45

WINDOWS 95/98 ISSUES

CHAPTER AT A GLANCE

In the early days of computing, hardware was relatively independent of the operating system. With the introduction of Windows, that line between an operating system and hardware began to blur, but it was the shift to Windows 95 and 98 that really began to merge the computer's software and hardware into one inseparable idea. Today, it is almost impossible to troubleshoot a computer without *some* working knowledge of the operating system—even if it's just to navigate between dialogs, update drivers, and check the status of each device. Consequently, troubles with the operating system can often manifest themselves as serious system problems, though there may be no problems at all with the hardware. This chapter is

intended to offer a series of troubleshooting tips that can help you deal with startup, shutdown, and other miscellaneous problems under Windows 95/98.

If you require detailed information regarding Windows 95/98/NT, you should acquire the Windows 95/98/NT "Resource Kit" for your particular Windows version from your local bookstore.

General Techniques

Let's get started with a number of handy support techniques that you can use to deal with common Windows 95/98 problems. This part of the chapter will show you how to perform basic "clean boot" troubleshooting of your Windows 95/98 platform and handle common Windows troubles such as:

- Re-create the SYSTEM.INI file
- Manage the MSDOS.SYS file
- Disable IRQ steering
- Disable fast shutdown
- Troubleshoot stack overflows

"CLEAN BOOT" TROUBLESHOOTING

Many of the problems that you encounter with Windows 98 will be due to issues with the computer's "environment," such as drivers and TSRs that are started when the computer boots. The objective of "clean boot" troubleshooting is to isolate potential problems related to the computer's environment. By simplifying the environment, you can systematically weed out problems areas. This part of the chapter offers a standard procedure for clean booting Windows 98. The following environment files are loaded as part of the boot process when Windows 98 starts, and these files help to create the environment used by the OS and application programs:

- **MSDOS.SYS** This file contains basic information about the location of the \Windows folder, startup files, and other options. Many of these options can be edited to adjust the boot performance of the system and Windows. See the "Managing MSDOS.SYS" section later in the chapter for more details.
- **CONFIG.SYS** This file is provided for backward compatibility with DOS-based and older Windows-based programs, and may not be present on your computer. It loads low-level DOS-based drivers, many with a system (or .SYS) extension.
- **AUTOEXEC.BAT** This file is also provided for backward compatibility with DOS-based and older Windows-based programs, and may not be present on your computer. It loads DOS-based programs, often with .COM and .EXE extensions.
- **WINBOOT.INI** This file is a temporary version of the MSDOS.SYS file that may be present if a program is making changes to your computer that might affect the boot process. Under normal conditions, it is deleted after the program is complete. Until it is deleted, it resides in the root directory and overrides settings in your MSDOS.SYS file.
- **WINSTART.BAT** This file is created for programs that need to run a DOS-based program to enable functionality of a Windows-based program. Most users do not have this program. The WINSTART.BAT file may not be available as a check box on the General tab in your System Configuration Utility.

- **SYSTEM.INI** This file contains critical information about your computer's settings for specific hardware. This file must be present in the \Windows folder for Windows to start. It is used to load various drivers (including sound and video adapter drivers). It may also contain additional 16-bit drivers for hardware that does not use 32-bit drivers. When you clear the "Process System.ini file" check box in the System Configuration Utility and restart your computer, your display is set to a resolution of 640 x 480 x 16. (If you had the display set to a higher resolution, shortcuts on the desktop may overlap. Also, your sound card may no longer operate correctly.)
- **WIN.INI** This file contains information specific to the overall appearance of Windows. This file must be present in the \Windows folder (or it is re-created by Windows), and is read at startup for backward compatibility with Windows 3.x. Many of the settings are duplicated in the registry. When you clear the "Process Win.ini file" check box in the System Configuration Utility, a generic version of the WIN.INI file is created.
- **WININIT.INI** This file is used to complete the installation of various components for Windows and third-party products. Each time a program needs to copy or remove a file that is in use, instructions are written to the WININIT.INI file. Windows checks for the presence of the WININIT.INI file during the boot process and (if found) performs the instructions. Rename this file in order to troubleshoot problems.
- **SYSTEM.DAT** This file is one of two registry files that are required in order to start Windows. The SYSTEM.DAT file is similar to the SYSTEM.INI file in that it contains computer and software settings. The "Load startup group" option contains the entries that are loaded from the SYSTEM.DAT portion of the registry.
- **USER.DAT** This file is the second of two registry files that are required in order to start Windows. The USER.DAT file is similar to the WIN.INI file in that it contains information for running specific programs, and information about the overall appearance of Windows.

You can use the System Configuration Utility to create a backup of the startup files. Click Create Backup on the General tab in the System Configuration Utility. You can choose to save the files to a folder on one of your hard disks, or save it to a floppy disk.

Some parts of this procedure will require you to edit the Registry. Be sure to make a complete backup of the system Registry before attempting any editing procedures.

Using MSCONFIG for a Clean Boot

Windows 98 includes the System Configuration Utility tool (named MSCONFIG.EXE), which can ease the steps needed to perform a clean boot. To start the System Configuration Utility, click Start, click Run, type **msconfig.exe**, and then click OK. Once the System Configuration Utility starts, select the General tab, click Selective Startup (Figure 45-1), and then click the following check boxes to clear them:

- Process Config.sys file
- Process Autoexec.bat file
- Process Winstart.bat file (if available)
- Process System.ini file
- Process Win.ini file
- Load startup group items

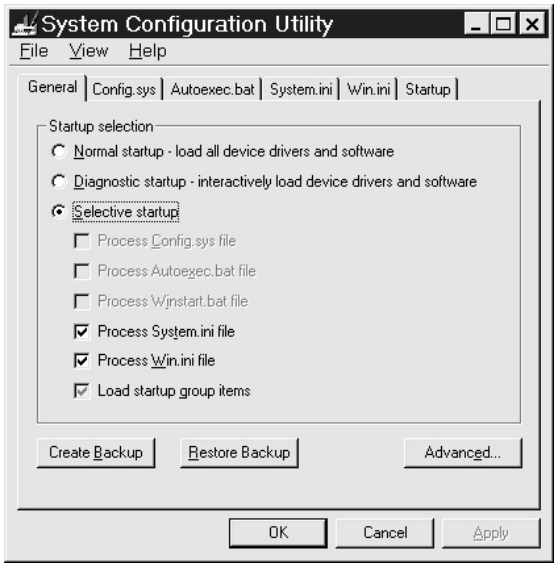

FIGURE 45-1 The General tab of the System Configuration Utility

Finally, click OK, and then restart your computer when you're prompted to do so.

Each check box (except "Load startup group items") represents files that are renamed with a "troubleshoot" (or .TSH) extension when you clear the check box. By comparison, the "Load startup group items" entry represents icons in the Startup folder or entries in the following registry keys:

```
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Run
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\RunServices
```

When you click the "Load startup group items" check box to clear it, the registry entries are written to the following keys:

```
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Run
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\RunServices-
```

The icons in the Startup folder are moved to the Disabled Startup Items folder in the \Windows\Start Menu\Programs folder.

Remember that when you click to clear an entry in a file, a "remark" statement is placed at the beginning of each line. For the CONFIG.SYS and AUTOEXEC.BAT files, **rem tshoot** is used (followed by a space). For the SYSTEM.INI and WIN.INI files, **;tshoot** is used (followed by a space). These remarks are removed when you click to select an entry that was cleared previously. When you click to select an item in the Startup tab, the corresponding registry entry is restored to its original location.

You must restart your computer each time you make a change to any of the startup files because they are only read when your computer starts.

Homing in on the Problem

If your computer no longer displays the problem after you clear all of the entries under the Selective Startup group (that is, perform a clean boot), you can systematically narrow the focus of the problem by

using the System Configuration Utility to restore files or file entries until you determine the specific entry that is causing the problem. Use the General tab and reselect the following entries, restart your computer, and then test:

- Process System.ini file
- Process Win.ini file

If the problem occurs again when these files are processed, the problem is related to one of these files. In that case, click to clear one of the files. If the problem still occurs, an entry in the file that is selected is causing the problem.

If the problem does not occur after the SYSTEM.INI and WIN.INI files are selected, click to select the "Process Autoexec.bat file" check box, restart your computer, and then test. If the problem returns, an entry in the AUTOEXEC.BAT file is responsible.

If the problem does not occur after selecting the AUTOEXEC.BAT file, click to select the "Process Config.sys file" check box, restart your computer, and then test. If the problem returns, an entry in the CONFIG.SYS file is responsible. If the problem does not reoccur, an item in the Startup group or WINSTART.BAT file is responsible.

Click to select the "Process Winstart.bat file" check box, restart your computer, and then test. If the problem does not return, an item in the "Load startup items" is responsible.

Narrowing Further

Now that you know which file area is causing the problem, you can test the individual files that make up the file area. On the General tab, click to select the check box for the file area causing the problem, click the tab representing that file, click to clear the bottom half of the list of check boxes, restart your computer, and then test. For example, if an entry in the Startup group is responsible, click to select the "Load startup group items" check box on the General tab, click the Startup tab (Figure 45-2), click to clear the bottom half of the entries, click OK, and then restart your computer when you're prompted.

If the problem persists, one of the entries that is still selected is causing the problem. If the problem does not occur, one of the entries that you have cleared was causing the problem. In the first case, click to clear half of the remaining entries that are selected, restart your computer, and then test. In the second case, click to select half of the file entries that are cleared, restart your computer, and then test.

Using this process, you can isolate the specific file entry that is causing the problem after restarting your computer several times. Once the specific file entry that is causing the problem is determined, you should edit the appropriate file or registry entry to remove this entry, and return the System Configuration Utility to its Normal Startup mode:

1. Click Start, click Run, type **msconfig** in the Open box, then click OK.
2. On the General tab, click Normal Startup, and then click OK.
3. When you're prompted to restart the computer, click No.

If the problem entry occurred in the CONFIG.SYS, AUTOEXEC.BAT, WIN.INI, or SYSTEM.INI files, use the System Configuration Editor (SYSEDIT.EXE) to edit the file and disable the appropriate line(s):

1. Click Start, click Run, type **sysedit** in the Open box, and then click OK.
2. On the Window menu, click the appropriate file name (for example, c:\Windows\System.ini).
3. Type **REM**, followed by a space, at the beginning of the appropriate line that is causing the problem.

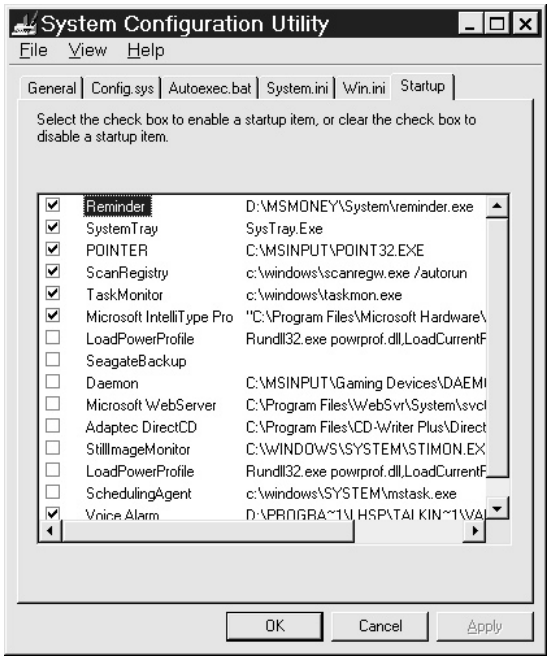

FIGURE 45-2 Deselecting file entries in the System Configuration Utility

4. On the File menu, click Save, and then click Exit.
5. Restart your computer now.

If the problem entry is a program on the Startup tab, remove the program from the Startup folder or delete the program from the registry:

1. Click Start, highlight Settings, and then click Taskbar And Start Menu.
2. Click the Start Menu Programs tab, and then click Remove.
3. Double-click Startup, click the offending entry, and then click Remove.
4. Click Close, click OK, and then restart your computer.

If the problem entry is not in the Startup folder, the program may be loading in the registry. Follow the steps below to remove the entry from the registry:

1. Start the Registry Editor and export the appropriate registry keys (for backup purposes):

   ```
   HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Run
   HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\RunServices
   ```

2. Delete the <filename.exe> value from the appropriate registry keys (where <filename.exe> is the name of the file that is causing the problem):

   ```
   HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Run
   HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\RunServices
   ```

3. Quit the Registry Editor and restart the computer.

Advanced Clean Boot Techniques

If you find that the system problem persists after you have cleared all of the boot entries in the System Configuration Utility, there are three other avenues you can test: select every check box listed on the Advanced Troubleshooting Settings tab in your System Configuration Utility, change your display adapter to "standard Video Graphics Adapter" (VGA) mode, or click Diagnostic Startup on the General tab in System Configuration Utility—then do not load static VXD files.

To check the items on the Advanced Troubleshooting Settings tab:

1. Click Start, click Run, type **msconfig.exe**, and then click OK.
2. On the General tab, click Advanced (Figure 45-3), click to select each check box, click OK, and then restart your computer when you're prompted to do so.

Use the same systematic process that you used above to isolate the problem. Many of the problems that are isolated through this process are related to hardware- or driver-compatibility issues. When you isolate the problem, contact the hardware or software manufacturer of the affected driver for a possible updated driver or patch.

To change your display adapter driver to "standard VGA":

1. Click Start, highlight Settings, click Control Panel, and then double-click the Display icon.
2. Click the Settings tab, click Advanced, click the Adapter tab, and then click Change.
3. Click Next, click "Display a list of all the drivers in a specific location, so you can select the driver you want," and then click Next.
4. Click Show All Hardware, click Standard Display Types in the Manufacturer's box, click Standard Display Adapter (VGA) in the Models box, and then click Next.
5. Click Yes, click Next, and then click Finish.

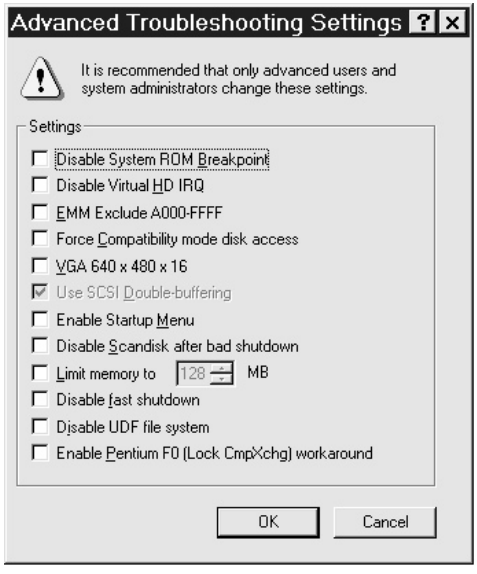

FIGURE 45-3 Using the Advanced Troubleshooting Settings tab under MSCONFIG

6. Click Close, click Close, and click Yes when you're prompted to restart your computer. If changing your display adapter to the "standard VGA" driver corrects the problem, contact your video adapter manufacturer for an updated Windows 98 video driver.

To select Diagnostic Startup and avoid loading static VXD files:

1. Click Start, click Run, type **msconfig.exe**, and then click OK.
2. On the General tab, click "Diagnostic startup—interactively load device drivers and software," and then click OK.
3. Restart your computer when you're prompted to do so.
4. On the Windows 98 Startup menu, choose Step-By-Step Confirmation, and then press ENTER.
5. Observe the following responses:

   Load DoubleSpace Driver: Yes
   Process the system registry: Yes
   Create a startup log file (BOOTLOG.TXT): Yes
   Process your startup device drivers (CONFIG.SYS): No
   DEVICE=C:\WINDOWS\HIMEM.SYS: Yes
   DEVICE=C:\WINDOWS\DBLBUFF.SYS: Yes
   DEVICEHIGH=C:\WINDOWS\IFSHLP.SYS: Yes
   Process your startup command file (AUTOEXEC.BAT): No
   Load the Windows graphical user interface: Yes
   Load all Windows drivers: Yes

6. Note each static VXD file and respond with No to avoid loading each file. Some typical static VXD files that you may encounter are

   VNETSUP.VXD: Microsoft Networking
   NDIS.VXD: Microsoft Networking
   NDIS2SUP.VXD: Microsoft Networking
   JAVASUP.VXD: Microsoft Java
   VRTWD.386: Clock
   VFIXD.VXD: Video Phone helper
   VNETBIOS.VXD: Microsoft Networking
   VSERVER.VXD: Microsoft Networking
   VREDIR.VXD: Microsoft Networking
   DFS.VXD: Microsoft Networking
   NDISWAN.VXD: Microsoft Networking
   MSMOUSE.VXD: Microsoft Mouse

7. Use the systematic process used above to isolate and identify the offending VXD file, and then delete the incompatible static VXD folder from the following key in the registry:

   `HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\VxD`

REBUILDING THE SYSTEM.INI FILE

Your Windows 95/98 platform relies heavily on the SYSTEM.INI file to specify the device drivers needed to support various hardware devices on your system. If the SYSTEM.INI file is deleted, damaged, or corrupted (and you don't have a backup available), it may be possible for you to rebuild a basic SYSTEM.INI file that will run without references to third-party drivers. Although some hardware

devices may not function, a basic SYSTEM.INI file may allow you to boot Windows 95/98. Use the following steps to create your basic SYSTEM.INI file.

The very best way to protect your system setup is to maintain a current Startup disk that includes all of your key INI files, as well as a complete backup copy of your registry.

1. Start your computer to the command prompt by booting from a floppy disk or using the Windows Startup menu.
2. Change to the \Windows folder:
   ```
   cd \windows
   ```

If you have installed Windows 95/98 to a drive or folder other than C:\Windows, adjust these instructions accordingly.

3. Rename the current SYSTEM.INI file:
   ```
   ren system.ini system.old
   ```
4. Create a new SYSTEM.INI file:
   ```
   copy system.cb system.ini
   ```
   Table 45-1 lists the default entries for a SYSTEM.INI file.
5. Edit the new SYSTEM.INI file:
   ```
   edit system.ini
   ```
6. Add the following lines at the top of the file:
   ```
   [boot]
   mouse.drv=mouse.drv
   drivers=mmsystem.dll
   ```
7. Add the following line in the [386Enh] section of the file:
   ```
   mouse=*vmouse
   ```
8. Save your new SYSTEM.INI file and exit the text editor.
9. Type **win** to start Windows.

If your mouse does not work when Windows starts, it is likely that it is not supported by the standard Windows mouse driver.

10. Click Start, click Run, type the path to the Windows setup program in the Open box, and then click OK. For example, if your Windows CD is in drive D:, type
    ```
    d:\setup
    ```
    If you're using Windows disks, insert disk 1 in drive A:, and then type
    ```
    a:\setup
    ```
11. When the Setup dialog box appears, click Continue, and follow the instructions to set up Windows again. Select the "Restore Windows files that are changed or corrupted" option if it's available. If you do not see this option, you'll need to reinstall Windows.
12. After setup has finished, you may find that some programs, tools, or devices are not working correctly. If this happens, you'll need to reinstall each offending application or device.

TABLE 45-1 DEFAULT ENTRIES FOR THE SYSTEM.INI FILE

```
[386Enh]
device=*vshare
device=*dynapage
device=*vcd
device=*vpd
device=*int13
keyboard=*vkd
display=*vdd
mouse=*vmouse, msmouse.vxd
woafont=dosapp.fon
device=*enable
[keyboard]
layout=kbdus.kbd
subtype=
type=4
keyboard.dll=
oemansi.bin=
[Intl]
ACP=1252
OEMCP=437
SystemLocale=00000409
[boot]
system.drv=system.drv
drivers=mmsystem.dll
user.exe=user.exe
gdi.exe=gdi.exe
sound.drv=mmsound.drv
dibeng.drv=dibeng.dll
comm.drv=comm.drv
shell=Explorer.exe
keyboard.drv=keyboard.drv
fonts.fon=vgasys.fon
fixedfon.fon=vgafix.fon
oemfonts.fon=vgaoem.fon
386Grabber=vgafull.3gr
display.drv=pnpdrvr.drv
mouse.drv=mouse.drv
*DisplayFallback=0
[power.drv]
[drivers]
wavemapper=*.drv
[iccvid.drv]
[mciseq.drv]
[mci]
cdaudio=mcicda.drv
sequencer=mciseq.drv
waveaudio=mciwave.drv
```

TABLE 45-1 DEFAULT ENTRIES FOR THE SYSTEM.INI FILE *(CONTINUED)*

```
avivideo=mciavi.drv
videodisc=mcipionr.drv
vcr=mcivisca.drv
[NonWindowsApp]
[vcache]
[nwnp32]
[boot.description]
keyboard.typ=Standard 101/102-Key or Microsoft Natural Keyboard
aspect=100,96,96
display.drv=Standard Display Adapter (VGA)
mouse.drv=Standard mouse
system.drv=Standard PC
[MSNP32]
[display]
[drivers32]
vidc.CVID=iccvid.dll
VIDC.IV31=ir32_32.dll
VIDC.IV32=ir32_32.dll
vidc.MSVC=msvidc32.dll
VIDC.MRLE=msrle32.dll
```

MANAGING MSDOS.SYS

The MSDOS.SYS file has been dramatically altered under Windows 95/98. Where older versions of MS-DOS relied on MSDOS.SYS for disk and file code, all of that functionality has been worked into IO.SYS. MSDOS.SYS under Windows 95/98 is now little more than a text INI file that is used to configure the boot properties of Windows and list important paths to key Windows files (including the registry). Normally, there is little need to access the MSDOS.SYS file, but you may be faced with the need to adjust the Windows 95/98 boot process. This part of the chapter takes you inside the MSDOS.SYS file for MS-DOS 7.x (Windows 9x) and illustrates the various options you can use to enhance the Windows 9x platform. A typical example of an MSDOS.SYS file is shown in Figure 45-4.

Notice that MSDOS.SYS must be longer than 1024 bytes. Otherwise, Windows 95/98 will fail to load. Do not alter or remove the "x" lines in MSDOS.SYS.

There are two main sections to the MSDOS.SYS file: the [Paths] section and the [Options] section. Paths defines the directory paths to major Windows file areas, while Options allows you to configure many of the available attributes used to boot a Windows 95/98 system. The entries in the [Paths] and [Options] sections are listed in Table 45-2.

The default is 1 for computers with networking installed. This value should be 0 if network software components are not installed.

If Windows 95 is installed in its own directory, the earlier version of MS-DOS is preserved on the hard disk. If you set BootMulti=1 in MSDOS.SYS, you can start the earlier version of MS-DOS by pressing F4 when starting Windows 95. Windows 98 offers the same feature.

```
[Paths]
WinDir=c:\windows
WinBootDir=c:\windows
HostWinBootDrv=c
UninstallDir=D:\

[Options]
BootMulti=1
BootGUI=1
;
;The following lines are required for compatibility with other programs.
;Do not remove them (MSDOS.SYS needs to be >1024 bytes).
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxa
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxb
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxc
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxd
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxe
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxf
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxg
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxh
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxi
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxj
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxk
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxl
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxm
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxn
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxo
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxp
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxq
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxr
;xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxs
DoubleBuffer=1
AutoScan=1
WinVer=4.10.1998
```

FIGURE 45-4 A typical MSDOS.SYS file under Windows 98

TABLE 45-2 ENTRIES IN THE [PATHS] AND [OPTIONS] SECTIONS OF MSDOS.SYS

[PATHS]	DESCRIPTION
WinDir=	Indicates the location of the Windows 9x directory specified during setup.
WinBootDir=	Indicates the location of the necessary startup files. The default is the directory specified during the setup process (for example, C:\WINDOWS).
HostWinBootDrv=c	Indicates the location of the boot drive root directory.
UninstallDir=c	Specifies the location of the W95UNDO.DAT and W95UNDO.INI files. These files are necessary to uninstall Windows 95. This setting is present only if you back up your system files when you are prompted during Windows 95 setup.
[Options]	
AutoScan=1	Defines whether or not ScanDisk is run after a bad shutdown. A setting of 0 does not run ScanDisk; 1 prompts before running ScanDisk; 2 does not prompt before running ScanDisk, but prompts before fixing errors if any errors are found. This setting is used only by OSR 2 and Windows 98.
BootMulti=	Enables dual-boot capabilities. The default is 0. Setting this value to 1 allows you to start MS-DOS by pressing F4, or by pressing F8 to use the Windows Startup menu.
BootGUI=	Enables automatic graphical startup into Windows 9x. The default is 1.
BootMenu=	Enables automatic display of the Windows 9x Startup menu. (The user must press F8 in Windows 95, or press and hold the CTRL key in Windows 98 to see the menu.) The default is 0. Setting this value to 1 eliminates the need to press F8 to see the menu.
BootKeys=	Enables the startup option keys (F5, F6, and F8). The default is 1.
BootWin=	Enables Windows 9x as the default operating system. Setting this value to 0 disables Windows 9x as the default (useful only with MS-DOS version 5 or 6.x on the computer). The default is 1.
BootDelay=n	Sets the initial startup delay to *n* seconds (default is 2). A BootKeys=0 entry disables the delay. The only purpose of the delay is to give the user sufficient time to press F8 after the "Starting Windows" message appears. BootDelay is not supported in Windows 98.
BootFailSafe=	Enables Safe Mode for system startup. The default is 0.
BootMenuDefault=#	Sets the default menu item on the Windows Startup menu; the default is 3 for a computer with no networking components and 4 for a networked computer.
BootMenuDelay=#	Sets the number of seconds to display the Windows Startup menu before running the default menu item. The default is 30 seconds.
Logo=	Enables display of the Windows 9x logo. The default is 1. Setting this value to 0 also avoids hooking a variety of interrupts that can create incompatibilities with certain memory managers from other vendors.
BootWarn=	Enables the Safe Mode startup warning. The default is 1.
DblSpace=	Enables automatic loading of DBLSPACE.BIN. The default is 1.
DrvSpace=	Enables automatic loading of DRVSPACE.BIN. The default is 1.
DoubleBuffer=	Enables loading of a double-buffering driver for a SCSI controller. The default is 0. Setting this value to 1 enables double-buffering (if required by the SCSI controller).

TABLE 45-2 ENTRIES IN THE [PATHS] AND [OPTIONS] SECTIONS OF MSDOS.SYS *(CONTINUED)*

[PATHS]	DESCRIPTION
LoadTop=	Enables the loading of COMMAND.COM or DRVSPACE.BIN at the top of 640KB memory. The default is 1. Set this value to 0 with Novell NetWare or any software that makes assumptions about what is used in specific memory areas.
Network=	Enables "Safe Mode with Networking" as a menu option.

Editing MSDOS.SYS

Although it is a relatively simple matter to edit changes in the MSDOS.SYS file, it can be a bit tricky because the file is generally read-only and hidden. Try the following steps to access and edit the file correctly:

1. Click Start, highlight Find, and then click Files Or Folders.
2. In the Named box, type **msdos.sys**.
3. In the Look In box, click your boot drive (usually drive C:). Click the Find Now button.
4. Right-click the **msdos.sys** file, and then click Properties.
5. Click the Read-Only and Hidden check boxes to clear them (removing these attributes from the MSDOS.SYS file); then click OK.
6. Right-click the MSDOS.SYS file, and then click Open With.
7. In the "Choose the program you want to use" box, click WordPad and click OK.
8. Make the changes you need to the MSDOS.SYS file. When you're done, save the file as a text document, and then quit WordPad.
9. Right-click the MSDOS.SYS file, and then click Properties.
10. Click the Read-Only and Hidden check boxes to select them (and reset these attributes for the file); then click OK. Close the Find window.
11. Quit and then restart Windows.

MANAGING PCI "IRQ BUS STEERING"

One of the major complaints about IRQs is that they cannot be shared—that is, two devices cannot use the same IRQ. With the introduction of the PCI bus, however, PCI devices can share the interrupts assigned to a PCI bus. The PCI bus architecture also supports *bus steering* under Windows 95 OSR2 and Windows 98, whereby Windows can dynamically assign (or steer) PCI bus IRQs to various PCI devices. PCI IRQ bus steering gives OSR2 and Windows 98 the flexibility to reprogram PCI interrupts when it rebalances PnP PCI and ISA resources around non-PnP ISA devices to solve resource conflicts. Windows 95 (the retail release) and OSR1 cannot support this function.

For example, suppose your computer's BIOS is unaware of non-PnP ISA cards, and the operating system does not have PCI IRQ bus steering. If the BIOS sets a PCI device to IRQ 10, you may have a resource

conflict when you add a non-PnP ISA device that is configured for IRQ 10. But with PCI IRQ bus steering, the operating system can resolve this IRQ resource conflict. To handle this, the operating system will

- Disable the PCI device.
- Reprogram a free IRQ to a PCI IRQ (such as IRQ 11).
- Assign an IRQ "placeholder" to IRQ 11.
- Move the PCI device to IRQ 11.
- Reprogram IRQ 10 to be an ISA IRQ.
- Remove the IRQ "placeholder" for IRQ 10.

The Placeholder

An "IRQ Holder for PCI Steering" may be displayed when you examine the System Devices branch of your Device Manager. This "IRQ Holder for PCI Steering" indicates that an IRQ has been programmed to PCI mode and is *unavailable* for ISA devices, even if no PCI devices are currently using the IRQ. To view IRQs that are programmed for PCI mode:

1. Click Start, highlight Settings, click Control Panel, and then double-click the System icon.
2. Click the Device Manager tab.
3. Double-click the System Devices branch.
4. Double-click the "IRQ Holder for PCI Steering" you want to view, and then click the Resources tab.

Checking for IRQ Steering

You can use the following steps to determine whether your computer is using IRQ steering:

1. Click Start, highlight Settings, click Control Panel, and then double-click the System icon.
2. Click the Device Manager tab.
3. Double-click the System Devices branch.
4. Double-click PCI Bus, and then click the IRQ Steering tab (Figure 45-5).
5. You should see one of the following settings: IRQ Steering Enabled or IRQ Steering Disabled.

PCI IRQ bus steering is disabled by default in OSR2. If you're using OSR2 and IRQ steering is disabled, verify that the Use IRQ Steering check box is *selected* on the IRQ Steering tab.

The Device Manager may display IRQ steering as disabled for any of the following reasons:

- The IRQ routing table provided by the BIOS to the operating system may be missing or corrupted. (The IRQ routing table provides information on how the motherboard is configured for PCI IRQs.)
- The Use IRQ Steering check box is not selected.
- The "Get IRQ table from Protected Mode PCIBIOS 2.1 call" check box is not selected.
- Your computer's BIOS may not support PCI IRQ bus steering.

Disabling PCI IRQ Bus Steering

When PCI IRQ bus steering is enabled, Windows 98 dynamically assigns (or steers) PCI bus IRQs to the PCI devices. If there are IRQ conflicts between PCI devices, you may need to disable the PCI IRQ bus

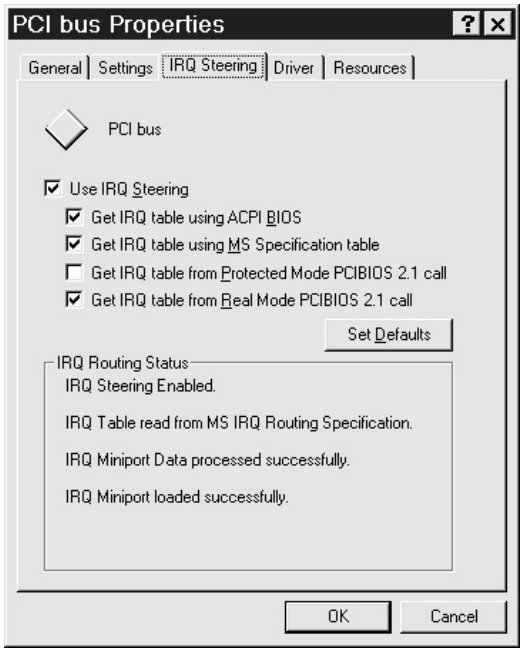

FIGURE 45-5 The PCI Bus Properties dialog

steering feature in order to determine where the conflicts occur. You can disable PCI IRQ bus steering with these steps:

1. Click Start, highlight Settings, click Control Panel, and then double-click the System icon.
2. Click the Device Manager tab.
3. Double-click the System Devices branch.
4. Double-click PCI Bus, and then click the IRQ Steering tab.
5. Click the Use IRQ Steering check box to clear it, click OK, and then click OK again.
6. Click Yes when you're prompted to restart your computer.

You may also need to disable PCI IRQ bus steering in your computer's BIOS through the CMOS setup.

The following selections will determine which routing table(s) Windows 98 uses when programming IRQ steering:

- *Get IRQ table using ACPI BIOS* When this box is selected, the ACPI BIOS IRQ routing table is the first table Windows 98 tries to use to program IRQ steering. If a PCI device is not working properly, click this check box to clear it.
- *Get IRQ table using MS Specification table* When this box is selected, the MS Specification routing table is the second table Windows 98 tries to use to program IRQ steering.

- *Get IRQ table from Protected Mode PCIBIOS 2.1 call* When this box is selected, the Protected Mode PCIBIOS 2.1 routing table is the third table Windows 98 tries to use to program IRQ steering.
- *Get IRQ table from Real Mode PCIBIOS 2.1 call* When this box is selected, the Real Mode PCIBIOS 2.1 routing table is the fourth table Windows 98 tries to use to program IRQ steering.

By default, the "Get IRQ table from Protected Mode PCIBIOS 2.1 call" check box is *not* selected. You should only select this box if a PCI device is not working properly.

The "IRQ Holder For PCI Steering" entry may appear under IRQ Routing Status, even though PCI IRQ bus steering is disabled. This can occur if the IRQ settings are being read by your computer's BIOS.

DISABLING FAST SHUTDOWN

When you shut down Windows 95/98 normally, all device drivers are systematically uninitialized. When fast shutdown is enabled in Windows 98, device drivers are not uninitialized. Normally, this results in a faster shutdown, and this feature is enabled by default. Disabling fast shutdown may be necessary if you're troubleshooting shutdown problems in Windows 98. Follow the steps below to disable fast shutdown:

1. Click Start, highlight Programs, select Accessories, choose System Tools, and then click System Information.
2. On the Tools menu, click System Configuration Utility.
3. On the General tab, click Advanced.
4. Click the Disable Fast Shutdown check box to select it (Figure 45-3, third entry from the end). Click OK, and then click OK again.
5. Click Yes when you are prompted to restart your computer.

Disabling fast shutdown in Windows 98 changes the FastReboot value data from 1 to 0 in the following registry key: HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Shutdown.

DEALING WITH STACK OVERFLOW ERRORS

Stacks are reserved memory areas that Windows 95/98 programs use for processing hardware events. The system state is stored in the stack, the IRQ handler routine is serviced, the system state is "popped" from the stack, and the system resumes where it left off. A *stack overflow* occurs when there is not enough space in memory to store the system state before handling the hardware interrupt routines. When Windows displays an error message related to an internal stack overflow, there are several common issues for you to consider:

- The CONFIG.SYS startup file may not be properly configured for the Windows installation. Try the following values:

```
STACKS=64,512
FILES=60
BUFFERS=40
```

- If you're using the dual-boot capabilities of Windows, your CONFIG.SYS and AUTOEXEC.BAT files may not contain the correct configuration to run Windows. If you're dual-booting between Windows

3.x and Windows 95/98, these files may not have been renamed back to CONFIG.DOS and AUTOEXEC.DOS. Examine the CONFIG.SYS file to determine whether files such as HIMEM.SYS or EMM386.EXE are being loaded from a folder *other* than the Windows folder. If so, boot Windows using the Safe Mode Command Prompt Only option. Rename the CONFIG.SYS file to CONFIG.DOS and the AUTOEXEC.BAT file to AUTOEXEC.DOS, and then restart the computer.

- Some TSRs may be interfering with Windows. Disable any non-boot device drivers in the CONFIG.SYS and AUTOEXEC.BAT files. If you're upgrading from Windows 3.x and getting a stack overflow error, check the WIN.INI and SYSTEM.INI files for non-Windows-based programs or drivers loading.
- There may be an incompatible hardware configuration. Check the port and IRQ settings of your network card, sound card, and modem. Make sure there are no COM2/COM4 or COM1/COM3 conflicts, and verify that no devices are sharing IRQs. Disable or remove any conflicting devices.
- Finally, the computer may need a BIOS upgrade. Check the BIOS version and contact the manufacturer of your computer for information about a BIOS upgrade.

RESTORING THE SYSTEM

When a system crash occurs, the most difficult part of the recovery is often in restoring the operating system and backup files in the correct order. Windows 98 attempts to resolve this difficulty by providing a System Recovery program that restores your Windows 98 system by using the full backup that you created with Microsoft Backup. To use System Recovery to restore your system, you must have your Windows 98 CD, a backup device (such as a tape drive) connected to your computer, and a full system backup created with Microsoft Backup. To restore Windows 98 on your computer:

1. Insert your Windows startup disk into the floppy disk drive, and then boot your computer.
2. On the Boot menu, choose "Start your computer with CD-ROM support."
3. Switch to your CD-ROM drive by typing its letter and pressing ENTER.
4. At the DOS command prompt, type the following command and press ENTER:

   ```
   cd tools\sysrec
   ```

   This will switch to the system recovery directory on the Windows 98 CD.
5. At the DOS command prompt, type the following and press ENTER to launch the recovery utility:

   ```
   pcrestor
   ```
6. Follow the instructions that appear on your screen.

   This feature will reinstall Windows 98 on your computer. When setup is complete, the System Recovery wizard will start. Use the System Recovery wizard to restore your files:
7. In the System Recovery wizard, click Next.
8. Type your name and company, click Next, and then click Details.
9. In the Help window, read the entire Backup Help topic. (This explains the entire recovery process.) When you finish, click Close.
10. In the System Recovery wizard, click Finish.
11. The Microsoft Backup "Welcome" screen appears.

If you click Cancel, click Yes, and then restart your system, the System Recovery wizard automatically starts.

12 In the Microsoft Backup dialog box, click "Restore backed up files." Follow the instructions that appear on your screen. The entire backup of the registry is restored, along with all selected local drives.

You should restore your hardware settings only if your hardware is the *same* as when you made the backup. This should be true if you maintain consistent backups.

13 If you do not click "Restore hardware and system settings to the registry" but continue with the operation, your software settings and configuration will be restored along with all selected local drives.

14 Restore all your new and changed files (incremental backups). Begin with the oldest and progress to the most recent incremental backup.

If you cannot access your backup device while running the System Recovery wizard, it's most likely that the driver for the backup device is not installed. Install the driver for your backup device:

1 Click Start, highlight Settings, click Control Panel, and then double-click the System icon.

2 Click Device Manager, double-click your backup device, and then click Driver.

3 Click Update Driver, and then follow the instructions on your screen.

4 When you're prompted for a disk, insert the disk that came with your backup device.

Startup Troubleshooting

Ideally, Windows 98/SE will start flawlessly each time you boot your computer. In actual practice, however, Windows 98/SE can suffer from numerous hardware and software issues that may prevent a correct startup. In most cases, startup problems are identified when the system hangs up, suffers from fatal exception errors, encounters invalid VXD errors, or when other file-related problems occur at start time. As a technician, you should be comfortable with isolating and correcting typical startup problems.

TRY THE SAFE MODE

If Windows 98/SE refuses to start normally, try booting in the Safe Mode. Starting Windows 98/SE in Safe Mode bypasses the current real-mode configuration and loads a minimal protected-mode configuration—disabling Windows 98/SE device drivers and using the standard VGA display adapter. To start Windows 98 in Safe Mode, restart your computer, press and hold down the CTRL key until the Windows 98 Startup menu appears, and then choose Safe Mode. If you are able to start in Safe Mode, pick up the procedure with the "Starts in Safe Mode" section below. If not, see the following "Won't Start in Safe Mode" section.

WON'T START IN SAFE MODE

If the error(s) persist and the system will not start in the Safe Mode, you should inspect the system carefully for all of the following conditions:

- Your computer may be infected with a virus—probably a boot sector virus. Run a current real-mode antivirus utility from a write-protected boot disk in order to scan the system disks and memory. Remove any viruses (especially boot sector viruses) that you may encounter. It may be necessary to fix the master boot record using the FDISK /MBR command.
- Your computer's CMOS settings may not be correct. Review your computer's CMOS setup, and make sure that every entry is correct for your system's particular hardware configuration. If you're not sure, try selecting the BIOS Default settings for your BIOS. Save any changes and exit in order to reboot the system.
- There may be a hardware conflict. These conflicts can include (but are not limited to) PCI BIOS settings, IRQ conflicts, redundant COM ports (such as two COM1 ports, or an internal modem set to the same COM port as an existing serial port), and defective RAM chips. Simplify (remove) your nonessential system devices, and try booting again. If this works, you'll need to reinstall one device at a time until you find the one that's precipitating the trouble; then inspect its condition and setup carefully.
- One or more settings in the MSDOS.SYS file need to be changed (for example, the Logo= setting should be set to 0). See the section "Managing MSDOS.SYS," earlier in the chapter, for details about the MSDOS.SYS file.
- You have a compressed drive that is unable to mount a compressed volume file (CVF). You may need to correct problems with the compression software, or remove the compression software outright.
- If you're still unable to start Windows 98/SE in the Safe Mode, run the Windows Registry Checker (SCANREG.EXE) tool to check for problems with the system registry. Restart your computer, press and hold CTRL, choose Command Prompt Only, type **scanreg**, and then press ENTER. If there is a problem with the registry, you may be able to correct the problem, or select an older working registry that will allow the system to boot.
- If you still cannot start Windows 98/SE in the Safe Mode after using Registry Checker, try installing Windows 98/SE into a new empty folder. This can help to establish whether the problem is related to a corrupted file or remnant of a previous operating system (such as a configuration setting), or a hardware problem.

STARTS IN SAFE MODE

If Windows 98 does start in the Safe Mode, step through the startup process with MSCONFIG to see if any devices do not load properly:

1. Click Start, click Run, type **msconfig** in the Open box, and then click OK.
2. Click Selective Startup.
3. Try different boot options (such as Boot A, Boot B, or Boot C) according to Table 45-3.

First, try the Boot A option. If Windows 98/SE does not start normally, try the Boot B option. If Windows 98/SE does start normally using the Boot A option, there is a problem in the SYSTEM.INI or WIN.INI file. Find which line in the SYSTEM.INI or WIN.INI file is causing the problem:

1. Click Start, click Run, type **msconfig** in the Open box, and then click OK.
2. Click the WIN.INI tab.
3. Double-click the \Windows folder.

TABLE 45-3 BOOT OPTIONS TO IDENTIFY SYSTEM STARTUP PROBLEMS

	BOOT A	BOOT B	BOOT C
Process Config.sys file	Yes	No	Yes
Process Autoexec.bat file	Yes	No	Yes
Process Winstart.bat (if available)	Yes	Yes	No
Process System.ini file	No	Yes	Yes
Process Win.ini file	No	Yes	Yes
Load Startup Group items	Yes	Yes	No

4. Click the load= and run= check boxes to remove the check marks.
5. Click OK.
6. Click Yes when you're prompted to restart your computer.

If this corrects the problem, one or more of the files you unchecked is probably the culprit. Replace each file systematically until you find the one causing the trouble.

If Windows 98/SE starts normally using the Boot B option, there is a problem with a driver or TSR program being loaded from the CONFIG.SYS or AUTOEXEC.BAT file—see the "Checking TSR Problems" section below.

If Windows 98/SE does not start normally with the Boot A or Boot B options, try the Boot C option. If Windows 98/SE starts normally using the Boot C option, there is a problem with a program that is run during startup. See the "Checking Startup Problems" section below.

If you're still unable to start Windows 98/SE normally, use the System File Checker tool to check for damaged or replaced system files. To start System File Checker, click Start, highlight Programs, select Accessories, choose System Tools, click System Information, and then click System File Checker on the Tools menu. If problems persist and you're still unable to start Windows 98/SE normally, refer to the "Checking Protected-Mode Problems" section below.

CHECKING STARTUP PROBLEMS

If you determine that there's an issue with the Startup folder, the problem may be a result of a program that is run during startup. Determine which program is causing the problem:

1. Click Start, click Run, type **msconfig** in the Open box, and then click OK.
2. Click the Startup tab, and then click each check box to clear it.
3. Click OK, and then restart your computer when you're prompted to do so.

If the problem is resolved, one or more of the programs that you unchecked is probably the culprit. Systematically restore each program until you find the one that's causing the trouble.

There may also be a problem with a TSR being loaded in the WINSTART.BAT file (if the WINSTART.BAT file exists). If the "Process Winstart.bat file" check box is available on the General tab in System Configuration Utility, click the check box to clear it, click OK, and then restart your computer. Keep in mind that the WINSTART.BAT file is usually located in the \Windows folder, and is used to load TSRs that are required *only* by Windows-based programs.

CHECKING TSR PROBLEMS

It is also possible that the problem may be a driver or TSR being loaded from the CONFIG.SYS or AUTOEXEC.BAT file:

1. Click Start, click Run, type **msconfig** in the Open box, and then click OK.
2. Click Selective Startup, and then click the "Process Autoexec.bat file" check box to clear it.
3. Click OK, and then restart your computer when you're prompted to do so.

If the problem is corrected, the problem driver or TSR is being loaded from the AUTOEXEC.BAT file. If the problem is not resolved, the problem driver or TSR is being loaded from the CONFIG.SYS file. To determine which line in the AUTOEXEC.BAT or CONFIG.SYS file is loading the driver or TSR, try these steps:

1. Click Start, click Run, type **msconfig** in the Open box, and then click OK.
2. Click the AUTOEXEC.BAT or CONFIG.SYS tab, and then click the check boxes for all nonessential drivers and programs to clear them.
3. Click OK, and then restart your computer when you're prompted to do so.

If the problem is resolved, one or more of the programs that you unchecked is probably the culprit. Systematically restore each program until you find the one that's causing the trouble. If the problem is not resolved, run the Windows Registry Checker to examine possible problems with the system registry. To start the Registry Checker, click Start, highlight Programs, select Accessories, choose System Tools, click System Information, and then click Registry Checker on the Tools menu.

CHECKING PROTECTED-MODE PROBLEMS

The startup problem may be in a Windows 98/SE protected-mode driver. Use the following steps to determine whether this is the case:

1. Click Start, click Run, type **msconfig** in the Open box, and then click OK.
2. On the General tab, click Advanced.
3. Under Settings, click a check box to select it.
4. Click OK, click OK again, and then restart your computer.

If the problem persists, repeat these steps to select additional items. When the problem is corrected, the last item to be selected is the culprit. If the problem is not resolved, you may try to disable PCI IRQ bus steering in Windows 98/SE. If the problem is still not resolved, disable devices in Device Manager:

1. Click Start, highlight Settings, and then click Control Panel.
2. Double-click System.
3. On the Device Manager tab, disable all devices under the following branches:

   Display adapters
   Floppy disk controllers
   Hard disk controllers
   Keyboard

Mouse
Network adapters
Ports
PCMCIA socket
SCSI controllers
Sound, video, and game controllers

4. Double-click the branch containing the device you want to disable, click the device to highlight it, and then click Properties.
5. On the General tab, click the "Disable In This Hardware Profile" check box to select it, and then click OK.
6. Restart your computer.

If the problem is resolved, systematically reenable each of the devices that you disabled (and verify that no devices are conflicting). Click the Resources tab and verify that there are no conflicts listed under Conflicting Device List.

If the problem is not resolved, run the Automatic Skip Driver Agent tool to enable any device that has been disabled. To start Automatic Skip Driver Agent, click Start, highlight Programs, select Accessories, choose System Tools, click System Information, and then click Automatic Skip Driver Agent on the Tools menu. If the problem is not resolved, check for a damaged static virtual device driver (VxD):

1. Restart your computer, press and hold down the CTRL key until the Windows 98 Startup menu appears, and then choose Step-By-Step Confirmation.
2. Press Y at each prompt up to (and including) "Load all Windows drivers?" and then press N to everything else.

Note that you should make a list of all the items trying to load after this point. This prevents VxDs from loading, and prevents VxDs in the \Windows\System\Vmm32 folder from overriding Windows internal VxDs (for example, VxDs built into the Vmm32.vxd file).

Shutdown Troubleshooting

Windows 98/SE may also suffer from problems during the shutdown phase. When Windows 98/SE shuts down, it performs many functions. It completes all disk write functions, flushes the disk cache, runs the Close Window code to close all currently running programs, and transitions all protected-mode drivers to real mode. Since shutdown problems can result in data loss, it's important that you understand just how to deal with shutdown problems under Windows 98/SE. Shutdown problems in Windows 98/SE can be caused by any of the following issues:

- A video card is not assigned an IRQ in real mode.
- A program or TSR may not close correctly.
- An incompatible, damaged, or conflicting device driver is loaded.
- A damaged "Exit Windows" sound file.
- Incorrectly configured or damaged hardware.
- An incompatible BIOS configuration setting.

- An incorrect APM or ACPI setting.
- The "Fast Shutdown" registry key is enabled.

Although Windows 98/SE includes many new drivers, not all third-party manufacturers have had a chance to update their hardware drivers. Some existing computers or devices may require an updated BIOS or device driver to fully support Windows 98/SE.

To troubleshoot shutdown problems in Windows 98/SE, you must first determine the cause of the problem:

- *Check the programs that are running.* This includes disabling any TSRs loading in real mode, disabling programs that start from your Startup group, and disabling any nonessential third-party device drivers.
- *Check the hardware configuration.* This includes the BIOS settings and the BIOS version. Disable or remove any hardware that may be responsible.

CHECK THE PROGRAMS

To check the programs that are running, use the System Configuration Utility tool (MSCONFIG.EXE) to clean boot your computer. If a clean boot resolves the issue, you can then use the System Configuration Utility tool to determine the program that is the cause of the shutdown problem.

CHECK THE HARDWARE

To check the hardware configuration on your computer, use Device Manager to troubleshoot the installed hardware:

1. Click Start, highlight Settings, click Control Panel, and then double-click the System icon.
2. On the Device Manager tab, disable all devices under the following branches:

   Display adapters
   Floppy disk controllers
   Hard disk controllers
   Keyboard
   Network adapters
   PCMCIA socket
   Ports
   SCSI controllers
   Sound, video, and game controllers
   Mouse

When you have a serial mouse and you disable the COM ports, if Windows reports to the BIOS that the COM ports are disabled, you'll have no mouse until you enable the COM ports in the BIOS again.

3. Double-click the branch containing the device you want to disable, click the device to highlight it, and then click Properties.
4. On the General tab, click to select the "Disable in this hardware profile" check box, and then click OK.
5. Restart your computer.

When you disable the mouse and then restart your computer, you may receive an error message such as "Windows did not detect a mouse attached to the computer. You can safely attach a serial mouse now."

To reenable your mouse, use the following keyboard commands:

1. Press CTRL+ESC to bring up your Start menu.
2. Press the UP ARROW until Settings is highlighted, press the RIGHT ARROW to select Control Panel, and then press ENTER.
3. Press the DOWN ARROW and LEFT ARROW keys until System is highlighted, and then press ENTER.
4. Press the LEFT ARROW key to highlight Device Manager, press TAB, press TAB, and then press the DOWN ARROW key and highlight the device listed under the expanded Mouse branch.
5. Press TAB once to highlight Properties, press ENTER, press TAB once to select Enable Device, and then press ENTER. The mouse should now work.
6. Click OK, and then click Yes to restart your computer.
7. If the mouse still does not work, press TAB, and then press ENTER. Press ENTER when you receive the message to restart your computer.

If the problem is resolved, reenable the devices you had disabled previously, and then verify that no devices are conflicting. Enable devices in the following order:

- COM ports
- Hard disk controllers
- Floppy disk controllers
- Other devices

To enable a device and check for possible conflicts, follow these steps:

1. Double-click the branch containing the device that you want to reenable, click the device, and then click Properties.
2. On the General tab, click to clear the "Disable in this hardware profile" check box.
3. On the Resources tab, verify that there are no conflicts in the Conflicting Device List. Note that the Resources tab does not appear for each device.
4. Click OK, and then restart your computer.

If the problem is not corrected, run the Automatic Skip Driver Agent to enable any device that has been disabled:

1. Click Start, highlight Programs, select Accessories, and choose System Tools.
2. Click System Information, and then click Automatic Skip Driver Agent on the Tools menu.

If the problem is resolved with these steps, and you determine a specific device to be the cause of your shutdown problem, contact the device manufacturer for an updated version of the driver or firmware for the device.

KNOWN SHUTDOWN ISSUES

IRQ Steering This powerful feature allows several PCI devices to share the same PCI IRQ. If the BIOS is not fully compliant, this option may result in shutdown problems, even if two or more devices are not sharing an IRQ. To disable PCI IRQ bus steering:

1. Click Start, highlight Settings, click Control Panel, and then double-click the System icon.
2. On the Device Manager tab, click System Devices.
3. Double-click PCI Bus, click to clear the Use IRQ Steering check box on the IRQ Steering tab.
4. Click OK, click OK, and then restart your computer.
5. After you restart the computer, try to shut down your computer again.

If your computer now shuts down successfully, you may need to change the BIOS configuration, or you may need a BIOS update.

Plug-and-Play BIOS In some cases, the BIOS and Windows may not be communicating properly with the computer hardware during the shutdown process. It is possible to configure Windows 98/SE to ignore the presence of a PnP BIOS and communicate directly with the hardware. Follow the steps below to configure Windows so it does not use the PnP BIOS.

This should only be done for testing purposes, as leaving the PnP BIOS disabled may cause some hardware to stop working.

1. Reboot your machine and hold the CTRL key until you see the Windows 98 Start menu.
2. Choose Command Prompt Only.
3. Type the following at the command prompt (where <Windows> is the folder in which Windows is installed):

   ```
   cd \<Windows>\System
   ```

4. Rename the BIOS.VXD file to BIOS.OLD.
5. Restart your computer.
6. After you restart, attempt to shut down Windows.

If the shutdown is now successful, it's most likely an indication that the system BIOS is contributing to the shutdown problems. You may need to update the system BIOS.

NVRAM/ESCD There are typically specific settings that dictate how the BIOS and Windows interact during the startup and shutdown processes. To check this, disable the "NVRAM/ESCD updates" feature to determine whether it resolves the shutdown problem:

1. Click Start, highlight Settings, click Control Panel, and then double-click the System icon.
2. On the Device Manager tab, select System Devices.
3. Select Plug and Play BIOS, and then click to select the "Disable NVRAM / ESCD updates" check box on the Settings tab (Figure 45-6).
4. Click OK, click OK, and then restart your computer.
5. After you restart the computer, try to shut down your computer again.

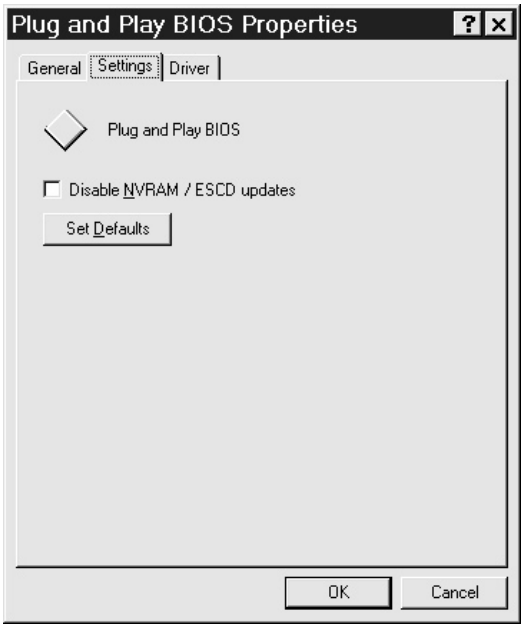

FIGURE 45-6 The PnP BIOS Properties dialog

Fast Shutdown Enabled The System Configuration Utility includes an option to disable fast shutdown. If this option is unchecked in Windows 98/SE, your system may reboot instead of shutting down. To correct this issue, change the FastReboot value data from 1 to 0 in the following registry key: HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Shutdown.

If you apply the Windows 98/SE Shutdown Supplement that addresses shutdown issues, the Disable Fast Shutdown option is no longer listed on the Advanced tab in MSCONFIG.

Antivirus Program If you have an antivirus program that's configured to scan your floppy disk drive when you shut down your computer, your computer may stop responding. Try disabling or uninstalling the antivirus software on your system.

Printer Troubleshooting

Printers are the most common and popular peripheral device for the PC. In the majority of cases, using a printer is as simple as connecting it to a parallel port and installing the drivers, but there are situations when the printer may not function properly under Windows 95/98/SE. This part of the chapter outlines a series of steps that may help you resolve printing problems under Windows.

CHECK THE PRINTER'S HARDWARE

Many printing problems can be caused by hardware-related issues. Before you jump into complicated troubleshooting procedures, you should first verify that there are no hardware-related printer issues:

- Verify that your printer is connected to the correct power source and turned on. If the printer has a "suspend" mode, see that the printer is not in the "suspend" mode.
- Verify that your printer is properly connected to your printer port (LPT1). Note that the printer cable must be seated properly in the printer port on your computer and at the printer.
- Verify that your printer has an adequate supply of paper (or other appropriate printing media), and that the media is not jamming the printer.
- Verify that your printer contains an adequate supply of ink or toner to work properly. Low supplies of ink or toner are usually indicated by an error light or message on the printer itself.
- If your printer has an "online/offline" setting or button, verify that your printer is "online."
- Many printing problems are the result of your printer memory being full. Reset your printer and clear its memory by turning it off, waiting five to ten seconds, then turning it back on.
- Verify that you've followed all of the installation instructions provided by your printer's manufacturer.
- Perform a self-test on the printer (according to the manufacturer's instructions). Such self-diagnostic tools can often resolve or diagnose basic issues with your printer hardware. If the printer's self-test doesn't work, your printer may be damaged.
- If another computer is available, verify that your printer works properly when connected to another computer. If your printer does not work properly when connected to another computer, your printer may be damaged.

CHECK THE PRINTER PROPERTIES

Incorrect printer property settings can cause poor or incomplete output, or can cause your printer not to print at all. See that your printer property settings are configured as recommended by the printer's manufacturer:

1. Click Start, highlight Settings, and then click Printers.
2. Right-click the printer you want to check, and then click Properties (Figure 45-7).
3. Verify that all of your printer properties are configured as recommended by your printer manufacturer.

TRY THE PRINT TROUBLESHOOTER

Windows 98 and Windows 95 both include a Print Troubleshooter tool that can help to automate the process of testing. Before you perform any of the troubleshooting steps below, try the Print Troubleshooter tool.

For Windows 95:

1. Click Start, and then click Help.
2. On the Contents tab, double-click the Troubleshooting topic.
3. Double-click the "If you have trouble printing" topic.

The Windows 95 Resource Kit also includes a Print Troubleshooter tool, and this tool is more detailed than the Print Troubleshooter in Windows. This tool (Epts.exe) is also available on the Windows 95 Upgrade CD-ROM in the Other\Misc\Epts folder.

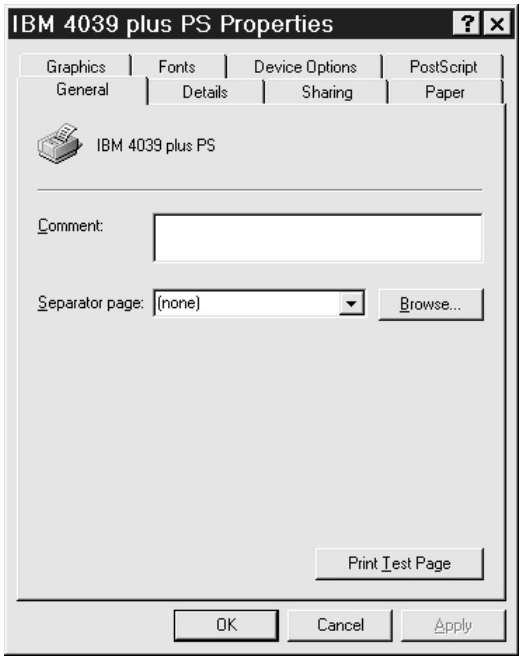

FIGURE 45-7 A typical printer Properties dialog

For Windows 98:

1. Click Start, and then click Help.
2. Click Troubleshooting, click Windows 98 Troubleshooters, and then click Print.

CHECK THE PRINTERS.TXT FILE

Windows 98 and Windows 95 include a file called PRINTERS.TXT, located in the \Windows folder. This file contains information about known printing issues, and may help you identify and resolve many common compatibility and printing problems.

TRY A TEST DOCUMENT

Often, a sophisticated printing application such as Microsoft Word or CorelDraw may not print as expected. Try printing a basic document from WordPad or Notepad. Restart your computer, click Start, highlight Programs, select Accessories, then click Notepad or WordPad. Type some text in the editor, and then try to print the text. If you can print successfully in Notepad or WordPad, your printing issue may be specific to one application. You should try the steps in the "Problems with Printing in One Program" section below. If you cannot print successfully in Notepad or WordPad, try the steps in the following "Print from a Command Prompt" section.

PRINT FROM A COMMAND PROMPT

Try printing from a DOS command prompt in order to determine whether your printer hardware is connected properly and can receive instructions from the computer. We'll do this by copying a file to your printer:

1. Verify that the printer is turned on and online without any printer errors.
2. Check that no "printer sharing" devices (such as printer switch boxes) or daisy-chained devices (such as parallel port CD-ROMs, Zip drives, etc.) are connected between the computer and printer.
3. Restart your computer to the Safe Mode Command Prompt mode using the Startup menu.
4. At the command prompt, type the appropriate line below, and then press ENTER:

   For a regular printer, try **copy c:\windows\mouse.txt lpt1**.
   For a laser printer, try **copy c:\windows\mouse.txt lpt1 /b**.
   For a PostScript printer, try **copy c:\windows\system\testps.txt lpt1**.

These commands assume that your printer is connected to LPT1. If your printer is connected to a different printer port, substitute that printer port number in the sample commands. If you do not have a MOUSE.TXT file in your \Windows folder, try substituting the LICENSE.TXT file, the SUPPORT.TXT file, or the CONFIG.TXT file from the \Windows folder.

These commands copy the given file to the printer. If the file is not printed (or you receive a Write Fault error message), there may be a problem with the printer port, the printer cable, or the printer itself. You may want to try using a different printer cable, or (if possible) test the cable with a different printer. If you determine that you can print from a command prompt (but not from Windows 95/98), try the steps listed in the "No Windows Support" section below.

When you copy a file to some ink-jet or laser printers, you may need to press the "form feed" or "resume" key after the printer has received the print job, or the printer may not eject the paper.

Alternatively, you can try printing from LPT1.DOS. Printing to the LPT1.DOS port is similar to printing to a file and then copying the file to the printer port. Enable the LPT1.DOS port in Windows 95/98:

1. Click Start, highlight Settings, and then click Printers.
2. Right-click the printer that you want to use, and then click Properties.
3. On the Details tab, click Add Port.
4. In the Add Port dialog box, click Other, click Local Port, and click OK.
5. Type **lpt1.dos** in the "Enter a port name" box, and then click OK.

Remember that printing to the LPT1.DOS port may be slower than printing to the standard LPT1 port. Since printing to LPT1.DOS uses low-level DOS commands to send a print job to the printer, not all of the available signals in the port and printer cable are used. As a result, if printing to LPT1.DOS is successful, this may indicate a problem with the printer port or printer cable. If you cannot print to LPT1.DOS in normal mode, try restarting your computer in Safe Mode and then printing to LPT1.DOS.

NO WINDOWS SUPPORT

If you can print from a command prompt, but not from *any* Windows-based program, there may be a problem with the system's "spool settings," or with bidirectional communication. Determine whether either of these issues is the cause of your problem:

1. Click Start, highlight Settings, and then click Printers.
2. Right-click the printer that you're trying to print to, and then click Properties.

3. Click the Details tab, click Spool Settings, and then click "Print directly to the printer."

If the local printer is being shared, the "Print directly to the printer" option is unavailable, so stop sharing the printer.

4. If your printer supports bidirectional communication, click "Disable bi-directional support for this printer." Bidirectional printing relies on the IEEE 1284 specification. If your printer cable does not conform to this specification (and is not of reasonable length), bidirectional printing will not work in Windows 98 or Windows 95.
5. Click OK, and then click OK again to close Print Properties.
6. Try to print from Notepad or WordPad.
7. If you can print from Notepad or WordPad, try different combinations of spool settings and bidirectional support until you find a combination that works. For example, try disabling bidirectional support with RAW and EMF spool data format settings. Also try bidirectional support with the RAW spool data format. Remember that RAW is the only spool data format supported for PostScript printers.

PROBLEMS WITH PRINTING IN ONE PROGRAM

If your printing problems only occur in *one* program, this almost always indicates your problem is specific to that one program and is not an issue with Windows 95/98 or your hardware. If you can print from Notepad, WordPad, and other programs, try the following steps to try to narrow the issue within your offending program:

1. As a test, try to print a blank page from the suspect program. If this prints correctly, the program may have problems with memory or fonts. The program may need a patch or update.
2. The system registry is used by 32-bit programs to obtain needed information, while 16-bit programs may use INI files. If you're having a printing problem with a 16-bit program, perhaps an INI file needs to be modified to accommodate the program.
3. Uninstall and then reinstall the program.
4. Contact the manufacturer of the program for specific settings or possible known issues with their program that might affect printing.

REMOVE AND REINSTALL THE PRINTER DRIVER

It is possible that the printer driver you're using is incorrect or corrupted. Verify that your printer driver is correct, properly installed, and undamaged. To do this, let's remove and reinstall the printer driver:

1. Click Start, highlight Settings, and then click Printers.
2. Right-click the printer that you want to remove, and then click Delete. If you're prompted to remove all the files associated with the printer, click Yes.
3. Click Start, highlight Settings, and then click Printers.
4. Double-click Add Printer, and then follow the instructions in the Add Printer wizard to reinstall the appropriate printer driver.
5. Test the printer to determine whether your printing issue is resolved.

If your printing issue is not resolved, try using the Generic/Text Only printer driver for your printer. This test can help determine whether your printing problem is related to your printer driver. To use the Generic/Text Only printer driver:

1. Click Start, highlight Settings, and then click Printers.
2. Double-click Add Printer, and then follow the instructions in the Add Printer wizard to install the Generic/Text Only printer driver as a local printer.

This driver is a very basic driver, and the printed output may be simplified (or appear in a lower resolution).

Test to see if you can print using this driver. If you can print successfully using the Generic/Text Only printer driver, your printing issue is most likely specific to the printer driver that you're using. You should contact your printer manufacturer to inquire about the availability of an updated printer driver, a patch (or fix) for your current driver, or information about any known compatibility issues with your driver.

CLEAN UP YOUR HARD DRIVE

Printing issues may sometimes occur if your hard disk contains too many temporary files, if the disk is fragmented or damaged, or if the disk does not contain more than 3MB of free space. Follow the procedures below to clean up the hard disk.

Delete TMP and SPL Files

You should first take some time to locate and delete any temporary (TMP) or spool (SPL) files that may be present on the drive:

1. Reboot your computer to a command prompt.
2. At the command prompt, type **set**, and then press ENTER.
3. Note the location of the TEMP variable.
4. Change to the TEMP folder. For example, if TEMP is set to c:\windows\temp, type

   ```
   cd\windows\temp
   ```

   and then press ENTER.
5. Delete any temporary files in this folder. Temporary files typically have a .TMP file extension. To delete these files, type

   ```
   del *.tmp
   ```

   Press ENTER.

You should not delete these files from *within* the Windows 98/95 GUI because Windows 98/95 (or a Windows-based program) may be using one of these files.

6. Change to the "spool folder." For example, type

   ```
   cd\windows\spool\printers
   ```

   Press ENTER.

Delete any "spool files" in this folder. Spool files typically have a .SPL file extension. To delete these files, type

```
del *.spl
```

Press ENTER.

Perform Basic Drive Maintenance

If your hard disk becomes severely fragmented, the file system is damaged, or the drive has cross-linked files, you may encounter printing problems. Run ScanDisk and Disk Defragmenter to check for these problems:

1. Restart your computer normally.
2. Click Start, highlight Programs, point to Accessories, select System Tools, and then click ScanDisk.
3. Let ScanDisk run a cycle on each drive in the system. Have ScanDisk fix any errors that it finds.
4. Click Start, highlight Programs, point to Accessories, select System Tools, and then click Disk Defragmenter.
5. Let Defrag run a cycle on each drive in the system. You may not need to defragment a drive that is less than 5 percent fragmented.

CHECK YOUR PRINTER PORT

If your printer port (LPT port) is not configured and working properly, your printer may not work correctly (or at all). Follow the procedures below to verify the configuration and operation of your printer port.

Check the Port Settings with Device Manager

Use Device Manager to verify that your printer port settings are correct and that no resource conflicts exist:

1. Right-click My Computer, click Properties, and click the Device Manager tab.
2. Double-click Ports (COM & LPT), and then double-click the appropriate port for your printer (for example, "Printer Port LPT1").
3. Click the Resources tab, and then verify that the settings are correct for your printer port. For example, the I/O range for a standard LPT1 port is 0378h-037Ah. (A physical LPT2 port typically uses I/O 278.) Also verify that the "Conflicting devices list" displays "No conflicts."
4. If you determine that you have one or more devices that are conflicting with your printer port, you'll need to isolate and correct the conflict.

Remove and Reinstall the Printer Port

The printer port itself may have a missing or corrupted driver. You may be able to correct an issue with your printer port by removing and reinstalling it:

1. Right-click My Computer, click Properties, and then click the Device Manager tab.
2. Double-click the Ports (COM & LPT) branch to expand it, and then click the appropriate port for your printer (this is normally Printer Port LPT1).
3. Click Remove, click OK to finish removing your port, and then restart your computer.

When Windows automatically detects your printer port, follow the instructions on the screen to finish reinstalling the port. If your port is not automatically detected after you restart your computer:

1. Click Start, highlight Settings, click Control Panel, and then double-click Add New Hardware.
2. In Windows 95, click Next, click No, and then click Next.
3. In Windows 98, click Next, and then click Next again to search for plug-and-play devices. If the port is not found, click "No, the device isn't in the list," click Next, click "No, I want to select the hardware from a list," and then click Next.

If Windows 98 finds your port when it searches for plug-and-play devices, click "Yes, the device is in the list," click the device in the list, click Next, and then click Finish.

4. Click Ports (COM & LPT), and then click Next.
5. Click (Standard port types) in the Manufacturers box, click Printer Port in the Models box, and then click Next.
6. Follow the directions on the screen, and then click Finish.

After you finish reinstalling the printer port, test to see if the issue is resolved. If not, continue with the next section.

DISABLE ECP SUPPORT

If your computer provides an Enhanced Capabilities Port (or ECP), you may need to disable the port in order to remove possible hardware incompatibilities between the ECP and the printer. Determine whether your issue is specific to your ECP, and disable the ECP by using the appropriate method under Windows 95 or 98.

Under Windows 95:

1. Click Start, highlight Settings, click Control Panel, and then double-click the System icon.
2. On the Device Manager tab, double-click the Ports (COM & LPT) branch to expand it.
3. Double-click the ECP port.
4. On the Driver tab, click Change Driver.
5. Click Show All Devices.
6. In the Manufacturers box, click Standard Port Types.
7. In the Models box, click Printer Port, and then click OK until you return to Control Panel.

Under Windows 98:

1. Click Start, highlight Settings, click Control Panel, and then double-click the System icon.
2. On the Device Manager tab, double-click the Ports (COM & LPT) branch to expand it.
3. Double-click the ECP port.
4. On the Driver tab, click Update Driver. When the Update Device Driver wizard appears, click Next.
5. Click "Display a list of all the device drivers in a specific location, so you can select the driver you want," and then click Next.
6. Click Show All Hardware.

7. In the Manufacturers box, click Standard Port Types.
8. In the Models box, click Printer Port, and then click Next.
9. When the Update Driver Warning dialog box appears, click Yes.
10. Click Finish, and then click Yes to restart your computer.

If the ECP port is redetected after you restart your computer, you may also need to disable or reconfigure the LPT port in the CMOS setup.

UPDATE THE LPT.VXD FILE UNDER WINDOWS 95

If you're using Windows 95, upgrading to Windows 98/SE can often resolve certain printing issues. If you want to continue using Windows 95, you may be able to resolve printing issues by updating to a different LPT.VXD file. The LPT.VXD file is the virtual device driver for your printer port. The standard printer port driver file works correctly with most Windows 95-based computers, but there is an alternate LPT.VXD file that may resolve the following problems:

- You may receive timeout error messages, or you may be unable to print if you're printing with a Compaq-based computer and a bidirectional printer.
- You experience problems printing to any bidirectional printer on a computer with a PS/2-style printer port. Symptoms may include an extra page being printed, PCL commands appearing on the printout, and so on.
- If you cannot use Device Manager to configure an ECP port to run in standard LPT mode, this may be because your computer has a plug-and-play BIOS that enumerates only ECP parallel ports.

The alternate LPT.VXD file is located in the \Drivers\Printer\Lpt folder on the Windows 95 CD. This file is also available for download from the Microsoft FTP site.

Use the steps below to install the alternate LPT.VXD file:

1. Click Start, highlight Find, and then click Files or Folders.
2. In the Named box, type **lpt.vxd**, and then click Find Now.
3. Right-click the LPT.VXD file in the \Windows\System folder, click Rename, type **lpt.old**, and then press ENTER.
4. Copy the LPT.VXD file from the \Drivers\Printer\Lpt folder on the Windows 95 CD to the \Windows\System folder on the hard disk.
5. Restart your computer.

The alternate LPT.VXD file has the same file size and date as the original file. The version number of the alternate LPT.VXD file is 4.00.503 or 4.00.951. To determine the version number, right-click the LPT.VXD file, and then click Properties.

DISABLE THE CHECK PORT STATUS OPTION

The BIOS in some computers incorrectly reports that the printer port is busy or not available. By default, Windows 98/95 checks for these errors. Clearing the Check Port Status check box causes Windows 98/95

to ignore these messages. If you had to disable the "Fast printing direct to port" option in Windows 3.1 or WfWG 3.x, you should also disable the "Check Port Status" option in Windows 98/95:

1. Click Start, highlight Settings, and then click Printers.
2. Right-click the printer that you want to use, and then click Properties.
3. Click the Details tab, click Port Settings, and then clear the Check Port Status check box.
4. Restart the computer if necessary.

CHECK FOR A READ-ONLY WIN.INI FILE

Some printing problems can occur if the WIN.INI file has the read-only attribute. Determine whether the WIN.INI file has the read-only attribute:

1. Click Start, highlight Find, and then click Files or Folders.
2. In the Named box, type **win.ini**.
3. In the Look In box, click the drive containing the \Windows folder, and then click Find Now.
4. Right-click the WIN.INI file, and then click Properties.
5. If the "read only" check box is selected, click to clear it.
6. Click OK.
7. Quit the Find tool, and then restart your computer.

Further Study

Microsoft: **http://www.microsoft.com**