PC Hardware
Chapter 3 Labs
System Configuration

IRQ And DMA Management

Objective

The objective of this lab is to provide you with the necessary experience of viewing currently installed device drivers, modifying their IRQ, DMA, and I/O address settings, and developing a general understanding of resource allocations. After completing this lab exercise, you will be able to:

- List examples of standard IRQ and DMA usage.
- Explain how to determine which IRQ and DMA channels and addresses are being utilized.
- Explain how to modify IRQ and DMA address settings to resolve resource conflicts.

Lab Setup & Safety Tips

- During this lab exercise you will use Device Manager to view the properties of your lab workstation. It is important that you not change parameters; otherwise your lab workstation may not function properly. (You will modify Device Manager Parameters in later labs.)

Activity

Recording your lab workstation's IRQ settings

1. Start your lab workstation, and allow it to boot into Windows 9x.
2. Click the **Start** button.
3. Point to Settings.
4. Click **Control Panel.**
5. Double-click the System icon.
6. Click the Device **Manager** tab, as shown in Figure 2-2.
7. Click the Properties button.

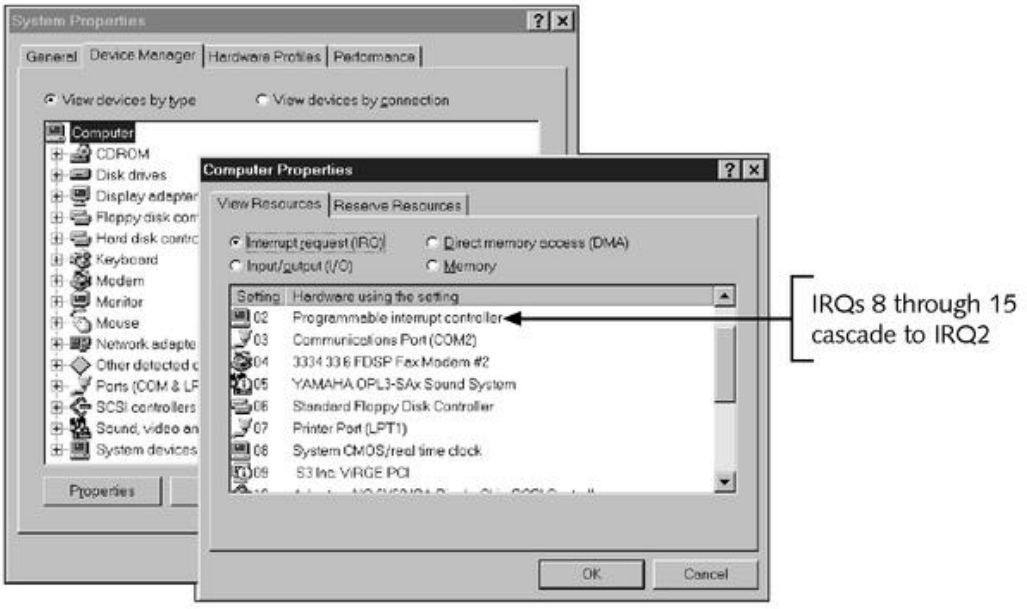

Figure 2-12 Use Device Manager to see how IRQs are used by your system

8. Record the device name for each of the following IRQs:

IRQ 00	
IRQO1	
IRQ 02	
IRQ 03	
IRQ 04	
IRQ 05	
IRQ 06	
IRQ 07	
IRQ 08	
IRQ 09	
IRQ 10	
IRQ 11	
IRQ 12	
IRQ 13	
IRQ 14	
IRQ 15	

Viewing the Edit Interrupt Request window using Device Manager

1. Start your lab workstation, and allow it to boot into Windows 9x.
2. Click the Start button.
3. Point to Settings.
4. Click Control Panel.
5. Double-click the System icon.
6. Click the Device Manager tab.
7. Double-click Ports.
8. Double-click Printer Port (LPT1) (options may vary).
9. Click the Resources tab.
10. Deselect Use automatic settings.
11. Double-click Interrupt Request.
12. The Edit Interrupt Request window allows IRQ modification.
13. Do not make any changes.
14. Click Cancel three times.
15. Close the Control Panel window

Recording your lab workstation's DMA settings

1. Start your lab workstation, and allow it to boot into Windows 9x.
2. Click the **Start** button.

3. Point to **Settings.**
4. Click **Control Panel.**
5. Double-click the System icon.
6. Click the **Device Manager tab.**
7. Click the **Properties** button.
8. Click the **Direct Memory Access** (DMA) option button.
9. Record the device name for each of the following DMA channels:

DMA 01	
DMA 02	
DMA 03	
DMA 04	

Lab Notes
Device Manager – is a windows 9x program that displays all the devices that Windows 9x has detected and the resources each device has been assigned.
Problems in Device Manager – If Windows 9x is having a problem with a device, it will notify you in the Device Manager using one of the following symbols:

- X (Red X) – A red X indicates that the device has bee disabled
- ! (Exclamation point) – indicates a problem. Often it indicates a resource conflict or hardware malfunction. A description of the exact problem can be found by double-clicking the device.
- ? (Question mark) – indicates an unknown device. It typically notes devices that are functioning properly but doesn't have a driver installed. Most often, a question mark device is found under the Other Device icon

What is an IRQ?—An IRQ (interrupt request number) is a line on a bus that is assigned to a device and is used to signal the CPU for servicing. These lines are assigned a reference number (for example, the normal IRQ for a printer port is IRQ 7)
What is a DMA?—A DMA (direct memory access) controls chips residing on the system board and provides channels that a device may use to bypass the CPU and send data directly to memory.

Review Questions

Circle True or False.

1. Device Manager can be used to view all of the DMA channels and the devices configured to use them. True *I* False

2. Device Manager is located on the Control Panel and accessed by double-clicking the Add New Hardware icon. True *I* False

3. IRQ is an acronym for internal response question. True / False

4. DMA is an acronym for direct memory access. True *I* False

5. You are employed as a hardware technician at Crunchy Corn Corporation. One of your coworkers, Todd, just finished installing a modern into a customer's computer. Unfortunately, the modem doesn't seem to be functioning properly. Todd believes there is a resource conflict between the modem and another device. Describe how you could use Device Manager to locate the resource conflict.

5. Consult your list of IRQs. For which device is IRQ 15 normally reserved?

6. Jacob believes his sound card has been disabled on his Windows 98 laptop. Use Device Manager to describe how Jacob could confirm that his sound card has been disabled.

I/O MANAGEMENT

Objective

The objective of this lab is to provide you with experience managing I/O addresses. After completing this lab exercise, you will be able to:

- List examples of standard I/O address usage.
- Explain how to determine which I/O addresses are being utilized.
- Explain how to modify I/O address settings to resolve resource conflicts.
- Explain the importance of unique I/O addresses.

Lab Setup & Safety Tips

During this lab exercise, you will use Device Manager to view the properties of your lab workstation. It is important that you not change the parameters of Device Manager; otherwise, your lab workstation may not function properly. You will get a chance to modify Device Manager parameters in later labs.

Activity

Recording your lab workstation's I/O Address settings

1. Start your lab workstation, and allow it to boot into Windows 9x.
2. Click the Start button.
3. Point to Settings.
4. Click Control Panel.
5. Double-click the System icon.
6. Click the Device Manager tab.
7. Click the Properties button.
8. Click **Input/output (I/O).**
9. Record all of the I/O address for each of the following devices:

Floppy drive

NIC (Network Interface card)

Sound Card

Keyboard

Printer Port (LPT1)

Direct memory access controller

10. Close all open windows and dialog boxes.

Viewing the Edit Input/Output Range window using Device Manager

1. Start your lab workstation, and allow it to boot into Windows 9x.
2. Click the Start button.
3. Point to Settings.
4. Click Control Panel.
5. Double-click the System icon.
6. Click the **Device Manager** tab.
7. Double-click **Sound, video, and game controllers.**
8. Double-click the installed sound card driver.
9. Click the **Resources tab.**
10. Deselect **Use automatic settings.**
11. **Double-click Input/Output Range.** *(Note:* Some Input/Output ranges may not be configurable. When they are not configurable, double-clicking produces no effect.)
12. The **Edit Input/Output Range** window allows I/O address modification.
13. Do not make any changes.

14. Click Cancel three times.
15. Close the **Control Panel** window

Lab Notes

What is an I/O Address? – An I/O address is an address stored in RAM and assigned to the operations of one particular device.

What exactly is an I/O card? – The term I/O card refers to an expansion card that often contains serial, parallel and game ports on the same adapter board, providing an input/output interface with the CPU.

Which devices most often require I/O address manipulation? - Depending on the type of hardware purchased, you may need to manipulate the I/O address using the Device Manager. Sound cards and NICs often require manual I/O configuration, meaning that you cannot use the Device Manager.

Why are some I/O ranges not configurable in the Device Manager? – Depending on the type of hardware device, the I/O address range may be hard-coded into the expansion card. Other expansion cards allow I/O address range configuration via jumpers or DIP switches

Review Questions

Circle True or False.

1. An I/O address is an address stored on the hard drive, and is assigned to the operation of one particular device. True *I* False

2. All LPT ports require one I/O address. True / False

3. The term I/O card is often used to refer to an expansion card, which contains a serial, parallel, and game port. True *I* False

4. Floppy drives do not require an I/O address assignment. True *I* False

5. Describe why some I/O ranges are not configurable in Device Manager.

6. John has configured the jumpers on his NIC (Network interface card) to use I/O address 300. Using Device Manager, what steps must John complete to confirm that I/O address 300 is properly assigned to the NIC?