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ANY PORT IN A STORM

One of the most troublesome tasks in setting up your computer is getting new devices, such as a mouse or modem, to work properly. Often, someone adds a mouse to a system and finds that a modem no longer works, or vice versa. The basic reason is that addition of the new device causes conflicts that did not exist before. Here is why, and some general background on how to avoid conflicts.

First and foremost, there are a number of hardware connections in your computer that allow a card you plug in (modem, scanner or whatever) to "talk" to the rest of the computer. These are physical wire connections, and when that new modem you plug in wants to communicate with, for example, the Central Processing Unit (CPU; 8088 or 80286, 386, 486 or Pentium chip), it does so by activating the wire. This activation is called an Interrupt Request, because it is asking the CPU to temporarily interrupt what it was doing to pay attention to the modem's needs. The Interrupt Request wires are called IRQ lines for short. XTs have 8 of these lines, while ATs (286 and above) have 16. Some IRQs are already dedicated to certain tasks, and can't normally be used for other jobs. Here is a list of both XT and AT IRQ lines, and the tasks assigned to them. Note that although there are 8 and 16 IRQs, they are numbered from 0 to 7 and 0 to 15. We inherit this wonderful little numbering confusion from computer engineers.

IRQ	XT	AT (286 and higher)
0	System timer	(same)
1	Keyboard	(same)
2	EGA Display	Cascade to IRQ9
3	Serial ports 2, 4	(same)
4	Serial ports 1, 3	(same)
5	Hard Drive	Printer 2
6	Floppy Drive	(same)
7	Printer 1	(same)
8		CMOS Real time clock
9		Cascade from IRQ2
10		(available)
11		(available)
12		(available)
13		Math coprocessor
14		Hard drive
15		(available)

You can see that there are not a lot of choices in an XT; all 8 IRQ lines are assigned to something. Don't set your modem to use IRQ5 in an XT or you may loose use of the hard drive!

Ports are the next consideration. We've already seen in previous articles that parallel ports send 8 bits of data out 8 wires, like 8 people walking down a hallway side by side. If the 8 people walk down the hall single file, that is serial communications. Commonly in XTs, there are two serial ports and one parallel port, the latter usually assigned to the printer. These ports are a combination of hardware and software. You can purchase serial cards that have four or more ports, but you have to have the software (and IRQs) to make them work.

The table above shows that the serial ports have a specific, standard assignment to IRQs. COM2 and 4 must use IRQ3; IRQ3 indicates when data is coming in on COM2 or COM4 and the computer will enable reception of one or the other, BUT NOT BOTH AT THE SAME TIME. Similarly, COM1 and COM3 use IRQ4. You can have a device plugged into COM1 and another device plugged into COM3, and you may get away with using both, but NEVER AT THE SAME TIME if they are both assigned to IRQ4. Mice are devices that often give headaches in this context. Mice are always active and ready to send data to the

computer, and so should never be in a position to share an interrupt with another device. Try it. Just plug a mouse into COM1 (which uses IRQ4) and assign a modem to COM3 (which also uses IRQ4). Disaster. You can readily expect the whole machine to lock up so badly that the three-finger salute (CONTROL-ALT-DELETE) will not work to reboot. You will need to turn off the computer, then back on again, to reboot it.

By the way, a modem contains a serial port. If your machine has two serial ports (COM1 and COM2) and you use one for a mouse and the other for a scanner, when you add a modem it will need to be configured for COM3 or COM4 (but remember the caveats outlined in the previous paragraph). The serial port in a modem is just like any other; it must also be assigned an IRQ.

Now that all of that is out of the way, let me relate that it IS possible for two devices to share an IRQ. One example is a modem and scanner both using IRQ3. So long as you don't run the modem's program and the scanner's program at the same time, they MAY happily coexist. Sometimes they won't. For example, if you load the scanner program in your CONFIG.SYS, it may interfere with the modem program even when the scanner is not being used. You may have to reboot without the scanner program in order to have a trouble free modem session. One scenario described by Ralph Griffin in his excellent article titled ALL ABOUT IRQ LINES (available on Exec-PC) is that the scanner may run just fine after running the modem program, but that the modem program will not run after the scanner. This is because the scanner software does not properly restore the state of the IRQ lines after it runs, while the modem does. I think Nels (WA9JOB) described just this problem to me recently. The solution is a reboot to restore the IRQ line states, or to run a custom program to do the same thing.

Another ploy is to use an unused IRQ. For example, if you have an XT but there is no printer port in it, you can certainly assign a device to IRQ7. Note, however, that if there is a printer (parallel) port installed in the machine, you may have to disable it before it will work properly, even if no printer is attached. Many boards will let you disable a port by throwing dipswitches or installing jumpers right on the board. Now that I have said that, note that disabling the port is not always necessary; it may work just fine anyway. If that sounds like a bit of voodoo, it is. The only sure way to know if it will work is to try it. Thank goodness we hams are experimenters!

A final suggestion and credits before I leave you. If you have a choice, assign any modem you add to a system to COM3. That seems to be the standard way of setting things up. Thanks to Tom (WB9LNL) for suggesting the need to cover this topic; he's made at least three such suggestions so far. If YOU have a pet topic you'd like me to cover, please let me know. Happy computing.