recovery Tools CD before you can use any of these utilities.

To create or start the Recovery Tools CD:

- 1 Click **Start**.
- 2 Choose **All Programs**.
- 3 Choose **PC Help & Tools**.
- 4 Click **HP PC Recovery Tools CD**. The tools window appears.
- 5 Follow the onscreen instructions. Store the Recovery Tools CD in a safe place.

Running System Recovery from Recovery Discs

This section contains the procedure for performing a system recovery from the recovery discs you created

To run the System Recovery program using recovery discs:

- 1 If the PC works, create a backup CD or DVD containing all data files that you want to save. Remove the backup disc from the disc tray when you are finished.
- 2 Insert recovery disc #1 into the appropriate drive tray (CD or DVD), and close the tray.
- 3 Turn off the PC:
 - If the PC works: Click **Start, Turn Off Computer**, and then **Turn Off**.

Or

 - If the PC is not responding: Press and hold the On button approximately 5 seconds until the PC turns off.

4 Disconnect all peripheral devices from the PC except the monitor, the keyboard, and the mouse.

5 Disconnect or remove all external drives and remove the HP Personal Media Drive if your PC includes one.

6 Press the On button to turn on the PC.

7 The PC starts the recovery from the recovery disc. Follow the onscreen instructions when they are displayed.

- For standard System Recovery, press R. Choose **Next** to proceed with the System Recovery. Choose **Yes** to start the recovery. Insert the remaining recovery discs when directed.

Or

- For Full System Recovery, press F. Choose **Yes** to perform a Full System Recovery. Insert the remaining discs when directed.

Or

- If your PC hard disk drive is blank or corrupted, press R to perform a Full System Recovery. Insert the remaining recovery discs when directed.

WARNING: The Full System Recovery option deletes any data or programs that you created or installed after purchase. Be sure to back up any data that you want to keep onto a removable disc.

8 Insert the next disc if prompted.

9 When the recovery program finishes, remove the last disc.

NOTE: If the message *Please Insert Login Advanced Installation Disc Number 1 and Restart* is displayed at the end of a Full System Recovery, remove the recovery disc from the drive tray, and restart the PC. You do not need to insert the referenced disc.

10 Click **Restart** to restart the PC.

11 After the PC restarts, a series of startup screens appears. To proceed with the initial Microsoft Windows setup, you must answer a few questions.

12 Complete the PC startup, finish the registration process, and wait until you see the desktop. Then, turn off the PC, reconnect all peripheral devices, and turn on the PC.

13 Reinstall software not originally installed on the PC by the factory.

14 Copy data files from the backup disc to your hard disk drive.

Running System Recovery from the Hard Disk Drive

Choose one of the following procedures to reinstall the software from the recovery image on your hard disk drive:

- Starting System Recovery if the PC is responding
- Starting System Recovery if the PC is not responding

Starting System Recovery if the PC is responding

1 Turn off the PC. Remove the HP Personal Media Drive if your PC includes one. Disconnect all peripheral devices from the PC except the monitor, the keyboard, and the mouse. Turn on the PC.

2 Click **Start** on the taskbar, choose **All Programs**, choose **PC Help & Tools**, and then click **PC System Recovery**.

You are prompted to confirm that you have performed the Microsoft System Restore and Driver Rollback:

- If you have not performed the Microsoft System Restore and Driver Rollback, click **Microsoft System Restore**, and follow the onscreen instructions.
- If you have performed the Microsoft System Restore and Driver Rollback, click **Yes** to start the recovery process, and then continue with step 3.

3 Follow the onscreen instructions.

WARNING: The Full System Recovery option deletes any data or programs that you created or installed after purchase. Be sure to back up any data that you want to keep onto a removable disc.

4 Complete the PC startup, finish the registration process, and wait until you see the desktop. Then, turn off the PC, reconnect all peripheral devices, and then turn on the PC.

Starting System Recovery if the PC is not responding

- 1** Turn off the PC. If necessary, press and hold the On button until the PC turns off.
- 2** Remove the HP Personal Media Drive if your PC includes one. Disconnect all peripheral devices from the PC except the monitor, the keyboard, and the mouse.
- 3** Press the On button to turn on the PC.
- 4** During the startup, do the following to enter the System Recovery program:
When the blue screen with the HP Invent logo appears, press the F10 key on the keyboard. (You have only a few seconds to press the F10 key before the normal startup process continues.)
- 5** The PC starts the recovery; wait for the onscreen instructions to display, and then follow those instructions.

WARNING: The Full System Recovery option deletes any data or programs that you created or installed after purchase. Be sure to back up any data that you want to keep onto a removable disc.

- 6** Complete the PC startup, finish the registration process, and wait until you see the desktop. Then, turn off the PC, reconnect all peripheral devices, and turn on the PC.

Laser Printer Troubleshooting

Problem 1	White Stripes Appear. (Printed Text is Faint or Patchy)
Cause	The toner cartridge is running out of toner.
Resolution	Remove the toner cartridge and gentle rock it from side to side 5 or 6 times, then reinsert the cartridge. If the same problem persists, replace the toner cartridge with a new cartridge.

Problem 2	The overall printing is faint.
Cause 1	The [Toner Density] setting is not appropriate.
Resolution	Remove the toner cartridge and gentle rock it from side to side 5 or 6 times, then reinsert the cartridge. If the same problem persists, replace the toner cartridge with a new cartridge.
Case 2	[Use Toner Save] is selected.
Resolution	Remove the checkmark from [Use Toner Save] in the printer driver. In order to change the [Use Toner Save] setting, click the [Details] button in the [Quality] sheet to open the [Detailed Settings] dialog box.

Problem 3	The overall printing is dark.
Cause 1	The [Toner Density] setting is not appropriate.
Resolution	Drag the [Toner Density] slider in the printer driver toward [Light]. In order to change the [Toner Density] setting, click the [Details] button in the [Quality] sheet to open the [Detailed Settings] dialog box.
Cause 2	The printer is exposed to direct sunlight or strong light.
Resolution	Move the printer to a location that is not exposed to direct sunlight or strong light. Alternatively, separate the printer from the source of the strong light.

Problem 4	The front or back of printouts is stained with black dots.
Cause	The fixing unit is dirty
Resolution	Perform cleaning.

Problem 5	The paper comes out completely black.
Cause	The drum in the toner cartridge has deteriorated.
Resolution	Replace the toner cartridge with a new one.

Problem 6	One portion of a page does not print.
Cause 1	The scale factor is incorrect.
Resolution 1	Clear the checkmark from [Manual Scaling] in the printer driver. When this checkbox is cleared, the scaling factor is automatically determined based on the [Page Size] and [Output Size] settings. In order to update the [Manual Scaling] setting, open the [Page Setup] sheet.
Resolution 2	Place a checkmark next to [Manual Scaling] in the printer driver and specify an appropriate scale factor according to the paper size you are using. In order to update the [Manual Scaling] setting, open the [Page Setup] sheet.
Cause 2	The paper is loaded in the wrong position.
Resolution	Load the paper properly
Cause 3	Data was printed from an application with the margin settings set outside the printable area of the printer.
Resolution	The printable area of the printer is bounded by margins of 4 mm at the top, 6 mm at the bottom, and 5 mm on the left and right .Make sure you have made sufficiently large margins in your data.

Problem 7	The printing position is misaligned.
Cause	The [Top Margin] and [Paper Position] settings in the application are configured incorrectly.
Resolution	Update the [Top Margin] and [Paper Position] settings in the application.
Problem 8	The next page is printed from halfway through the previous page.
Cause	The [Line Spacing] or [Lines/Page] settings in the application are not configured correctly.
Resolution	Update the [Line Spacing] and [Lines/Page] in the application so that data fits onto one page and print again.
Problem 9	White dust is attached to the printed transparencies.
Cause	You printed the transparencies just after continuously printing on another type of paper.
Resolution	you print transparencies after printing continuously on normal paper, paper dust may adhere to the transparencies when they are output. If this is the case, use a soft cloth to wipe off the paper dust.

Problem 10	Nothing is printed on the paper.
Cause 1	The toner cartridge was installed with the sealing tape still attached.
Resolution	Remove the toner cartridge, pull away the sealing tape, and reinstall the cartridge.
Cause 2	Multiple sheets of paper are feeding at the same time.
Resolution	Thoroughly align the stack of paper and load it again.

Problem 11	The paper comes out completely black.
Cause	The drum in the toner cartridge has deteriorated.
Resolution	Replace the toner cartridge with a new one.

Problem 12	Paper comes out wrinkled.
Cause 1	Paper is loaded in the multi-purpose tray or manual feed tray at an angle.
Resolution	Load the paper in the multi-purpose tray or manual feed tray straight.
Cause 2	The paper is damp.
Resolution	Replace the paper with paper from a new ream.

Problem 13	Printed pages have white specks.
Cause 1	The paper is inappropriate.
Resolution	Replace the paper with one of the usable paper types and print again.
Cause 2	The paper is damp because it was stored in poor conditions.
Resolution	Replace the paper with new paper and print again.
Cause 3	The drum in the toner cartridge has deteriorated.
Resolution	Replace the toner cartridge with a new one.

Problem 14	The paper curls.
Cause 1	The paper is inappropriate.
Resolution	Replace the paper with paper that can be used with this printer.
Cause 2	The [Paper Type] setting does not match the loaded paper.
Resolution	Set the [Paper Type] in the printer driver to [Plain Paper L]. In order to change the [Paper Type] setting, open the [Paper Source] sheet.

Inkjet Printer Troubleshooting

Problem	Prints garbage
Cause	This usually happens because the wrong printer driver is installed.
Resolution	Re install The printer driver

Problem	No response from printer; computer gives error message
Cause	Check that cables are properly connected and look for an Online or Select button to press on the printer. Many PC printers require an IEEE 1284 cable, which is different from the standard bidirectional parallel cable. Likewise, printers for older Macintoshes require either a serial cable or a Local Talk cable. Consult your manual to find out what cabling you need.
Resolution	Re install Port Driver and check/change the cable

Problem	Print head cannot travel its full horizontal distance
Cause	Open the cover and make sure there is nothing obstructing the movement of the print head. Obstructions can result if you haven't removed some of the packaging, or if there is a paper jam. If this is a new printer, remember that you must remove the safety tape, which is put there to prevent the print head from slamming back and forth during shipping.
Resolution	Check the paper piece or any pins or clean dust in the head Moving assembly

Problem	Acts like it is printing but puts no ink on the page
Cause	There is no ink cartridge installed. In many cases, this is a separate item from the print head assembly, which is already installed in the printer from the factory.
Resolution	Install the ink cartridge or check the cartridge having ink or empty

Problem	Text has wrong print attributes (e.g., bold text not printed as bold)
Cause	This usually happens because the wrong printer driver is installed. See information above about drivers.
Resolution	Re installed the driver

Problem	Parts of characters missing, or characters not correct color
Cause	The ink cartridge is either clogged or running out of ink. Run the software cleaning utility (almost always accessible from the printer) in order to fix a clog. Replace the ink cartridge if the clog cannot be fixed or if the cartridge is almost empty.
Resolution	Replace the cartridge or cleaning the cartridge nozzle

Problem	Text is faded
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Cause	One or more of the inkwells in the print cartridge is almost empty. Unless your printer's ink cartridge can have individual colors replenished, this usually means you need to replace the whole cartridge.
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Resolution	Check the cartridge or replace it
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Problem	Printout is smeared
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Cause	The paper is mismatched to the paper setting for the printer. For example, if you are using high-quality photo paper, set the printer's output for that paper; do not use the plain paper setting.
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Resolution	Change the paper settings of the printer
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Problem	Paper jams often
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Cause	The feeder bin or tray may be overloaded.
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Resolution	Excess humidity may be causing pages to stick together; in that case, remove all sheets and use only as much as needed. The paper may have already been through the printer; the feeding process tends to warp and thicken areas of the page by bunching it up. Try not to use paper that's already been fed through the printer.
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Dot Matrix Printer Troubleshooting

Control Panel LED Does Not Light On.

Cause	Check point	Solution
Blowout of a fuse on the power board.	Is a fuse on the power board blew out?	Check the electric circuit and printer mechanism. If there is no short circuit, replace the fuse.
Connector is not connected to the power board.	Are connectors connected to the power board properly?	Replace the power board.
Power switch is defective.	Is conductivity of the switch is OK?	Replace the power board.
Power board is defective.	Are +5VDC and +35VDC OK when the power is on?	Replace the power board.
Main board is defective.	-	Replace the main board.
Control panel harness is not connected properly.	Is the harness of the control panel connected properly?	Connect the harness properly.
Control panel board or harness is defective.	-	Replace the control panel.

Printer Mechanism Does Not Operate.

Cause	Check point	Solution
Any of CN3 to CN12 is not connected to the main board properly.	Are all connectors connected properly?	Connect them properly.
Main board is defective.	-	Replace the main board.
Printer mechanism is defective.	-	Replace the printer mechanism.

Control Panel and Switches Do Not Operate.

Cause	Check point	Solution
Switch is defective.	Is conductivity of the switch is OK?	Replace the control panel.
Connect the control panel harness.	Control panel harness is connected properly?	Connect it properly.
Control panel board is defective or the harness is defective.	-	Replace the control panel.

Self Test Print is Abnormal.

Cause	Check point	Solution
Any of CN3 to CN12 is not connected to the main board properly.	Are all connectors connected properly?	Connect them properly.
Print head driver is defective.	-	Replace the main board.
Bi-d is not correct.	Are rows aligned properly when bidirectional Printing is proceeded?	Adjust Bi-D.
Print head is defective.	Is there any dot missing?	Replace the print head.
Head FFC is not connected properly or broken.	-	Replace the head FFC.
Platen gap is not correct.	Is printing too light / weak? / Is there any dirt on printed documents?	Adjust the platen gap.
Ribbon mask is defective.	Is there any dirt on printed documents?	Replace the ribbon mask.

Self Test Print is Abnormal.

Cause	Check point	Solution
Ribbon mechanism is defective.	Is ribbon advanced properly?	Replace the ribbon mechanism parts.
Printer mechanism is defective.	-	Replace the printer mechanism.

Printing Operation is Abnormal When it is On-Line.

Cause	Check point	Solution
Initial setting is wrong.	Check the initial setting with the default setting. Is it OK?	Reset the setting or use the EEPROM clear to reset setting to the default.
Interface cable is not connected properly.	Are cables connected properly?	Connect them properly.
Interface cable is defective.	-	Replace the interface cable.
Main board is defective.	-	Replace the main board.
Firmware is defective.	Is the firmware version latest?	Replace the firmware.

Paper Feed is Abnormal.

Cause	Check point	Solution
RPE detector or BPE detector is defective or not connected properly.	Check the sensors.	Replace the sensor.
	Is there any abnormality?	Check the connection to the main board.
Paper switching mechanism is defective.	Switch the release lever. Is the paper loading direction switched?	Replace the printer mechanism or check the connection.
	Can the release lever be switched?	Replace the release sensor or check the connection.
Printer mechanism paper loading mechanism is defective.	When the power is off, can the printer feed paper by rotating the platen knob manually?	Replace the printer mechanism or paper loading mechanism parts.
PF motor is defective.	Is PF motor normal?	Replace the PF motor.
PF motor driver is defective.	-	Replace the PF motor.

When Power is Applied, the Printer Becomes Fatal Error.

Cause	Check point	Solution
CR motor harness is not connected properly.	Is CR (Carriage Motor) motor harness CN10 connected properly?	Connect it properly.
CR motor is defective.		Replace the CR motor.
HP detector harness is not connected properly	Is HP (Carriage Home Position) detector harness CN3 connected properly?	Connect it properly.
HP detector is defective.	-	Replace the HP detector.
Power board is defective.	Is power voltage normal?	Replace the power board.
-	-	Replace the main board and printer mechanism.

Scanner Troubleshooting

Basic Troubleshooting Tips

- ❑ Simple issues such as smudges on the scanner glass or a loose cable can cause your scanner to produce fuzzy scans, operate in an unexpected manner, or fail to operate. Always check the following items when you encounter scanning problems.
 - If scans are fuzzy, check to see if the scanner glass is dirty or smudged. If so, clean the glass.
 - If you are scanning a document using an optical character recognition (OCR) shortcut, make sure that the original document is clear and crisp enough to be scanned.
 - Make sure that the USB cable is securely connected between the scanner and the computer.
 - If you have connected the scanner to the computer through a USB hub or through a USB port on the front of the computer, disconnect the scanner and then reconnect it to a USB port on the back of the computer.
 - Restart the computer.

- If a program has frozen, close it.
 - Windows: Press and hold CTRL, ALT, and DELETE to open the Windows Task Manager dialog. In the Applications tab, select the application to shut down, and then click End Task.

Scanner Installation Troubleshooting

This section provides solutions for installation and setup problems.

- Check the USB cable
- Uninstall and then reinstall the software (Windows only)
- ❑ Check the USB cable
 - The USB cable is connected between the scanner and the computer.
 - Use the cable that was included with the scanner. Another USB cable might not be compatible with the scanner.
 - Ensure that the USB cable is securely connected between the scanner and the computer.
 - If the USB cable is connected to a USB port on the front of the computer, move it to a USB port on the back of the computer.

Uninstall and Then Reinstall the Software

- ❑ An incomplete software installation could cause the scanner not to be recognized or the software not to launch correctly. Try uninstalling and then reinstalling the scanning software. To reinstall the scanning software, you must have the scanning software CD.
1. Click Start > Control Panel.
 2. Do one of the following:
 - Windows XP: Click Add or Remove Programs, select scanner software (HP/Canon/Epson), and click Remove.
 - Windows Vista and 7: Click Programs and Features or Uninstall a program, select scanner software((HP/Canon/Epson), and click Uninstall.
 3. Unplug the scanner USB cable from the computer.
 4. Reinstall the software, using the HP scanning software CD that came with your scanner.
 5. Reconnect the scanner USB cable when prompted by the software.

Scanner Initialization or Hardware Problems

❑ If the scanner does not work after installation or if the scanner has stopped working correctly, you might see a message on the computer screen that is similar to one of the following:

- The scanner could not be initialized.
- The scanner could not be found.
- An internal error has occurred.
- The computer cannot communicate with the scanner.
- The scanner is not listed and therefore unavailable for the user to select for scanning.

Solutions : Scanner Initialization or Hardware Problems

Solution I : Reset the Scanner

If you receive an error message similar to “Scanner initialization failed” or “Scanner not found” when trying to use the scanner, use the following procedure:

- ☐ Close the scanning software, if it is open.
- ☐ Disconnect the cable that connects the scanner to the computer.
- ☐ Reconnect the cable that connects the computer and the scanner.
 - Make sure that you are using the USB cable that came with the scanner.
 - Make sure that the USB cable is connected to the back of the scanner correctly. The USB symbol on the end of the cable (the connector) should be facing up. When connected correctly, the USB connector will feel slightly loose. When connected incorrectly, the USB plug will feel overly tight.
 - Try connecting the USB cable to a different USB port on your computer. If the USB cable is connected to a port on the front of the computer, move it to a port on the back of the computer.
- ☐ Turn the computer off, wait 60 seconds, and then turn the computer on again.

Solution II : Test the Scanner Hardware

- ❑ If you think that the scanner has a hardware problem, verify that the USB cable is firmly connected to the scanner and the computer.
- ❑ If the cable is correctly connected, test the scanner using the following procedure:
 - Disconnect the USB cable from the scanner.
 - Reconnect the USB cable to the scanner.
 - The carriage on the scanner will move forward and backward approximately 10 mm (0.39 inch).
 - If the carriage does not move, a problem might exist with the scanner hardware. Proceed with the next section.

Solution III: Scanner Has Stopped Working Properly

❑ If the scanner stops scanning, complete the following steps, in order. After each step, start a scan to see if the scanner is working. If the problem continues, proceed with the next step.

- Ensure that the USB cable is securely connected.3
- Turn the scanner off by disconnecting the USB cable and then reconnecting it to the scanner and the computer.
- Restart your computer.
- Uninstall and then reinstall the scanner software.

Scanner Buttons are Not Working Correctly

- ❑ After each step, start a scan to see if the buttons are working. If not, proceed with the next step.
 - Ensure that the USB cable is securely connected.
 - Turn the scanner off by disconnecting the USB cable and then reconnecting it to the scanner and the computer.
 - If you are using Mac, make sure all scanning applications are closed. The scanner buttons are only enabled when another scanning application is not open.
 - Restart your computer.

Scanner Buttons are Not Working Correctly

Follow the instructions to check the scanner properties:

1. Click Start > Control Panel.
2. Select the scanner:
 - Windows XP and Vista: Click Scanners and Cameras, and then select your scanner model from the list.
 - Windows 7: Click Devices and Printers or View devices and printers, and then select your scanner model.
3. Right-click your scanner model, and then click Properties.
4. Examine the buttons setting for your scanner:
 - Windows XP and Vista: Ensure the Take No Action option is not selected.
 - Windows 7: Click Hardware > Properties > Driver, and ensure the Disable button is not selected.

Scanner Glass Needs to be Cleaned

Clean the scanner glass under the following conditions:

- Ink is on the glass.
- Fingerprints are on the glass.
- Items have excessive amount of dust or dirt on them.
- Smudges or other marks appear on scanned images.
- Haze or dust is on the glass.

Note: Allow the glass to dry thoroughly before scanning another image.

Problems and Solutions

Symptoms	Solution
Release the lock switch	<ul style="list-style-type: none">▪ The scanner may be locked.▪ Exit the application, then unlock the scanner, and then reconnect the USB cable.
Scanner Does Not Work	<ul style="list-style-type: none">▪ Connect the USB cable to a different USB port on the computer.▪ If the USB cable is connected to a USB hub, remove it from the USB hub and connect it to a USB port on the computer.▪ Restart the computer.
Scan Gear Does Not Start	<ul style="list-style-type: none">▪ Make sure that Scan Gear (scanner driver) is installed.▪ Select your scanner on the application's menu.▪ Make sure that the application supports TWAIN.▪ Scan and save images with IJ Scan Utility and open the files in your application. <p>Note:</p> <ul style="list-style-type: none">▪ The operation may differ depending on the application.▪ Use the WIA driver when scanning from a WIA-compliant application.

Symptoms	Solution
Error Message Appears and the Scan Gear Screen Does Not Appear	<ul style="list-style-type: none"> ▪ Connect the USB cable to a different USB port on the computer. ▪ If the USB cable is connected to a USB hub, remove it from the USB hub and connect it to a USB port on the computer. ▪ Make sure that Scan Gear (scanner driver) is installed. ▪ Your scanner may be locked. ▪ Select your scanner on the application's menu. ▪ Make sure that the application supports TWAIN. ▪ Exit ScanGear if it is running on another application.
Scanner Buttons Do Not Work	<ul style="list-style-type: none"> ▪ Reinstall the required applications from the Setup CD-ROM or the web page. ▪ To use the COPY button, install the printer driver for your printer. ▪ To use the COPY button, check that your printer operates properly. ▪ To use the SEND button, install a compatible application or e-mail client. ▪ The IJ Scan Utility screen may be hidden behind other windows. ▪ Applications may not be assigned to the scanner buttons.

Symptoms	Solution
Cannot Scan Multiple Items at One Time	<ul style="list-style-type: none"> Make sure that the items are placed correctly. Check if you can properly scan one item.
Cannot Scan Properly with Auto Scan	<ul style="list-style-type: none"> Make sure that the items are placed correctly. Multiple items scanning may not be supported.
Slow Scanning Speed	<ul style="list-style-type: none"> To view the image on a monitor, set the output resolution to around 150 dpi. To print, set it to around 300 dpi. Set Fading Correction, Grain Correction, etc. to None. In IJ Scan Utility, deselect the Correct slanted text document / Detect the orientation of text document and rotate image checkbox and scan again.
There is not enough memory. Message Is Displayed	<ul style="list-style-type: none"> Exit other applications and try again. Reduce the resolution or output size and scan again.
Computer Stops Operating during Scanning	<ul style="list-style-type: none"> Restart the computer, reduce the output resolution in ScanGear (scanner driver) and scan again. Delete unnecessary files to obtain sufficient free hard disk space, then scan again. In Folder to Save Temporary Files of IJ Scan Utility, specify a folder on a drive with sufficient free space. Multiple devices may be connected to USB ports.

Drum/Sheet Fed Scanner Troubleshooting

Paper Jam

- ❑ When your document is jammed inside the scanner, remove the document in the following procedure.
 - Remove all documents from the ADF paper (feeder).
 - Open the ADF.
 - Remove the jammed document.
 - Close the ADF.

ATTENTION

- Make sure to check the documents and the paper path thoroughly. Remove any metal objects such as staples and paper clips to prevent paper jams.
- Be careful not to damage the glass surface and the guides when removing documents with metal objects such as staples or paper clips.
- Confirm that the ADF is closed properly. Otherwise, the document may not be fed into the ADF.
- Occasionally when scanning is complete or canceled, documents may remain in the ADF without any error message displayed. In that case, remove the documents by following the above steps.

Problems and Solutions

Problem	Solutions
Paper Protection Remove and check the document, and then try again carefully.	<ul style="list-style-type: none"> Remove the jammed document. Check if the document is suitable for scanning by ADF. Press the [Menu] button on the operator panel, select whether to enable or disable the document protection function, and then press the [Scan/Enter] button or perform a scan from the computer.
Paper Protection Remove and check the document, and then try again carefully.	<ul style="list-style-type: none"> Remove the jammed document. Make sure that there is no document that is folded and that the documents conform to the paper specifications (e.g. thin paper). Press the [Menu] button on the operator panel, select whether to enable or disable the document protection function, and then press the [Scan/Enter] button or perform a scan from the computer.
Optical error (ADF Front) If the problem persists after turning the power back on, please inform your service provider of the above error code.	<ul style="list-style-type: none"> Clean the glass section. Turn the scanner off then back on. If the problem persists, write down the displayed error code and contact your service provider.

Problem	Solutions
<p>Multifeed detected (Overlap) Press the Scan button to eject the document. After ejecting the document, multifeed detection for the next document can be enabled/disabled from the Menu button.</p>	<ul style="list-style-type: none"> ▪ Press the [Scan/Enter] button on the operator panel to eject the documents. ▪ Press the [Menu] button on the operator panel, select whether or not to detect multifeed, and then press the [Scan/Enter] button or perform a scan from the computer.
<p>Multifeed detected (Overlap) Press the Scan button to eject the document.</p>	<ul style="list-style-type: none"> ▪ Press the [Scan/Enter] button on the operator panel to eject the documents. ▪ Press the [Scan/Enter] button on the operator panel or perform a scan from the computer.
<p>Sensor(s) dirty Clean the Pick Sensor.</p>	<ul style="list-style-type: none"> ▪ Open the ADF and clean the eight document sensors.
<p>Sensor(s) dirty Clean the READ-TOP Sensor.</p>	<ul style="list-style-type: none"> ▪ Open the ADF and clean the eight document sensors.
<p>FB carrier error Unlock the transport lock switch.</p>	<ul style="list-style-type: none"> ▪ Unlock the transport lock switch.
<p>Motor circuit error</p>	<ul style="list-style-type: none"> ▪ Turn the scanner off then back on. If the problem persists, write down the displayed error code and contact your scanner Service provider

Plotter Troubleshooting

Problems and Solutions

Symptom	Possible Cause	Solution
Nothing is displayed on the LCD panel.	There is no power supplied. Or, the plotter is defective.	<ul style="list-style-type: none"> Check that the power cord is securely connected to the plotter's AC line inlet and the electrical outlet. Check that the power is supplied to the electrical outlet. Contact your customer center if the problem still exists.
Drops the media while detecting.	Bright light might be shining onto the media sensor.	<ul style="list-style-type: none"> Block the light if there is direct sunlight shining on the plotter that is placed near the window. Move away the fluorescent lamps if there is one close to the plotter.
Corners are rounded. Corners are too sharp.	Blade and OFFSET does not match.	Change the OFFSET.
The cut line starts out crooked.	The blade inside the plunger doesn't turn smoothly.	The blade inside the plunger doesn't turn smoothly.

Symptom	Possible Cause	Solution
The blade skips and does not completely cut lines that should be solid. Straight cut lines seems to wobble.	<ul style="list-style-type: none"> ▪ The blade is extended too far. ▪ The cutting speed is too high. 	<ul style="list-style-type: none"> ▪ Lower the speed setting. ▪ Adjust the software's resolution setting.
Abnormal noise generated from the tool carriage during cutting. The media is discolored where the blade has passed.	Media is rubbed by the tip of the tool plunger.	Adjust the blade length and the cutting FORCE settings.
Characters or lines are deformed during pen plotting.	The plotter is in cutting mode.	Select PEN as the tool in the CONDITION setting.
Characters are deformed. Complex drawings are deformed.	The STEP PASS setting is set too high.	Lower the STEP PASS setting.
The starting and end points of cutting do not match.	<p>Coordinate points are incorrectly specified.</p> <p>The media backing is too flimsy.</p> <p>Blade rotation is not smooth.</p>	<p>Check the coordinate data by plotting it with a pen.</p> <p>Switch to a media with a stronger backing.</p> <p>Check that there is no dirt in the blade.</p>

Problems and Solutions

Problem	Solution
Is the power switched on?	Make sure the power button is illuminated. If the power button is dark, press it to switch on the power.
Is the power cord connected correctly?	If it is not connected correctly, refer to the page indicated below and connect it properly.
Is material loaded?	Check and make sure of the following two points. <ul style="list-style-type: none">• The loading lever is raised.• The display shows the cutting conditions or the width and length.
Is the cable used for the connection to the computer connected correctly?	If it is not connected correctly, refer to the page indicated below and connect it properly.
Are the settings for the driver correct?	Make sure the communication port is set correctly.
Is the loading lever lowered?	The material is not secured in place. Make sure the pinch rollers are inside the edges of the material and inside the areas of the pinch-roller position-verification marks, then raise the loading lever.

Problem	Solution
Is the material making contact somewhere while cutting is in progress?	<ul style="list-style-type: none"> Make sure the edges of the material do not touch the inner surfaces of the machine during cutting. Such contact may not only damage the material, but may make normal material feed impossible or cause the positioning of the material to slip.
Are the blade and blade holder securely mounted?	Make sure the screw is tightened securely.
Is the tip of the blade broken?	If the blade tip is broken, then replace the blade with a new one.
Is there any buildup of dust or material adhesive on the tip of the blade?	Check if there are any dirty deposits on the blade. If dirty, remove and clean the blade.
Is there any buildup of pieces of material or dust inside the blade holder?	Take off the tip of the blade holder and remove any pieces of material inside.
Is the blade force appropriate for the material being cut?	Carry out a cutting test and adjust the blade force until cutting can be performed without problem.

Computer Virus

Virus

A computer virus is a program that may disturb the normal working of a computer system

- Virus attaches itself to files stored on floppy disks, USBs, email attachments and hard disks.
- A file containing a virus is called infected file. If this file is copied to a computer, virus is also copied to the computer.

Damages caused by virus

- ☐ Computer virus cannot damage computer hardware. IT may cause many damages to a computer system.
 - A computer virus can damage data or software on the computer.
 - It can delete some or all files on the computer system.
 - It can destroy all the data by formatting hard drive.
 - It may display a political or false message very few times.

Different Virus Expressions

❑ ***Virus***

A computer virus is a piece of software that can 'infect' a computer, install itself and copy itself to other computers, without the users knowledge or permission. It usually attaches itself to other computer programs, data files, or the boot sector of a Hard drive.

❑ ***Malware***

Malware is short for **malicious software**. Malware is the name given to any type of software that could harm a computer system, interfere with and gather a user's data, or make the computer perform actions without the owner's knowledge or permission.

❑ ***Trojan horse***

A type of malware that uses malicious code to install software that seems ok, but is hidden to create back doors into a system typically causing loss or theft of data from an external source.

Different Virus Expressions Cont.

☐ ***Worm***

Unlike a virus, a worm, is a standalone piece of malicious software that replicates itself in order to spread to other computers. It often uses a computer network to spread itself, relying on security flaws on the target system to allow access.

☐ ***Spyware***

Spyware is software that aids in gathering information about a person or organization without their knowledge, they can monitor and log the activity performed on a target system, like log key strokes, or gather credit card and other information.

☐ ***Adware***

Adware is software which can automatically causes pop-up and banner adverts to be displayed in order to generate revenue for its author or publisher. A lot of freeware will use Adware but not always in a malicious way, if it was malicious, it would then be classed as spyware or malware.

Causes of Computer Virus

Infected Flash Drives or Disks

- Flash drives and disks are the main cause of spreading viruses. Flash drives and disks are used to transfer data from one computer to other.
- A virus can also be copied from one computer to other when the user copies infected files using flash drives and disks.

Email Attachments

- Most of the viruses spread through emails. Email attachment is a file that is sent along with an email. An email may contain an infected file attachment.
- Virus can spread if the users opens and downloads an email attachment. It may harm the computer when it is activated.
- It may destroy files on the hard disk or may send the virus automatically to all email addresses saved in the address book.

Causes of Computer Virus Cont.

Infected / Pornography websites

- Thousands of insecure websites can infect computer with viruses. Most of the websites with pornographic materials are infected, so by visiting these websites the user's computer also gets infected by virus.
- These websites are developed to spread viruses or other unethical material.
- The virus is transferred to the user's computer when this material is downloaded. These websites may access the computer automatically when the users visit them.

Networks

- Virus can spread if an infected computer is connected to a network. The internet is an example of such network.
- When a user downloads a file infected with virus from the internet, the virus is copied to the computer. It may infect the files stored on the computer.

Causes of Computer Virus Cont.

Pirated Software

- An illegal copy of software is called pirated software. Virus can spread if user installs pirated software that contains a virus.
- A variety of pirated software is available in CDs and from the internet. Some companies intentionally add virus in the software.
- The virus is automatically activated if the user uses the software without purchasing license.

Types of Computer Virus

☐ CodeRed

It is a worm that infects a computer running Microsoft IIS server. This virus launched DOS attack on White House's website.

It allows the hacker to access the infected computer remotely.

☐ Nimba

- It is a worm that spreads itself using different methods. IT damages computer in different ways.
- It modified files, alters security settings and degrades performance.

☐ SirCam

- It is distributed as an email attachment. It may delete files, degrade performance and send the files to anyone.

☐ Ripper

- It corrupts data from the hard disk.

Types of Computer Virus Cont.

☐ Melisa

- It is a virus that is distributed as an email attachment.
- It disables different safeguards in MS Word. It sends itself to 50 people if Microsoft Outlook is installed..

☐ MDMA

- It is transferred from one MS Word file to other if both files are in memory.

☐ Concept

- It is also transferred as an email attachment. It saves the file in template directory instead of its original location.

☐ One_Half

- It encrypts hard disk so only the virus may read the data. It displays One_Half on the screen when the encryption is half completed.

Dangerous Computer Viruses

❑ Boot Sector Virus

- When it comes to the ordinary user perspective, this type of virus is one of the most dangerous ones out there. Their infection spreads on the master boot record. This means that they're not easy to remove, often resulting in a full system reformat.
- This proves especially true when the virus encrypts the computer's boot sector and damages the code. The great thing about technological advances is that the BIOS architecture of newer PC units reduced its effectiveness over the past years.
- In any case, you're liable to get this virus with the use of removable media like USB flash disks or hard drives.

Dangerous Computer Viruses Cont.

❑ Direct Action Virus

- When it comes to these types of viruses, direct action viruses infect your files and are one of the two main types of computer virus that does this. It doesn't hide in your computer's memory nor install itself. The way it works is through particular file types like EXE or COM, which they attach into.
- Once you click on the infected file, it becomes active. It then looks for other files in the infected file's location so it can spread more. While it's annoying, it doesn't cripple your system's performance since it only makes your files inaccessible.
- You can remove it with a simple anti-virus program, so it's not much of a threat compared to the Boot Sector virus.

Dangerous Computer Viruses Cont.

☐ Resident Virus

- Like its direct action counterpart, the resident virus is a file infector. But its primary difference from the former is that they install themselves on your PC unit. They become even dangerous because they can persist even after the primary source of the virus infection gets removed.
- Depending on the virus's programming, it can be difficult to spot it and remove it from your system. It depends on whether the resident virus is a fast infector or a slow infector. The former causes damage as fast as it can while the latter progresses its damage at a much slower pace.

Dangerous Computer Viruses Cont.

❑ Multipartite Virus

- More nefarious than most viruses, multipartite viruses are an amalgamation of the different types of computer viruses regarding how it spreads. It spreads using various means, and it could take a wide variety of actions depending on several factors.
- For example, it can act in a different manner depending on your PC's operating system.
- It can infect your boot sector and files, making it act and spread faster. This makes it tougher to remove and might require a complete reformat to prevent a recurrence.

Dangerous Computer Viruses Cont.

❑ Polymorphic Virus

- This type of virus is dangerous because anti-virus programs have a hard time detecting it. Most programs take days or months formulating routines necessary to identify a single polymorphic virus.
- Detection takes a long time because of the way anti-virus programs function. These software types can only blacklist a single virus variant. Polymorphic viruses take advantage of this by changing its signature when it reproduces, making it look like a different, otherwise harmless file.

Dangerous Computer Viruses Cont.

❑ Overwrite Virus

- Viruses, in general, are frustrating, especially because insurance companies don't protect businesses against virus attacks. But to end users, the most frustrating type of virus is the overwrite virus. This holds water even if its danger level is low compared to the ones mentioned so far.
- The only way you can get rid of the virus is to get rid of the file it infects. This can apply to both individual files and entire software applications. It's often hard to identify, but you can prevent it if you're careful with emails with attachments.

Dangerous Computer Viruses Cont.

❑ Spacefiller Virus

- Compared to other types of viruses, spacefillers have more intelligence. Most computer virus types attach themselves to executable files. In comparison, spacefiller viruses occupy the empty spaces often found within files.
- This allows it to invade programs without damaging it or increasing its size. It ignores the other techniques most viruses rely on to avoid detection. While it's more nefarious, its rarity makes it less of a threat in most cases.

Dangerous Computer Viruses Cont.

❑ Memory Resident Virus

- This is one of the most destructive virus types around. It infects your computer memory and sets it as its base of operations. What this means is that your operating system helps the virus work more by simply running.
- Its effects differ, but if you notice a significant increase in corrupted files, your computer might have a memory resident virus infection.

Dangerous Computer Viruses Cont.

Web Scripting Virus

- These viruses often transmit themselves into your computer's system through the programming used for websites. Placing images, videos, and layouts require a certain degree of coding. That means you might download the viruses without your knowledge if you click on malicious websites' links or watch their videos.
- The best way to prevent this is to have security programs that detect malicious coding when browsing the internet.

Dangerous Computer Viruses Cont.

❑ Browser Hijacker

- This type of virus is one of the most straightforward and easy-to-detect viruses. It will interfere with your work by leading you off to different websites even if you enter the internet address you want to go to. A good practice is to be careful with your downloads and toolbars.

Dangerous Computer Viruses Cont.

❑ Macro Virus

- There are few softwares such as word processor that allows a macro program to embed in documents. This virus is written in macro language, so it may run automatically when the document is opened and it can easily spread to other files too.
- It depends on application rather than OS. They are generally hidden in documents which are more likely shared via email.

Dangerous Computer Viruses Cont.

❑ Companion Virus

- Companion Viruses were more popular during MS-DOS era. Unlike traditional viruses they do not modify the existing file. It creates a copy of file with a different extension (usually .com) which runs in parallel with actual program.
- For example, if there is file named run.exe, this virus will create another hidden file named run.com. And when system calls a file run, the .com (higher priority extension) will run before .exe extension. It can perform malicious step such as deleting the original files.

Dangerous Computer Viruses Cont.

❑ FAT Virus

- FAT stands for file allocation table which is a section of storage disk that is used to store information like location of all files, total storage capacity, available space, used space etc.
- A FAT virus alters the index and makes it impossible for the computer to allocate the file. It is powerful enough to force you to format the whole disk.

Dangerous Computer Viruses Cont.

❑ Polymorphic Virus

- Polymorphic virus encodes themselves using different encryption key and algorithm each time they infect a program or create a copy of itself. Because of different encryption keys it becomes very difficult for the antivirus software to find them.
- In other words, it is a self-encrypted virus which is designed to avoid detection by scanners.

Dangerous Computer Viruses Cont.

❑ Directory Virus

- Directory Virus (also known as Cluster virus) infects the file by changing the DOS directory information. In this case, DOS points to the virus code instead of original program.
- When you run a program, DOS first loads and executes the virus code before running the actual program code. It becomes very difficult to locate the original file after getting infected.

Dangerous Computer Viruses Cont.

❑ Logic Bombs

- They are not virus but inherently malicious like worms and viruses. It is a piece of code intentionally inserted (hidden) into a program or software. This code is executed after satisfying a certain criteria.
- For example a cracker can insert a Keylogger code inside any web browser extension.
- The malicious code gets activated whenever you visit any login page and captures your keystrokes such as username and passwords. These malicious codes are known as Logic Bombs.

Malicious Programs Cont.

❑ Malware

- Malware is short for **malicious software**, meaning software that can be used to compromise computer functions, steal data, bypass access controls, or otherwise cause harm to the host computer.
- Malware is a broad term that refers to a variety of malicious programs. This post will define several of the most common types of malware; adware, bots, bugs, rootkits, spyware, Trojan horses, viruses, and worms.

Malicious Programs Cont.

☐ Adware

- Adware (short for advertising-supported software) is a type of malware that automatically delivers advertisements. Common examples of adware include pop-up ads on websites and advertisements that are displayed by software. Often times software and applications offer “free” versions that come bundled with adware.
- Most adware is sponsored or authored by advertisers and serves as a revenue generating tool. While some adware is solely designed to deliver advertisements, it is not uncommon for adware to come bundled with spyware (see below) that is capable of tracking user activity and stealing information.
- Due to the added capabilities of spyware, adware/spyware bundles are significantly more dangerous than adware on its own.

Malicious Programs Cont.

❑ Bot

- Bots are software programs created to automatically perform specific operations. While some bots are created for relatively harmless purposes (video gaming, internet auctions, online contests, etc), it is becoming increasingly common to see bots being used maliciously.
- Bots can be used in botnets (collections of computers to be controlled by third parties) for DDoS attacks, as spambots that render advertisements on websites, as web spiders that scrape server data, and for distributing malware disguised as popular search items on download sites.
- Websites can guard against bots with CAPTCHA tests that verify users as human.

Malicious Programs Cont.

❑ Bug

- In the context of software, a bug is a flaw produces an undesired outcome. These flaws are usually the result of human error and typically exist in the source code or compilers of a program.
- Minor bugs only slightly affect a program's behavior and as a result can go for long periods of time before being discovered. More significant bugs can cause crashing or freezing. Security bugs are the most severe type of bugs and can allow attackers to bypass user authentication, override access privileges, or steal data.
- Bugs can be prevented with developer education, quality control, and code analysis tools.

Malicious Programs Cont.

❑ Ransomware

- Ransomware is a form of malware that essentially holds a computer system captive while demanding a ransom.
- The malware restricts user access to the computer either by encrypting files on the hard drive or locking down the system and displaying messages that are intended to force the user to pay the malware creator to remove the restrictions and regain access to their computer.
- Ransomware typically spreads like a normal computer worm (see below) ending up on a computer via a downloaded file or through some other vulnerability in a network service.

Malicious Programs Cont.

❑ Rootkit

- A rootkit is a type of malicious software designed to remotely access or control a computer without being detected by users or security programs. Once a rootkit has been installed it is possible for the malicious party behind the rootkit to remotely execute files, access/steal information, modify system configurations, alter software (especially any security software that could detect the rootkit), install concealed malware, or control the computer as part of a botnet.
- Rootkit prevention, detection, and removal can be difficult due to their stealthy operation. Because a rootkit continually hides its presence, typical security products are not effective in detecting and removing rootkits. As a result, rootkit detection relies on manual methods such as monitoring computer behavior for irregular activity, signature scanning, and storage dump analysis.
- Organizations and users can protect themselves from rootkits by regularly patching vulnerabilities in software, applications, and operating systems, updating virus definitions, avoiding suspicious downloads, and performing static analysis scans.

Malicious Programs Cont.

☐ Spyware

- Spyware is a type of malware that functions by spying on user activity without their knowledge. These spying capabilities can include activity monitoring, collecting keystrokes, data harvesting (account information, logins, financial data), and more.
- Spyware often has additional capabilities as well, ranging from modifying security settings of software or browsers to interfering with network connections. Spyware spreads by exploiting software vulnerabilities, bundling itself with legitimate software, or in Trojans.

Malicious Programs Cont.

❑ Trojan Horse

- A Trojan horse, commonly known as a “Trojan,” is a type of malware that disguises itself as a normal file or program to trick users into downloading and installing malware.
- A Trojan can give a malicious party remote access to an infected computer. Once an attacker has access to an infected computer, it is possible for the attacker to steal data (logins, financial data, even electronic money), install more malware, modify files, monitor user activity (screen watching, keylogging, etc), use the computer in botnets, and anonymize internet activity by the attacker.

Malicious Programs Cont.

❑ Spam

- Spam is the electronic sending of mass unsolicited messages. The most common medium for spam is email, but it is not uncommon for spammers to use instant messages, texting, blogs, web forums, search engines, and social media. While spam is not actually a type of malware, it is very common for malware to spread through spamming.
- This happens when computers that are infected with viruses, worms, or other malware are used to distribute spam messages containing more malware. Users can prevent getting spammed by avoiding unfamiliar emails and keeping their email addresses as private as possible.

Malware Symptoms

- ❑ While these types of malware differ greatly in how they spread and infect computers, they all can produce similar symptoms. Computers that are infected with malware can exhibit any of the following symptoms:
 - Increased CPU usage
 - Slow computer or web browser speeds
 - Problems connecting to networks
 - Freezing or crashing
 - Modified or deleted files
 - Appearance of strange files, programs, or desktop icons
 - Programs running, turning off, or reconfiguring themselves
 - Strange computer behavior
 - Emails/messages being sent automatically and without user's

Malware Prevention and Removal

There are several general best practices that organizations and individual users should follow to prevent malware infections. Some malware cases require special prevention and treatment methods, but following these recommendations will greatly increase a user's protection from a wide range of malware:

- Install and run anti-malware and firewall software. When selecting software, choose a program that offers tools for detecting, quarantining, and removing multiple types of malware. At the minimum, anti-malware software should protect against viruses, spyware, adware, Trojans, and worms. The combination of anti-malware software and a firewall will ensure that all incoming and existing data gets scanned for malware and that malware can be safely removed once detected.
- Keep software and operating systems up to date with current vulnerability patches. These patches are often released to patch bugs or other security flaws that could be exploited by attackers.
- Be vigilant when downloading files, programs, attachments, etc. Downloads that seem strange or are from an unfamiliar source often contain malware.

Computer Virus Symptoms

- Computer and/or internet suddenly slower
- Computer behaves weird PC freezes and crashes a lot
- Unusual error messages appear
- Files have been automatically deleted or added
- Unwanted advertisements appear
- Emails have been sent from your account to your contacts (which you know you didn't sent)
- Sudden hardware problems (e.g., display acting weird)
- Antivirus software and/or its shields are turned off automatically
- PC automatically restarts (reboots) by itself

Protection from Computer Virus

- ☐ Virus infects computer system if latest and updated version of an Antivirus program is not installed.
- ☐ Latest Antivirus software should be installed on Computer to protect it from viruses.
- ☐ A computer system can be protected from virus by following these precautions.
- ☐ The latest and updated version of Anti-Virus and firewall should be installed on the computer.

Protection from Computer Virus Cont.

- The Anti-Virus software must be upgraded regularly.
- USB drives should be scanned for viruses, and should not be used on infected computers.
- Junk or unknown emails should not be opened and must be deleted straightaway.
- Unauthorized or pirated software should not be installed on the computer.
- An important way of protection against virus is the use of back up of data. The backup is used if the virus deletes data or modifies it. So back-up your data on regular basis. There are some great softwares that can back up your data automatically.
- Freeware and shareware software from the internet normally contain viruses. It is important to check the software before using them.
- Your best protection is your common sense. Never click on suspicious links, never download songs, videos or files from suspicious websites. Never share your personal data with people you don't know over the internet.

Protection from Computer Virus Cont.

- Keep your operating system and software always up-to-date
- Use a firewall
- Use antivirus software
- Don't ignore security warnings from Windows or your antivirus software
- Don't install and use pirated software
- If you don't use Java, then remove or disable it
- Always download software from the official link or from a trusted website
- When installing software, always pay attention and always read everything clearly before clicking *Next*, *OK*, *Install*, *Continue*, etc.
- Microsoft recommends that you disable SMB1 on Windows for security reasons.

How Does Virus Affect

- By downloading files from the Internet.
- During the removable of media or drives.
- Through pen drive.
- Through e-mail attachments.
- Through unpatched software & services.
- Through unprotected or poor administrator passwords.

Impact of Virus

- Disrupts the normal functionality of respective computer system.
- Disrupts system network use.
- Modifies configuration setting of the system.
- Destroys data.
- Disrupts computer network resources.
- Destroys confidential data.

Virus Detection

- The most fundamental method of detection of virus is to check the functionality of your computer system; a virus affected computer does not take command properly.
- However, if there is antivirus software in your computer system, then it can easily check programs and files on a system for virus signatures.

Virus Preventive Measures

- Installation of an effective antivirus software.
- Patching up the operating system.
- Patching up the client software.
- Putting highly secured Passwords.
- Use of Firewalls.

Most Effective Antivirus

- K7
- Bitdefender Antivirus Plus
- Quick Heal Antivirus
- Avira Antivirus
- McAfee Antivirus Plus
- Symantec Norton Antivirus
- Avast Pro Antivirus
- Kaspersky Anti-Virus
- Emsisoft Anti-Malware
- ESET NOD32 Antivirus

Queries ?

Thank You