CNS /Update Newsletter Feature

A Technical Introduction to Choosing a Telephone Modem

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Table of Contents

A Technical Introduction to Choosing a Telephone Modem .............................................. 3
Choosing Cables for a Macintosh Standalone Modem: .................................................. 3
Choosing a Modem to Use with an IBM PC or Compatible .......................................... 3
Navigating the COM: Maze ..................................................................................... 3
Checking for UART Bottlenecks ............................................................................. 4
Communications Software Compatibility ................................................................. 4
University of Florida Internet Packages ..................................................................... 5
Coming in the final Installment: .................................................................................. 5
A Technical Introduction to Choosing a Telephone Modem


Previous /Update installments in this series covered: Modem terminology -- particularly modem speed protocols (Part I, December '96); Error correction and data compression (Part II, January '97); Modem compatibility with regard to various types of computing services and applications (Part III, March '97); and pros and cons of internal and external modems (Part IV, April '97).

This is part five of a series designed to help demystify the purchase of a telephone modem for a personal computer or workstation. This installment covers various hardware issues, with particular caveats for owners of older Macintosh and IBM PC computer models, and compatibility between modems and communications software on personal computers.

Choosing Cables for a Macintosh Standalone Modem:

Standalone modems usually connect to a Mac via a cable that plugs into the "modem" serial port on the back of the computer. To establish reliable connections at modulation speeds of 9600 bps or higher, it is generally necessary to use a special "hardware-handshaking" cable. Not all Macintosh modem cables support hardware-handshaking, so ask before you buy. Also, the earliest Macs -- he 128K, 512K, and 512KE -- cannot use the same cables as later models.

Choosing a Modem to Use with an IBM PC or Compatible

Unless you are using an internal modem, you need a free serial port to connect a modem. Some PCs do not come with a serial port (as was the case with the original IBM PC), but today most PCs come with two serial ports. Even so, if your computer's serial ports are tied up (say, by a serial mouse and a serial printer), there is still an alternative; you can plug in a serial interface card (sometimes called an "asynchronous communications adapter") into a free expansion slot.

Navigating the COM: Maze

You should be aware that the DOS operating system was originally designed to support a maximum of two serial ports: COM1: and COM2:. Nevertheless, it is possible to have COM3: and COM4: ports. The way additional serial ports are accessed, however, is not completely standardized.

If you need to use COM3: or COM4: for your modem, you will need to make sure that the communications program that you are using will be able to access it. You may also need to change the default port address or interrupt request (IRQ) line to avoid conflicts with other...
hardware. There are often switches or jumpers on serial interface cards that allow you to change the IRQ and to specify whether the port is addressed as COM1:, COM2:, COM3:, or COM4:. For information on how you might do this, you will need to consult the manual that came with your computer or serial interface card. Note that these issues also apply to internal modems. Internal modems, in effect, have a serial port built into them that must be addressed as COM1:, COM2:, COM3:, or COM4:.

**Checking for UART Bottlenecks**

There is one other issue related to serial ports that you may need to be aware of when connecting a modem to an older IBM-compatible personal computer. The original IBM PC, IBM PC XT, and older compatible computers normally use a serial communication chip called an 8250 UART (Universal Asynchronous Receiver/Transmitter) designed to operate at a maximum of 9600 bps. Communications between the modem and PC normally go through this UART chip. If you are using a modulation speed of 9600 bps and are using data compression protocols, the serial port must be able to operate at speeds greater than 9600 bps. The IBM PC AT and many computers compatible with the PC AT use a more advanced chip called a 16450, which can operate at higher speeds. Nevertheless, even the 16450 can cause performance problems, particularly on computers that are running Microsoft Windows. The more recent 16550 UART, which is used on many newer IBM-compatible computers, provides much better performance, although not all communications software (particularly older software) can take advantage of the increased performance of this chip. If your computer has an older UART, you can sometimes simply remove the old UART from its socket and plug in a new one. All three of these UARTs fit into the same sockets. The new UARTs are fully backwards compatible with the older ones. However, if the UART is soldered onto the computer's mother-board or serial interface card, you may have to use a plug-in serial interface card with a newer UART or use an internal modem with its own UART.

**Communications Software Compatibility**

One additional consideration in selecting a modem is software compatibility. A modem will perform functions such as dialing a phone number or answering a call only when it is given an instruction to do so, generally by the communications software running on the microcomputer or workstation. Most communications programs only support the instructions used by the most popular modems.

Virtually all modems currently on the market use some variant of the "AT" command set originally developed by Hayes Microcomputer Products, Inc. This command set is referred to as the "AT" command set because each sequence of commands normally begins with the letters "AT," which stand for "attention." The AT command set has been extended to take advantage of advances in modem technology such as higher speeds, new error correction and data compression protocols, and the ability to send and receive faxes, but these extensions often differ from manufacturer to manufacturer. In order for some communications software to run properly (particularly if you are going to use your modem's advanced features), it must be configured for the specific model of modem used. In particular, if you are considering buying a high-speed modem, it is a good idea to find out if the software you want to use with it has been tested with that particular modem. Generally, if you buy a modem from a major manufacturer you should run into fewer compatibility problems.

You should also be aware that some communications software may not perform adequately on some older computers. In particular, at higher modulation speeds, particularly when data
compression is also being used, older microcomputers may not be able to keep up with the amount of data being transmitted. In some cases, it might be best for you not to use the maximum modulation speeds and data compression capabilities offered by your modem.

University of Florida Internet Packages

At UF, the Center for Instructional and Research Computing Activities (CIRCA) distributes Internet software packages for both Windows and Macintosh computers. To run one of the CIRCA Internet software packages, you should get a modem that supports, at a minimum, the V.32 modulation standard and V.42 error correction standard, although a V.32bis or V.34 modem is highly recommended. However, a modem that supports these protocols will not necessarily be compatible with the CIRCA packages because both the Macintosh and Windows versions of the CIRCA Internet Software Package come configured to recognize only a limited subset of all the modems available. If you plan to run one of the CIRCA packages, you can contact the UF Computing Help Desk (520 CSE, telephone 392-HELP) for compatibility information.

Coming in the final Installment:

Other modem features you may be interested in -- speakers; indicator lights or displays; nonvolatile memory; circuitry for noisy lines; security features; fax capability; automatic voice/data switching; and technical support by manufacturers.

Your Comments are Welcome

We welcome your comments and suggestions on this and all UFIT documentation. Please send your comments to:

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