The Missing Link

Information can be passed from one computer to another over thousands of miles by means of the modem

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Acoustic Coupler
Most modems in use are 'all electronic' devices that connect directly to the telephone lines, plugging into the telephone socket. Telephone companies set very rigid standards for devices such as modems. This tends to make them expensive. A cheaper solution, since it by-passes the regulations, is to use an 'acoustic coupler'. This is a type of modem that converts the sine-wave audio-frequency signals into actual sounds fed into a small loudspeaker

The term 'modem' is a contraction of 'modulator/demodulator'. Although modems have been commercially available for about five years, they are now being used by owners of home computers in increasing numbers. If we can all have a computer of our own, what's the point of spending money on a modem to link it to the telephone system?

Modems allow your computer to 'talk' to other computers all over the world. The only requirement is for the computer at the other end of the telephone line to have its own modem. This other computer may be just an ordinary home micro owned by another enthusiast, or it could just as easily be a huge mainframe owned by a university or financial institution. Connecting your computer to a large mainframe can give access to large databanks, information services and even the latest stock market prices. Connecting your micro to a friend's enables you to exchange software or send inexpensive 'electronic' mail and even play two-way games.

Modems work in a similar way to the cassette interface supplied with most home computers. Both cassette interfaces and modems convert the computer's ones and zeros into audio frequencies. In the case of cassette interfaces, these frequencies can easily be recorded as though they were audio signals on the cassette tape. With modems, the audio frequencies are simply sent down the telephone line to be converted back into binary numbers by the modem at the other end.

Cassette interfaces, however, need only to convert binary into audio signals in order to record on the tape (this process is called modulating). Or they do the opposite and convert the audio signals replayed from the cassette into binary (this is called demodulating). Most modems, on the other hand, are designed for two-way communication over a single telephone line and so they need two frequency bands and four individual frequencies. One popular standard uses a frequency of 1,070Hz for a 0 and 1,270Hz for a 1 for transmitting and 2,025Hz for a 0 and 2,225Hz for a 1 for receiving. You will notice that the two frequencies in each of the two bands (the low frequency band and the high one) are very close. There's only a 200Hz difference in frequency for a 1 and a 0 in both bands. This contrasts sharply with cassette interfaces where the frequency that represents a 1 is usually twice as high as the frequency for a 0. To be able to decode frequencies so close together calls for rather complex electronic circuitry and this tends to make modems something of a luxury — modems can cost as much as many small home micros.

FAX Machine
FAX machines (short for facsimile machines) are fast becoming popular in offices in Europe and the United States. In Japan even the smallest businesses have them and many private homes use them too. FAX machines can transmit large documents, including drawings and pictures, to other FAX machines in a matter of seconds, using nothing more than a built-in modem and an ordinary telephone