



Microsoft[®] **Windows[™] 3.1 and Serial Communications**



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What's New in Windows 3.1

Choose this button for some highlights about improvements in the way Windows 3.1 handles serial communications.



Conceptual Overview

Choose this button for an introduction to the subject of serial communications and an explanation of the concepts that are discussed in this ViewNote.



Why Conflicts Occur

Choose this button for information about the most common causes of serial communications conflicts.



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Choose this button for information about how to correct your COM port problems.



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Conceptual Overview



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Why Conflicts Occur



The Basics: Why Conflicts Occur



IRQ Sharing



BIOS Data Area (BDA) and Address Packing



MS-DOS-Based Communications Software



Third-Party Communications Drivers



How to Resolve Conflicts

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How to Resolve Conflicts



Resolving IRQ Conflicts



Resolving Address Packing



Resolving Device Contention



Resolving Driver Conflicts



Miscellaneous Troubleshooting

Choose this button to see a list of symptoms that may match what you are experiencing. Then you can choose from the list for help.

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Tip: For information about how to use this guide, choose the More Info button on the Contents screen (the first screen).

[Click a mouse button or press a key to dismiss this notice.](#)

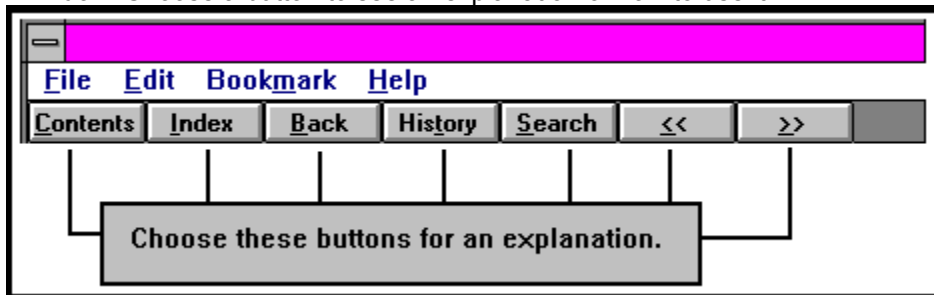
About This Guide

This ViewNote provides information about serial communications in the Microsoft Windows version 3.1 environment.

Tip: For the best readability, view the Windows 3.1 and Serial Communications ViewNote in a maximized window by choosing Maximize from the Control menu (--).



You move around in this ViewNote by choosing a "hotspot." Hotspots can come in the form of hypertext or graphic icons. Choosing a hotspot can bring up a pop-up window or a jump. The illustration below explains how to use the button bar located near the top of the ViewNote window. Choose a button to see an explanation of how to use it.



See Also

[Changing the Color of Your Hypertext](#)
[Trademarks](#)

Trademarks

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Hotspot

Hotspots are text, graphics, or parts of graphics that provide links to other topics or information about the current topic. The mouse pointer changes to the shape of a hand when it is over a graphical or hypertext hotspot.

To highlight all the hotspots in a topic, press CTRL+TAB.

Index Button

To find a topic from the index, choose the Index button and type a word or select one from the list.

See Also

[Search Button](#)

Browse Buttons

To move backward and forward to view the various topics available on the Contents screen, choose the << and >> Browse buttons .

Contents Button

To return to the Contents screen (the first screen), choose the Contents button .

Back Button

To return to the last screen you were viewing, choose the Back button.

History Button

To obtain a list of topics you have read, choose the History button. You can then choose a topic from the History list to return to that topic.

Search Button

To search the entire document for specific words, choose the Search button and type the desired word in the Search For text box.

For example, if you want to read all the topics in this ViewNote that refer to Windows, search on the word "Windows" by choosing the Search button and typing **windows** in the Search For text box. A list of topics will appear. To view the desired topic, choose the Go To button.

Hypertext

Hypertext is text that, when chosen, brings up a new screen or pop-up window to provide additional information about the current topic or a related topic. Hypertext is often (but not always) colored and underlined.

To show all hypertext in a topic, press CTRL+TAB.

You can change the color of the hypertext on your screen.

Graphic Icons

Not all graphic icons are hotspots. In this ViewNote, the folder icons and the More Information button icons are graphical hotspots. You can choose them to see more information about a topic or to go to a related topic.



To show all the hotspots in a topic, press CTRL+TAB.



(The buttons you see here are just illustrations. You cannot choose them.)

Choosing a Graphic or Hypertext Link

You choose a graphic or hypertext link by either clicking it with a mouse or pressing `TAB` to highlight it, and then pressing `ENTER`.

Changing the Color of Your Hypertext

You can change the color of the hypertext in this ViewNote by placing a `JUMPCOLOR` setting in the [Multimedia Viewer] section of your WIN.INI file. (The WIN.INI file is located in the WINDOWS\SYSTEM directory, and can be edited with any text editor, such as Notepad.)

The `JUMPCOLOR` setting syntax is

```
jumpcolor=<red-value> <green-value> <blue-value>
```

where the value is a number from 000 to 999, with 999 giving the highest intensity. You must include three digits for each value, and you must include each color value. For example, the following `JUMPCOLOR` setting changes your hypertext to a high-intensity blue:

```
jumpcolor=000 000 999
```

Blue text works well on non-white backgrounds. You can experiment with this setting to create a color that works best for you.

Tip: Choose the Back button from the button bar to return to the previous screen.

Pop-up Windows

A pop-up window provides more information about a topic and keeps the original topic screen visible in the background. To return to the original screen, you can click anywhere with the mouse or press any key.

Jumps

A jump takes you to a related topic on a new screen. From there, you can navigate as you would in any screen. For example, choose the Back button to return to the previous screen.

Performance Improvements

- Windows 3.1 supports the high-speed 16550AFN Universal Asynchronous Receiver-Transmitter (UART) buffer; Windows 3.0 does not. (The 16550AFN buffer is supported for Windows-based applications only.)
- Windows 3.1 supports baud rates of up to 57.6 kilobytes (K). (You may need to update your application to take advantage of these higher baud rates.) Some users experienced lockups during high-speed, full-duplex transfers while using Windows 3.0. These problems are resolved in Windows 3.1.
- Windows 3.1 has a new serial driver interface that allows data to be passed in blocks, instead of one character at a time. (Each block is treated as a single character.) This means faster data throughput and fewer transmission errors. Windows 3.0 passes data one character at a time.
- Windows 3.0 uses a "constant polling" method to determine when serial ports are occupied. Windows 3.1 uses the EnableCommNotification application programming interface (API); this enables applications to directly notify Windows of serial events, thereby increasing overall system performance.

Better Support for COM Ports

- Windows 3.1 provides better support for COM ports 3 and 4. You can now configure these ports by using Windows Control Panel.
- Windows 3.1 fully supports IRQ sharing; Windows 3.0 does not. (To take advantage of this feature, your personal computer must have Extended Industry Standard Architecture (EISA) or Micro Channel™ Architecture (MCA), or you must have a serial I/O card that supports IRQ sharing.)

Serial vs. Parallel Ports

Input/output (I/O) ports provide the means for your personal computer to send or receive data through external devices such as modems, printers, fax machines, and so forth. Virtually all personal computers have both parallel and serial ports. There are several distinctions between serial and parallel I/O ports.

Parallel ports are generally used only for printers, which is where the name LPT, for line printer, originates. Parallel ports transmit data in complete bytes, and in most cases they handle outgoing data only; they cannot receive information. (The IBM™ PS/2™ parallel ports are bidirectional; in addition, you can use certain peripherals, such as network card adapters, to enable your ports to transmit data bidirectionally.) You do not configure parallel ports; they are preconfigured for your machine.

Serial ports are generally used for communications, or COM devices, which include serial printers, modems, fax machines, and so forth. Serial ports are capable of both sending and receiving data. You can configure settings -- such as parity, stop bits, and data length -- for your serial ports. (In Windows, you can specify these settings by using Control Panel.) Serial ports transmit data one bit at a time, sequentially (or serially).

Port Addresses and Interrupt Request Lines (IRQs)

Every time you start your personal computer, your system BIOS checks your COM ports to see what serial devices are installed on your personal computer and posts this information to the system BIOS data area (BDA). Windows "reads" the BDA, and uses the IRQ for each device that is registered there. Usually, each COM port requires a unique IRQ to communicate with your personal computer. Certain personal computers and some I/O cards support IRQ sharing.

Note: Some earlier BIOS versions may not check for devices on COM ports 3 and 4. If you have devices installed on COM port 3 or 4 and your system BIOS does not recognize these ports, you need to register the addresses for COM3 and COM4 by using Windows Control Panel. This is explained in the procedure "Registering a Serial Device."

See Also

How Should My COM Ports Be Configured?

How Should My COM Ports Be Configured?

Generally, personal computers come with built-in ports COM1 and COM2 preset to the following values:

Port	Addresses	IRQ
COM1	03F8	4
COM2	02F8	3

In most cases, the default values for COM ports 1 and 2 should work for your system. You can view your COM port settings by using Windows Control Panel.

Most personal computers do not have built-in ports for COM3 and COM4. The default settings for these additional ports are listed here:

Port	Addresses	IRQ
COM3	03E8	4
COM4	02E8	3
COM3 (PS/2)	3220	3

Because COM1 and COM3 both use IRQ4 as the default, and COM2 and COM4 both use IRQ3, you may need to reassign the IRQ if you use serial devices (such as a fax card or modem) on COM ports 3 or 4. (You should not need to reassign the IRQ in this situation if you have an MCA or EISA machine, or a serial I/O card that supports IRQ sharing.)

You can reassign IRQs by using Control Panel.

See Also

[Resolving IRQ Conflicts](#)

[Reassigning the IRQ from Control Panel](#)

[IRQ-Sharing Serial I/O Cards](#)

16550AFN UART Chip Support

Every serial port uses a Universal Asynchronous Receiver-Transmitter (UART) chip to send and receive data. Inside your personal computer, data travels in parallel form. When you send or receive data by means of a serial device, the UART chip converts the data to a serial format so that your port can read it.

Many machines still use either the 8520 or the 16450 UART chip. The main advantage of the 16550AFN UART chip is its first in, first out (FIFO) buffering scheme, which can dramatically improve performance for modem transfer speeds of 9600 baud or higher. If you usually set your modem to 2400 or 1200 baud, chances are you don't need the 16550AFN UART.

Note: The 16550, an earlier version of the chip, was used in IBM PS/2 computers, models 50, 60, and 80, and replaced by the 16550AFN in the PS/2 model 70. You may want to check with your manufacturer to determine which version of the 16550 chip is installed in your machine. The 16550 chip does not support FIFO buffering.

MS-DOS-Based vs. Windows-Based Applications

Windows-based applications share a single time slice; each MS-DOS-based application running under Windows receives its own time slice. A time slice is the amount of processor time allocated to an application, usually measured in milliseconds. The smaller the time slice, the more efficiently Windows can run multiple tasks; therefore, in general, you will notice better performance with Windows-based applications running under Windows.

You run MS-DOS-based applications under Windows by writing PIF files that specify how you want Windows to schedule processor time for these applications. (For more information about PIF files, refer to Chapter 8, "PIF Editor," in the version 3.1 "Microsoft Windows User's Guide.")

See Also

[Using MS-DOS-Based Communications Software Under Windows 3.1](#)

The Basics: Why Conflicts Occur

For serial communications to be successful, three settings must match: the port addresses in the BIOS data area, the COM port entries in the SYSTEM.INI file, and the switches on your serial hardware (if you have any installed). This section discusses the situations that can occur if these settings do not match, as well as other situations that can cause conflicts.

Determining whether these settings match, and changing them if they do not, is discussed in the topics listed under "See Also," below.

For more information about why conflicts occur, choose one of these topics:

[IRQ Sharing](#)

[BIOS Data Area \(BDA\) and Address Packing](#)

[MS-DOS-Based Communications Software](#)

See Also

[Resolving IRQ Conflicts](#)

[Resolving Address Packing](#)

[Resolving Device Contention](#)

[Resolving Driver Conflicts](#)

IRQ Sharing

Many serial communications problems result from two devices attempting to use the same IRQ. For example, if you install a serial mouse on COM1 and a modem on COM3, both devices could attempt to use IRQ4 (the default setting) at the same time. Unless your personal computer supports IRQ sharing (the ability to have multiple ports use the same IRQ), this could cause your mouse or modem to lose functionality.

MCA or EISA machines support IRQ sharing. In addition, some serial I/O cards support IRQ sharing even if your machine is not specifically configured to do so. Windows 3.1 fully supports such serial I/O cards.

See Also

[Resolving IRQ Conflicts](#)

BIOS Data Area (BDA) and Address Packing

Every time you start your personal computer, your system BIOS checks your COM ports to see what serial devices are installed on your personal computer and posts this information to the system BIOS data area (BDA). There are four sequential spaces in the BDA for COM port addresses 1 through 4. The BIOS lists port addresses so that no blank spaces occur between addresses. Windows reads the BDA sequentially and actually expects a blank address where there is no COM port. This can cause conflicts when Windows assigns IRQs.

For example, if you have a mouse on COM1, a printer on COM2, and a modem on COM4, Windows expects the BDA to look something like this:

	(COM 1)	(COM 2)	(COM 3)	(COM 4)
0040:000	F8	F8	00	E8
0	03	02	00	02

Because the BIOS does not use zeros as placeholders, however, the BDA actually looks something like this:

	(COM 1)	(COM 2)	(COM 3)	(COM 4)
0040:000	F8	F8	E8	00
0	03	02	02	00

This behavior is known as address packing, or address shifting. Windows assigns IRQs in the order that it finds a COM port address. In this situation, Windows would assign IRQ4 (the default for COM3) to the device that is actually on COM4. This could cause loss of functionality on COM4 because IRQ4 is already being used by COM1.

Address packing can affect COM ports 1 and 2 as well. For instance, if you have no device on COM1, your COM2 address may register in the COM1 BIOS area.

Whether or not you experience problems as a result of address packing may depend on what COM ports you are using, what type of hardware you have, and whether you are using MS-DOS-based communications software.

You can remedy this situation by writing a Debug script. A Debug script records the correct port addresses in your system memory. This procedure is described under "Resolving Address Packing."

MS-DOS-Based Communications Software and Windows 3.1

MS-DOS-based applications and Windows-based applications handle serial communications in different ways. The topics below discuss guidelines for using your MS-DOS-based communications programs under Windows 3.1. For more information, see chapters 7, "Non-Windows Applications," and 8, "PIF Editor," in the version 3.1 "Microsoft Windows User's Guide."

See Also

[General Guidelines](#)

[Device Contention](#)

[UART Support for MS-DOS-Based Applications](#)

[Address Packing and MS-DOS-Based Applications](#)

Using MS-DOS-Based Communications Software Under Windows 3.1

General Guidelines

You use program information files (PIFs) to give Windows control of your MS-DOS-based communications applications. We recommend running MS-DOS-based communications applications only when Windows is in 386 enhanced mode. Running these applications when Windows is in standard mode may cause data loss or other problems.

For better performance, run your MS-DOS-based applications in full-screen mode rather than in a window. If you run an MS-DOS-based communications application in the background during a data transfer, run it minimized as an icon rather than in a window.

PIF File Guidelines

- Select the Background check box (under Execution in the main PIF Editor dialog box), or your MS-DOS-based application will stop running when you switch away from it.
- Select the Lock Application Memory check box (in the PIF Editor Advanced Options dialog box), or you may receive an error message. (This setting applies only if you have a permanent swap file and 32-bit disk access is enabled.)



If you encounter errors during data transfers, specify a larger Background Priority or Foreground Priority setting (in the Multitasking Options area of the Advanced Options dialog box).

See Also

[Device Contention](#)

[UART Support for MS-DOS-Based Applications](#)

[Address Packing and MS-DOS-Based Applications](#)

Device Contention

In the Windows multitasking environment, two applications sometimes simultaneously request the use of a device (such as a COM port or modem). This is known as device contention. Before running MS-DOS-based communications applications under Windows in 386 enhanced mode, you need to set device contention options in Control Panel. Doing so specifies how you want Windows to handle device requests from your MS-DOS-based applications.

Problems that can occur as a result of serial device contention include the inability to access a COM port.

See Also

[Resolving Device Contention](#)

UART Support for MS-DOS-Based Applications

Windows 3.1 provides application support for the new 16550AFN Universal Asynchronous Receiver-Transmitter (UART) buffer (see the section on the [UART](#) in this ViewNote). However, MS-DOS-based applications may not recognize the 16550AFN UART, treating it instead like the earlier 8250 version. This, in turn, may result in data loss. Whether you experience these problems also depends to a certain extent on your hardware manufacturer.

Bio-Engineering's TurboCom is an advanced serial port communications driver for Windows that provides UART support for MS-DOS-based applications running under Windows. TurboCom also supports IRQ sharing and baud rate speeds of up to 57.6 kilobytes (K). If you regularly use MS-DOS-based communications software or software that requires a baud rate of 9600 bits per second (bps) or higher, you may want to use the TurboCom driver. For additional information, contact your local dealer, or call Bio-Engineering Research Laboratories at (510) 540-8080.

Note: If your communications software runs at 2400 baud or lower, using the 16550AFN UART probably won't noticeably improve your system's performance.

Address Packing and MS-DOS-Based Applications

If Windows assigns an IRQ to a serial port that is already in use by your MS-DOS-based communications program, you may receive the error message "The COMx port is currently assigned to an MS-DOS application. Do you want to reassign the port to Windows?"

Note: The x in COMx refers to the COM port number.

This problem can occur as a result of "address packing," or "address shifting." For example, if you have a serial device on COM2 but not on COM1, the COM2 address "shifts" into the BIOS data area (BDA) slot for COM1. Windows reads the BDA sequentially, assigning the default IRQ for COM1 to the first entry it finds, the IRQ for COM2 to the second entry, and so forth. In the situation mentioned, Windows would assign IRQ4 (the default for COM1) to the device that is actually on COM2.

MS-DOS-based communications programs access the COM ports directly, without posting their port address to the BDA. In the same situation, if you have no serial device on COM1, and your MS-DOS-based communication program is using COM2, the MS-DOS-based program still uses the default IRQ for COM2.

You can remedy this situation by writing a Debug script.

Note: This error message may also occur if you have an earlier system BIOS that does not search for COM ports 3 or 4. If this is the case, you can use Control Panel to register the ports. See the procedure "Registering a Serial Device."

Third-Party Communications Drivers

Some Windows-based third-party programs install their own drivers to replace the drivers provided by Windows. If these third-party drivers are installed in your system when you upgrade from Windows 3.0 to Windows 3.1, Setup does not install the Windows communications driver (COMM.DRV). In most instances, it is best to use the Windows 3.1 driver, rather than a driver designed for Windows 3.0.

If you are experiencing driver problems (such as an inability to use higher baud rates, or problems accessing the modem), you can reinstall COMM.DRV or contact the manufacturer of your third-party driver for an update.

You can tell whether you have the Windows communications driver, or whether it has been replaced by the driver(s) that came with your communications software, by looking in your SYSTEM.INI file.

See Also

[Checking for Third-Party Communications Drivers](#)

Resolving IRQ Conflicts

If you have serial devices on both COM1 and COM3, or COM2 and COM4, and your machine architecture does not support IRQ sharing, you need to reassign the IRQ for COM3 or COM4. (If you are using a serial card that supports IRQ sharing, read "[IRQ-Sharing Serial I/O Cards.](#)")

Reassigning the IRQ: A Procedural Overview

You cannot change IRQ settings just by using Windows Control Panel. You also have to make sure your hardware settings match, and you have to select an available IRQ. This overview explains the steps you should follow.

1. Determine the valid IRQ settings for the serial device by referring to the manufacturer's documentation.

Most serial devices such as I/O cards or internal modems can use either of several valid IRQs. For example, a modem on COM3 may be able to use IRQ5 if IRQ4 is not available.

2. Determine which IRQs are available on your personal computer.

You can do this by referring to the table provided below, or you can use the Microsoft Diagnostic (MSD) utility. (Refer to the procedure "[Using MSD to Determine Available IRQs.](#)") MSD is included with Windows version 3.1.

3. Set both your serial device and Windows to the IRQ that you have determined is valid and available.

Set your serial device to the alternate IRQ by following the directions in the manufacturer's documentation. Direct Windows to the alternate IRQ by using Control Panel to place a COMxIRQ entry in your SYSTEM.INI file, where x is the COM port number. (Refer to the procedure "[Reassigning the IRQ from Control Panel.](#)")

Note: Your serial device setting MUST match the COMxIRQ setting in your SYSTEM.INI file. If these two settings do not match, the COM port will not function properly.

Standard IRQ Settings (Table)

The following table shows the most common IRQ settings. You can use Control Panel to specify an IRQ from this table if it matches your hardware requirements. Or, if you'd like to view a table similar to this that lists the current settings in your personal computer, you can use MSD.

IRQ Number	Description
0	Timer
1	Keyboard
2	Link to IRQs 8-15
3	COM2, COM4
4	COM1, COM3
5	LPT2, or Reserved
6	Floppy disk controller
7	LPT1, LPT3
8	Real time clock
9	Redirected IRQ2
10	Reserved
11	Reserved

12	PS/2 mouse
13	Math coprocessor
14	Hard disk controller
15	Reserved

The IRQs with "Reserved" entries in the corresponding Description column are often available. (This does not guarantee they are currently available on your personal computer.) You can use Control Panel to choose one of the "Reserved" IRQs, such as IRQ10, and then restart your system to see whether the COM port now works.

If the first IRQ you choose does not work, you can try the next IRQ from this table, and so forth. If you do not have a PS/2 mouse port, you may be able to use IRQ12. Or, you can use MSD to view the IRQs that are actually available on your personal computer.

Note: You must also change the hardware setting to the same IRQ. To do this, follow the manufacturer's instructions.

See Also

[Using MSD to Determine Available IRQs](#)

[Reassigning the IRQ from Control Panel](#)

Using MSD to Determine Available IRQs

You can use the Microsoft Diagnostic Utility to view a table that shows the IRQs your system is currently using, and any available IRQs. Then you can use Control Panel to change an IRQ setting. (Your machine hardware must also match the setting you choose in Control Panel.)

To use MSD

1. Quit Windows.
2. At the MS-DOS command prompt, type `msd`.

An initial screen appears, providing information about MSD. Choose the OK button to view the MSD main menu.

3. From the MSD main menu screen, choose the IRQ Status button.

The IRQ Status screen shows which IRQs are currently assigned (not available).

4. Make a note of each IRQ number where the entry in the corresponding Detected column reads No.

A No entry in the Detected column indicates that the corresponding IRQ is available. If you do not find a "No" entry in the Detected column, there are no available IRQs, and you should not attempt to reassign IRQs.

5. Use Control Panel to assign one of the available IRQs to the COM port whose IRQ you want to change.

You must also change the hardware setting to the same IRQ. Follow the manufacturer's instructions.

Note: Windows 3.1 does not support nonstandard IRQ settings. If your serial communications device requires an IRQ that is different than what is described in the MSD listing, we cannot guarantee the results.

See Also

[Reassigning the IRQ from Control Panel](#)

Reassigning the IRQ from Control Panel

To reassign the IRQ from Control Panel:

1. In the Main group, choose the Control Panel icon.
2. In the Control Panel window, choose the Ports icon.
3. In the Ports dialog box, select the COM port for the device whose IRQ you want to change, and then choose the Settings button.
4. In the Settings dialog box, choose the Advanced button.
5. Open the Interrupt Request Line (IRQ) list box, and select a number.

This number must match your hardware setting.

6. Choose the OK button twice to exit the settings dialog boxes, and then choose the Close button to exit the Ports dialog box.

IRQ-Sharing Serial I/O Cards

If you are using an IRQ-sharing I/O card on a machine that does not support this feature, you need to add the following line to the [386Enh] section of the SYSTEM.INI file:

```
COMIrqSharing=TRUE
```

Note: This setting does not, by itself, provide your system with IRQ-sharing support. You must have the correct hardware configuration, and the hardware must be installed according to the manufacturer's specifications.

Resolving Address Packing

Address packing, or shifting, occurs when a serial device is using a COM port to the right of a vacant COM port. For example, certain internal modems are configured to use COM4, because COM1 and COM2 may be in use on the computer, and COM3 may have an IRQ conflict with the mouse. If you install such a modem, and you have no serial device on COM3, the BIOS data area (BDA) reflects the COM4 address in the slot for COM3. This is what is referred to as address shifting, or packing.

Windows assigns IRQs according to what it reads, in sequential order, in the BDA. In this situation, Windows would assign the default IRQ for COM3 to the modem that is actually on COM4.

To remedy this situation, you first need to familiarize yourself with the BDA. Refer to the following procedures.

[Viewing the BIOS Data Area \(BDA\) by Using Debug Writing a Debug Script](#)

See Also

[Address Packing and MS-DOS-Based Applications](#)

Viewing the BIOS Data Area (BDA) by Using Debug

To view the BDA by using Debug:

1. Quit Windows.
2. At the MS-DOS command prompt, type `debug`, then press ENTER.

A hyphen (-) prompt appears.

3. Type `d40:0`, then press ENTER.

This returns a listing of the BDA. The first row of the BDA shows the COM port and LPT port addresses, divided by a center hyphen. COM ports are listed to the left of the hyphen; LPT ports are listed to the right.

4. Once you have interpreted the BDA (see the following procedure), type `q` to quit Debug.

To interpret the BDA COM address entries

This table shows the four standard COM addresses as they should be listed in the BDA. (The COM headings do not appear in the BDA.)

	(COM1)	(COM2)	(COM3)	(COM4)
0040:000	F8 03	F8 02	E8 03	E8 02

If you have a serial device on COM port 3 or 4, and the BDA does not show an entry for the port, you can use Control Panel to register the port in the BDA. However, if the BDA shows any of the standard addresses in a location other than what is shown here (for example, address F8 02 in the space for COM1, or address E8 02 in the space for COM3), then you need to write a Debug script.

Note: If you see an address in your BDA that is not shown here, your hardware may use nonstandard serial port addresses. In this case you need to register the nonstandard address by using Control Panel. See the procedure ["Registering a Serial Device."](#)

Writing a Debug Script

To write a Debug script, do the following:

1. Open any standard text editor, such as Windows Notepad.
2. Type the following three lines:

```
E40:0  
F8 03 F8 02 E8 03 E8 02  
q
```

You must press ENTER after typing q. If you do not, the Debug script will cause your system to remain indefinitely in Debug mode.

3. Save the file as FIXCOM.DEB, or any filename that you will remember.
4. Add the following line to the end of your AUTOEXEC.BAT file:

```
DEBUG < FIXCOM.DEB > NUL
```

The "> NUL" ending keeps the Debug script from echoing to the screen.

Note: Do not place this entry after a program execution line, such as WIN. If you do, the Debug script will not execute. Microsoft recommends that you place the Debug script after the PATH statement.

5. Save your AUTOEXEC.BAT file and restart your personal computer.

You can view the BIOS data area (BDA) again to see whether the address changes have taken effect.

Note: The port address setting on your physical serial device must match what you specify in the Debug script. If your hardware requires a nonstandard address, you can specify that address in the Debug script.

Also, if you update your machine hardware you should check with the manufacturer to ensure the debug script remains accurate.

Serial Devices on COM3 and COM4 Do Not Register

Some earlier BIOS versions only recognize COM ports 1 and 2. If your system BIOS does not recognize COM ports 3 and 4, you can use Control Panel to inform Windows that you have these ports. Refer to the procedure "[Registering a Serial Device.](#)" However, if your BIOS recognizes these ports but incorrectly records their addresses in the BIOS data area (BDA) due to address shifting, you cannot use Control Panel to correct this situation. Instead, you need to write a Debug script. Refer to the procedure "[Writing a Debug Script.](#)" (For more information, see the section on "[BIOS Data Area \(BDA\) and Address Packing.](#)")

To determine whether your system BIOS registers COM port 3 or 4, you need to read the BDA. Refer to the procedure "[Viewing the BIOS Data Area \(BDA\) by Using Debug.](#)"

Caution: Setting the port address by using Control Panel does not override a BDA value. The BIOS overrides any entries you make by using Control Panel. This is why you cannot use Control Panel settings as a substitute for writing a Debug script if your BIOS incorrectly registers COM addresses.

Registering a Serial Device

You can use this procedure to register a serial device that your system BIOS may not recognize, or to record nondefault addresses or IRQ settings for a serial device.

To register a serial device:

1. In the Main group, choose the Control Panel icon.
2. In the Control Panel window, choose the Ports icon.
3. In the Ports dialog box, select the port you want to identify to Windows, and then choose the Settings button.
4. In the Settings dialog box, choose the Advanced button.
5. Open the Base I/O Port Address list box, and select an address. Check your hardware documentation for the appropriate value.
6. Open the Interrupt Request Line (IRQ) list box, and select an IRQ. Check your hardware documentation for the appropriate value.

Selecting values in this dialog box places COMxBase and COMxIRQ entries in your SYSTEM.INI file, where x is the COM port number.

For more information on COMxBase and other SYSTEM.INI file entries, refer to the SYSINI.WRI file in your Windows directory.

Resolving Device Contention

Before running MS-DOS-based communications applications under Windows, you should set the device contention options in the Windows Control Panel. These options control how Windows handles device requests from MS-DOS-based applications.

To set device contention options

1. In the Main group, choose the Control Panel icon.
2. In the Control Panel window, choose the 386 Enhanced icon.
3. Select the port that is connected to the device you want to control.
4. In the Device Contention group, select the option you prefer.

Each option is described below.

Always Warn

Select this option to have Windows display a dialog box whenever more than one application requests use of a COM port at the same time. The dialog box lets you specify which MS-DOS-based application should receive control of the COM port. In most cases, you should select Always Warn.

Note: The Always Warn option does not replace IRQ sharing. When you specify that one application receive control of a COM port, the other application requesting to use the port is interrupted. Optimally, once the first application completes its operation (for example, a fax transmission), the COM port becomes available again and the other application can resume. However, giving control of a COM port to one application over another can sometimes indefinitely hang the application that is required to wait.

Never Warn

When you select this option, Windows provides COM port access to MS-DOS-based applications even if it detects that the requested port may already be in use by another application.

Selecting this option may cause unexpected problems, such as data loss or an interruption during application processing.

Idle (in sec.)

Select this option to specify the number of seconds Windows should wait before giving port access to an application without notifying you. For instance, if you specify 10 seconds, Windows displays a dialog box when any application requests the use of a port that was occupied within the last 10 seconds. The dialog box lets you specify which MS-DOS-based application should receive control of the COM port. Otherwise, Windows provides COM port access without a warning.

For more information about these options, see page 247 of Chapter 7, "Non-Windows Applications," in the version 3.1 "Microsoft Windows User's Guide."

Resolving Driver Conflicts

Driver conflicts can result in a wide range of problems, and for that reason they may be hard to identify. There are several steps you can take to diagnose and resolve driver conflicts. You may want to do this as part of a general troubleshooting routine.

The Windows 3.1 Setup program updates many drivers that were included in Windows 3.0. However, Setup does not update third-party drivers (drivers supplied by other vendors). You should obtain updates from the manufacturer for any third-party drivers that you are using under Windows 3.1.

Once you update your third-party drivers, you should remove any remaining outdated driver files.

See Also

[Checking for Third-Party Communications Drivers](#)

[Removing Outdated Driver Files](#)

Checking for Third-Party Communications Drivers

To check for third-party communications drivers:

1. Open your SYSTEM.INI file by using any text editor, such as Windows Notepad.
2. Under the [boot] section, look for the following entry:

```
comm.driv=comm.driv
```

If this entry reads differently, then your system is using a third-party Windows-level driver.

3. Under the [386Enh] section, look for the following entries:

```
device=*vcd  
device=*combuff
```

If either of these entries reads differently, or if there is an additional entry, then your system is using third-party communications drivers.

To determine whether you need an update, contact your manufacturer.

To use third-party drivers that have not yet been updated, you need to add the following line to the [386Enh] section of your SYSTEM.INI file:

```
COMdrv30=TRUE
```

Once you obtain an update for your third-party driver(s), you can remove this entry from your SYSTEM.INI file. You should also remove any remaining outdated driver files.

See Also

[Removing Outdated Driver Files](#)

Troubleshooting Communications Port Problems

This section can help you identify what is causing a problem and then point you to the appropriate section in this ViewNote for an explanation of how to resolve the problem.

[Serial Devices on COM3 and COM4 Do Not Register](#)

[Communications Application Cannot Access a Serial Port](#)

[Computer Locks Up When Accessing Serial Port](#)

[Error: "The COM port is currently assigned to a DOS application..."](#)

[Modem Problems](#)

[Mouse Problems](#)

[COM4 Problems](#)

[Problems Running Windows in 386 Enhanced Mode](#)

Communications Application Cannot Access a Serial Port



Are you using MS-DOS-based communications software? Refer to ["MS-DOS-Based Communications Software and Windows 3.1"](#).

Related procedure: ["Resolving Device Contention"](#)



Is the serial device using an available IRQ? Refer to ["Resolving IRQ Conflicts."](#)

Related procedures: ["Using MSD to Determine Available IRQs"](#)
["Reassigning the IRQ from Control Panel"](#)

Computer Locks Up When Accessing Serial Port



Is the serial device using a unique IRQ? Refer to ["Resolving IRQ Conflicts."](#)

Related procedures: ["Using MSD to Determine Available IRQs"](#)
["Reassigning the IRQ from Control Panel"](#)



Is the serial device on COM4? Refer to ["Serial Devices on COM3 and COM4 Do Not Register."](#)

Related procedure: ["Registering a Serial Device"](#)

Error: "The COM port is currently assigned to a DOS application..."

If you receive this error message and you are using MS-DOS-based communications applications, refer to the section "Address Packing and MS-DOS-Based Applications."

You may also receive this error message if your BIOS does not search for serial devices on COM ports 3 or 4. If this is the case, you can use Control Panel to register the devices. See the procedure "Registering a Serial Device." For more information, refer to "Serial Devices on COM3 and COM4 Do Not Register."

Modem Problems



Does your system BIOS recognize your internal modem? Refer to the procedure, "[Viewing the BIOS Data Area \(BDA\) by Using Debug](#)".

Related Procedure: "[Registering a Serial Device](#)"



Do you have a modem on COM3 and a mouse on COM1, or a modem on COM4 and a mouse on COM2? Unless your machine or serial I/O card supports IRQ sharing, this configuration is not recommended. Refer to "[Resolving IRQ Conflicts](#)".

Related Procedure: "[Reassigning the IRQ from Control Panel](#)"



Do you have an internal modem and a serial I/O card? Have you observed any of the following symptoms:

- The modem dials and rings but does not connect.
- The system reboots when the modem attempts to dial out.
- The system reboots when the modem should have connected.
- The cursor does not work in Windows Terminal.

If your internal modem uses a COM port that is addressed by your serial I/O card, you may experience IRQ conflicts. To correct this problem, disable the COM port setting on the serial I/O card. For example, if your internal modem is set to use COM2, and you have a serial I/O card that recognizes COM2, you may need to disable COM2 on the serial I/O card for the modem to work correctly.

Mouse Problems

General Guidelines

The mouse uses a different driver for MS-DOS-based applications than it does for Windows-based applications. In general, all mouse drivers should come from the same vendor. For example, do not use a Microsoft driver as the Windows mouse driver and a third-party driver as the MS-DOS mouse driver.

Do not install a modem on COM3 if you have a mouse on COM1, or a modem on COM4 if you have a mouse on COM2, unless your machine or serial I/O card supports IRQ sharing. Refer to "[Resolving IRQ Conflicts](#)."

See Also

[Mouse Doesn't Work in 386 Enhanced Mode](#)

[Logitech™ Mouse](#)

[100%-Microsoft-Compatible Mouse](#)

[Microsoft Mouse](#)

Mouse Doesn't Work in 386 Enhanced Mode

If your personal computer has no COM1 or if you have disabled COM1 and you have a mouse installed on COM2, you may experience problems using the mouse in 386 enhanced mode. Refer to "BIOS Data Area (BDA) and Address Packing."

Logitech™ Mouse

The Logitech virtual mouse driver (LVMD.386) is hard coded for the standard base port addresses and IRQs. If you use the Logitech mouse with a nondefault port address or IRQ, it may fail to work in 386 enhanced mode.

100%-Microsoft-Compatible Mouse

Any "100% Microsoft compatible" mouse that you purchase from your dealer is not interchangeable with the Microsoft Mouse. If your 100%-Microsoft-compatible mouse comes with a driver disk that contains mouse drivers for Windows and MS-DOS, install these in place of the Microsoft Mouse drivers. Installing such drivers places a new setting in the Mouse section of Windows Setup. After you install a 100%-Microsoft-compatible mouse, use Windows Setup to select your mouse type.

Microsoft Mouse

If you are using the Microsoft Mouse with Windows 3.1, make sure each of the following is true:



You are using version 8.2 or 8.2a of MOUSE.COM and MOUSE.SYS (the mouse drivers for MS-DOS-based applications). Version 8.2 or 8.2a of the driver is included with Windows 3.1.



MOUSE.DRV (the mouse driver for Windows-based applications) is in the Windows SYSTEM subdirectory, is the only copy of this file on your system, and is the most current version of the driver.



The mouse is assigned a unique IRQ (unless the serial port supports IRQ sharing). For more information, see the "[IRQ Sharing](#)" section in this ViewNote.



The mouse is not installed on COM3 or COM4.

To see what version of the MS-DOS mouse driver you have

At the MS-DOS command line from the MS-DOS mouse directory (usually, MSMOUSE), type:

```
mouse /?
```

To see what Windows mouse driver you are using

From the Main group, choose the Windows Setup icon. The mouse type should be "Microsoft, or IBM PS/2."

To change your Windows mouse driver

1. In the Main group, choose the Windows Setup icon.
2. From the Options menu, choose Change System Settings.
3. In the Mouse list box, select the type of mouse that you are using.
4. Choose the OK button to close the dialog box.

COM4 Problems



If you have NO COM3, and your modem is addressed to use COM4, you may need to disable the COM3 IRQ. Refer to "[Disabling a Serial Port](#)."

Related procedure: "[Viewing the BIOS Data Area \(BDA\) by Using Debug](#)"



If your communications software doesn't recognize a serial device on COM port 3 or 4, you may have a system BIOS that was manufactured before those COM ports became standard. Refer to "[Serial Devices on COM3 and COM4 Do Not Register](#)."

Related procedure: "[Registering a Serial Device](#)"



The COM4 default address of 02E8 conflicts with some peripheral devices, including the 8514/A, Ultra (ATI), and S3 (Orchid Fahrenheit 1280 STB WIND/X, Diamond Stealth VRAM) display adapters, and certain network adapters. Do not readdress COM4 in this situation. Contact your hardware manufacturer for information about how to reset the adapter's default address.

Problems Running Windows in 386 Enhanced Mode

Problems of this type may be related to a number of causes, including outdated (third-party) driver files or IRQ conflicts. You can try the troubleshooting steps outlined below if you experience any of the following problems when trying to run Windows in 386 enhanced mode:



Windows stops running or returns to the MS-DOS command prompt



General protection (GP) fault



Windows defaults to standard mode

If the steps outlined below do not help, the problem is probably not caused by a serial communications conflict. Refer to the Windows Resource Kit for more information about problems with running Windows in 386 enhanced mode.

Troubleshooting Steps

Before starting Windows from the MS-DOS command prompt, change to the Windows directory, and then start Windows.

If Windows runs in 386 enhanced mode only when you start it from the Windows directory, you may have an outdated driver file in some other directory. When Windows starts, it looks for the files it needs in the following order:



The current directory



The Windows directory



The Windows SYSTEM subdirectory



All the directories listed in the PATH statement in the AUTOEXEC.BAT file



All the directories in a network path

If you suspect that you have outdated driver files, you need to delete them from your system.

See Also

[Removing Outdated Driver Files](#)

[Identifying an IRQ Conflict](#)

Removing Outdated Driver Files

If you have third-party communications drivers, check with your manufacturer to see whether updates are available. After you update these files, or if you choose to use the Windows COM driver, you need to remove any outdated driver files that remain on your system.

To delete outdated driver files

1. Use File Manager to find all versions of the driver file(s) on your system. Compare each version by date.
2. Delete all other versions of the driver file(s) except the most current version. Retain a single copy of the most current version in the Windows SYSTEM subdirectory.

Identifying IRQ Conflicts

To identify an IRQ conflict:

1. Remove any serial hardware you have installed on your system (mouse, network card, fax board, modem, and so forth) and then restart Windows.

If Windows now runs in 386 enhanced mode with no problems, the problem may be caused by an IRQ conflict.

2. Reinstall each separate piece of serial hardware, one at a time, restarting Windows between each addition.

This isolates the hardware that is causing the IRQ conflict. When the problem recurs, you can assume it is caused by the hardware you have just reinstalled.

3. Reassign the IRQ for the piece of hardware in question.

Refer to the section in this ViewNote on "[Resolving IRQ Conflicts.](#)"

Disabling a Serial Port

If you have a modem on COM4 but no physical COM3 on your personal computer, Windows assigns the IRQ for COM4 to COM3 and doesn't recognize your COM4. This is due to address packing in the BIOS data area (BDA). In most situations you can write a Debug script to correct address packing. In this specific situation, however, you may want to try the procedure listed here. We don't recommend disabling serial ports as a general rule.

To Disable a Serial Port:

1. Open your SYSTEM.INI file by using any text editor, such as Windows Notepad. (The SYSTEM.INI file is usually located in the Windows directory.)
2. In the [386Enh] section of the file, add a `COMxIrq=-1` entry to disable the specific COM port. For example, to disable COM3, add the following entry:

```
COM3Irq=-1
```

3. Save and close the file. Restart Windows for the change to take effect.

Note: If you install a COM3 on your machine you need to delete this entry from the SYSTEM.INI file.

See also

["BIOS Data Area \(BDA\) and Address Packing"](#)

["Writing a Debug Script"](#)

