SOS POLITICAL SCIENCE AND PUBLIC ADMINISTRATION

MBA FA 401

SUBJECT NAME: COMPUTER APPLICATIONS IN FINANCIAL ADMINISTRATION

UNIT-V

TOPIC NAME: MODEM

MEANING OF MODEM:

Modem

Modem is short for "Modulator-Demodulator." It is a hardware component that allows a computer or another device, such as a router or switch, to connect to the Internet. It converts or "modulates" an analog signal from a telephone or cable wire to digital data (1s and 0s) that a computer can recognize. Similarly, it converts digital data from a computer or other device into an analog signal that can be sent over standard telephone lines.

The first modems were "dial-up," meaning they had to dial a phone number to connect to an ISP. These modems operated over standard analog phone lines and used the same frequencies as telephone calls, which limited their maximum data transfer rate to 56 Kbps. Dial-up modems also required full use of the local telephone line, meaning voice calls would interrupt the Internet connection.

Modern modems are typically DSL or cable modems, which are considered "broadband" devices. DSL modems operate over standard telephone lines, but use a wider frequency range. This allows for higher data transfer rates than dial-up modems and enables them to not interfere with phone calls. Cable modems send and receive data over standard cable television lines, which are typically coaxial cables. Most modern cable modems support DOCSIS (Data over Cable Service Interface Specification), which provides an efficient way of transmitting TV; cable Internet, and digital phone signals over the same cable line.

Modem is abbreviation for Modulator – Demodulator. Modems are used for data transfer from one computer network to another computer network through telephone lines. The computer network works in digital mode, while analog technology is used for carrying massages across phone lines.

Modulator converts information from digital mode to analog mode at the transmitting end and demodulator converts the same from analog to digital at receiving end. The process of converting analog signals of one computer network into digital signals of another computer network so they can be processed by a receiving computer is referred to as digitizing.

FEATURES OF MODEM:

1. AT Command Help Screens

AT commands allow you to control many of the functions of your modem. You can use AT commands by typing them at the command line of any Terminal program.

Your modem can display screens summarizing AT commands (AT$ and AT&$), dial command options (ATD$), and S-Register functions (ATS$) (see AT Commands).

2. Automatic Cable Sensor

3Com's analog cellular cables allow your modem to recognize the cellular telephone to which it is connected automatically.

3. Automatic Calling Card Dialing

Whenever you make a calling card call, your modem will detect the tone that sounds prior to entering your calling card number. You can have the modem automatically enter your calling card number and place the call by entering the following string:

ATDT <phone#>&<calling card#>

4. Call Progress Detection

An optional set of result codes lets you know when:

- The telephone number you have dialed is busy
- The line has been picked up, but a modem is not answering the call
- There is no dial tone on the telephone line
- A call is coming in

These result codes, and the commands that enable or disable these result codes, are controlled by the ATXn command. See the listing for ATXn in AT Commands and Result Codes.

5. Caller ID

If you live in North America, your modem allows you to identify callers' names and telephone numbers when they call. Your communications software must support this feature, and you must subscribe to Caller ID from your phone company.

Use AT#CID=1 to manually turn on Caller ID and set S=2, because Caller ID is received between the first and second rings.

6. Analog Cellular Communications

With the purchase of a cellular upgrade kit, you can connect your modem to a cellular telephone to send and receive data and faxes. See Analog Cellular and GSM Communications for more information.

7. Dialing Stored Phone Numbers

Your modem can store up to four of your most frequently called numbers. See AT&Z in AT Commands for storing numbers. For dialing stored numbers, see ATDS.

For example, suppose you are dialing a phone number of 123-4567, and it is the first number you have stored. You would enter AT&Z0=1234567 to store the number, and ATDS0 to dial it. To dial the second phone number in the stored numbers list, you would enter AT&Z1=9876543 to store it, and ATDS1 to dial it.

8. Digital Line Guard

For landline connections, protects the card circuitry from overvoltage from ISDN or digital PBX lines.

9. Exclusive Line Probing

Exclusive Line Probing technology for V.90 connections automatically steers you around even the worst line impairments, allowing faster connections and transfers.

10.Flash ROM

The firmware in your PC Card can often be updated to correct problems without returning your card to 3Com. This capability is called "flash ROM." Current flash ROM programs and the instructions to use them are on the BBS, the 3Com Web site (www.3com.com), and online services (see Technical Support).

If your modem is functioning properly, there is usually no need to flash it. In any case, we recommend flashing it only under the direction of a Customer Support Application Engineer.

11.GSM Communications

You can connect your computer to a mobile telephone and use the GSM system to send and receive data and faxes. See Analog Cellular and GSM Communications for more information.

12.Redialing the Last Dialed Number

Your modem stores each dialed number until another number is dialed. Enter ATDL to redial the last number dialed during the current session.

13.Speakerphone

With communications software that supports Speakerphone functions in Windows 2000, 98, 95, 3.1x, and NT 4.0, you can use your computer as you would a telephone if your computer is equipped with a sound card, a speaker, and a microphone (either built-in or externally attached), and a multimedia subsystem is installed. Use your modem to dial the number, and then use your computer's speaker and microphone to listen and to talk. Refer to your communications software manual for instructions.

14.Telephone Answering Device (TAD)

Your modem, when used with communications software that supports this feature, allows you to send and receive personal voice mail. If you have a multimedia computer, you can send greetings and record voice messages as you would with a standard answering machine. You can even access your voice messages remotely.

Your software and modem can auto detect incoming fax, voice, or data calls and provide fax-on-demand services that you can tailor to your needs.

Many communications software packages support voice messaging. Refer to your communications software help files or manual for details about using this feature.

TYPES OF MODEM:

Modems can be of several types and they can be categorized in a number of ways.

• Categorization is usually based on the following basic modem features:

1. Directional capacity: half duplex modem and full duplex modem.

2. Connection to the line: 2-wire modem and 4-wire modem.

3. Transmission mode: asynchronous modem and synchronous modem.

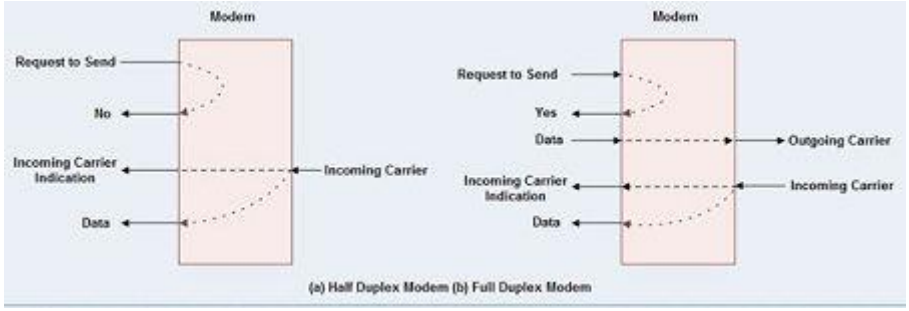
Half duplex and full duplex Modems:

Half duplex:

1. A half duplex modem permits transmission in one direction at a time.

2. If a carrier is detected on the line by the modem, I give an indication of the incoming carrier to the DTE through a control signal of its digital interface.

3. as long as they camel' IS being received; the modem does not give permission to the DTE to transmit data.



Full duplex:

• A full duplex modem allows simultaneous transmission in both directions.

• Therefore, there are two carriers on the line, one outgoing and the other incoming.

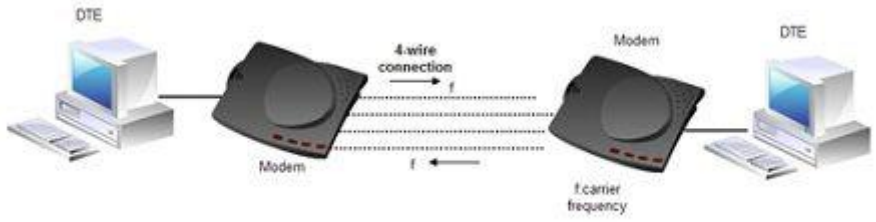
Wire and 4-wire Modems:

• The line interface of the modem can have a 2-wire or a 4-wire connection to transmission medium. 4-wire Modem

• In a 4-wire connection, one pair of wires is used for the outgoing carrier and the other pair is used for incoming carrier.

• Full duplex and half duplex modes of data transmission are possible on a 4- wire connection.

• As the physical transmission path for each direction is separate, the same carrier frequency can be used for both the directions.



4wire-Modem

2-wire Modem:

• 2-wire modems use the same pair of wires for outgoing and incoming carriers.

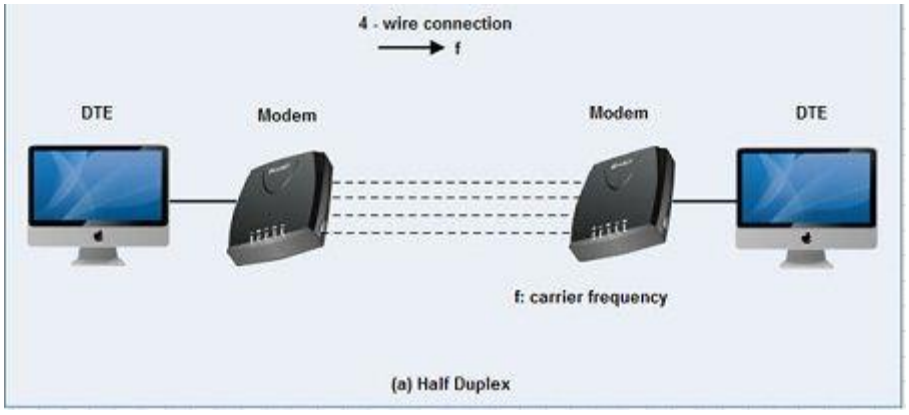
• A leased 2-wireconrlection is usually cheaper than a 4-wire connection as only one pair of wires is extended to the subscriber's premises.

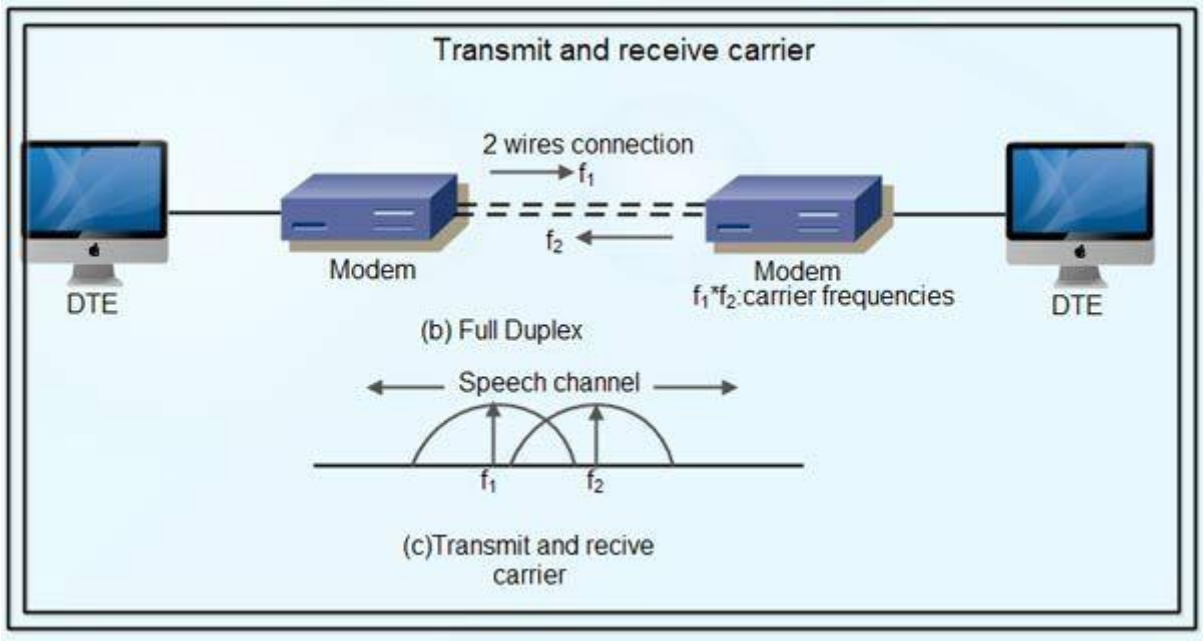
• The data connection established through telephone exchange is also a 2-wire connection.

• In 2-wire modems, half duplex mode of transmission that uses the same frequency for the incoming and outgoing carriers can be easily implemented.

• For full duplex mode of operation, it is necessary to have two transmission channels, one for transmit direction and the other for receive direction.

• This is achieved by frequency division multiplexing of two different carrier frequencies. These carriers are placed within the bandwidth of the speech channel.





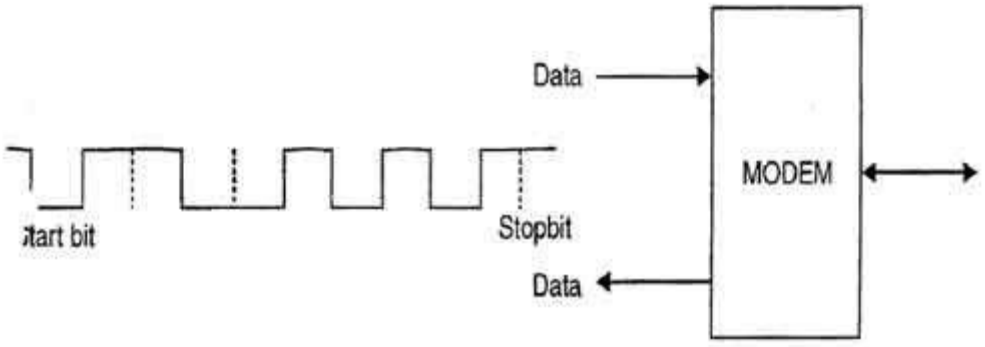
Asynchronous & Synchronous Modems:

Asynchronous Modem:

• Asynchronous modems can handle data bytes with start and stop bits.

• There is no separate timing signal or clock between the modem and the DTE.

The internal timing pulses are synchronized repeatedly to the leading edge of the start pulse.



Asynchronous modem

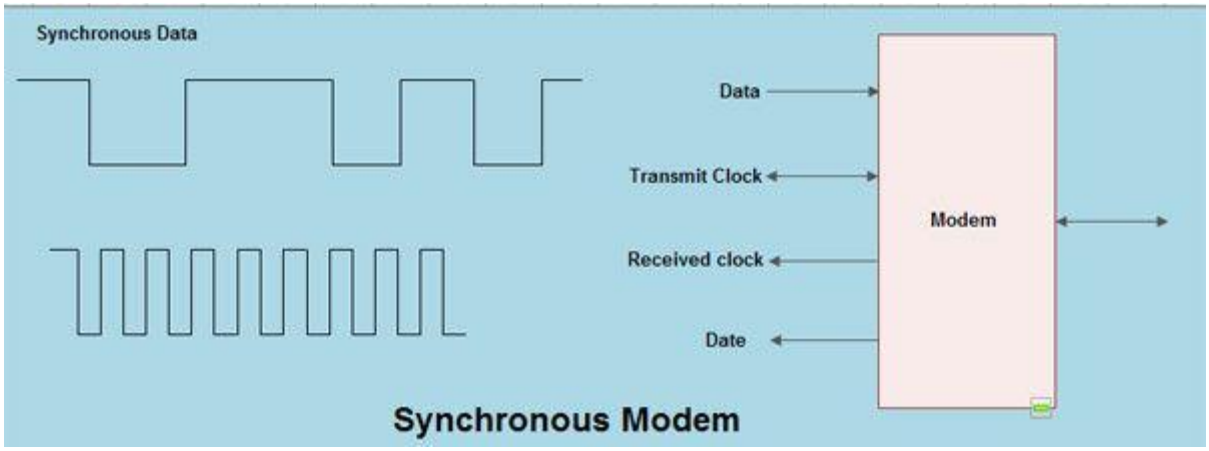
Synchronous Modem:

• Synchronous modems can handle a continuous stream of data bits but requires a clock signal.

• The data bits are always synchronized to the clock signal.

• There are separate clocks for the data bits being transmitted and received.

• For synchronous transmission of data bits, the DTE can use its internal clock and supply the same to the modem



Modulation techniques used for Modem:

The basic modulation techniques used by a modem to convert digital data to analog signals are:

• Amplitude shift keying (ASK).

• Frequency shift keying (FSK).

• Phase shift keying (PSK).

• Differential PSK (DPSK).

These techniques are known as the binary continuous wave (CW) modulation.

• Modems are always used in pairs. Any system whether simplex, half duplex or full duplex requires a modem at the transmitting as well as the receiving end.

• Thus a modem acts as the electronic bridge between two worlds - the world of purely digital signals and the established analog world.

FUNCTIONS OF MODEM:

- **Modulated Signals:**

  The essential function of a modem is to create an easily transmitted and decoded signal that allows digital data to be sent from place to place without the loss of information. The most familiar use of modems is to send information over a telephone channel, but modems can be used to relay data

over any system that provides a means of transmitting analog signals, including radio and optical networks.

- **Data Compression:**
  To reduce the amount of time it takes to send data and to cut down on the amount of error in the signal, modems need to employ data compression. This was especially necessary in the early days of modem technology, since data had to be sent via conventional phone lines. Not being designed for digital information, phone lines placed heavy limitations on the size and speed of signals sent over them. Data compression techniques reduce the size of the signal needed to send the required data.
- **Error Correction:**
  When information is transmitted between modems, it can sometimes be damaged meaning that parts of the data are altered or lost. To get around this, modems use error correction. Information is grouped into batches, called frames. Each frame is tagged with a checksum, a small piece of data derived from the information in the frame. A checksum can be thought of as a kind of fingerprint, unique to the data in a particular frame. The modem that receives the information derives its own checksum from the frame it has been sent, and then compares its checksum data with the checksum sent by the transmitting modem. If the checksums match, the information is undamaged. If they don't match, the data has been corrupted in transmission; the receiving modem sends it back and waits for the transmitting modem to re-send that frame.
- **Flow Control:**
  Individual modems send information at different speeds. It's necessary for faster modems to slow down so that slower modems can catch up, otherwise the slower modem will receive more data than it can process. If this starts to happen, the slower modem transmits a character to the faster one. This character is a signal for the fast modem to pause in sending information until

the slow modem gets caught up. When the slow modem is ready for more data, it sends a different character that signals to the fast modem that it can start transmitting again. In this way, the two modems can match their speeds.

- **Modem Speed Classification:**

  The speed of a modem is typically classified by the amount of data it can send in a specific length of time. This is generally expressed in terms of bits per second (bps). An alternative way of classifying modem speed is the change in the state of the signal per unit time the number of times a modem sends a new signal in a given length of time. This is known as the symbol rate and is measured in units called baud (Bd).

ADVANTAGES AND DISADVANTAGES OF MODEM:

ADVANTAGES	DISADVANTAGES
• More useful in connecting LAN with the internet. • Speed depends on the cost. • Modem is probably the most widely used data communication roadway.	• Slow speed when compared to hub. • Acts just as an interface between LAN and internet. • No traffic maintenance modem is speed, if although if you spend more money you get more speed but that shouldn't be expectable.