Seminar on Sound Card

Presented by:-

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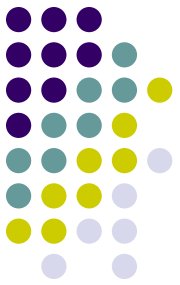   Roll no:- (6550)

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Guided by:-

   C.A.Patel

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Intrduction

❖ The voices in your computer made possible by the sound card.

❖ The sound card is responsible for bringing the world of sound & music to life on the PC.

❖ Sound is a relatively new capability   for PCs.
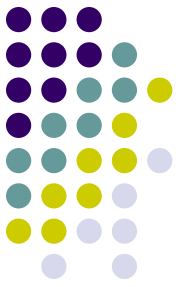
Fundamentals of sound

direct path — first-order reflection — second-order reflection

- How sound is produced
- Result of collision between to objects releasing energy in form of wave.
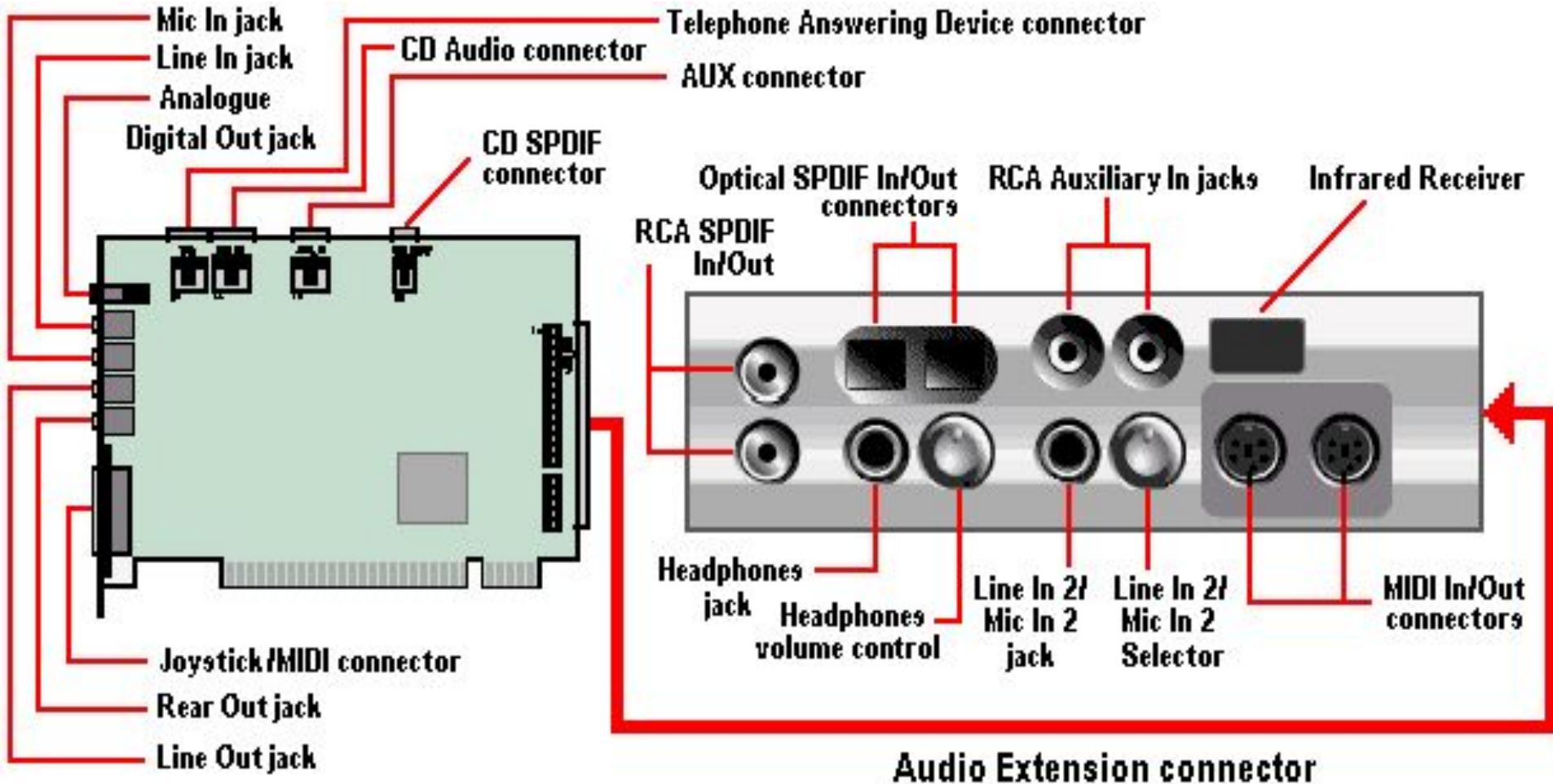- Reflections
- Human brain
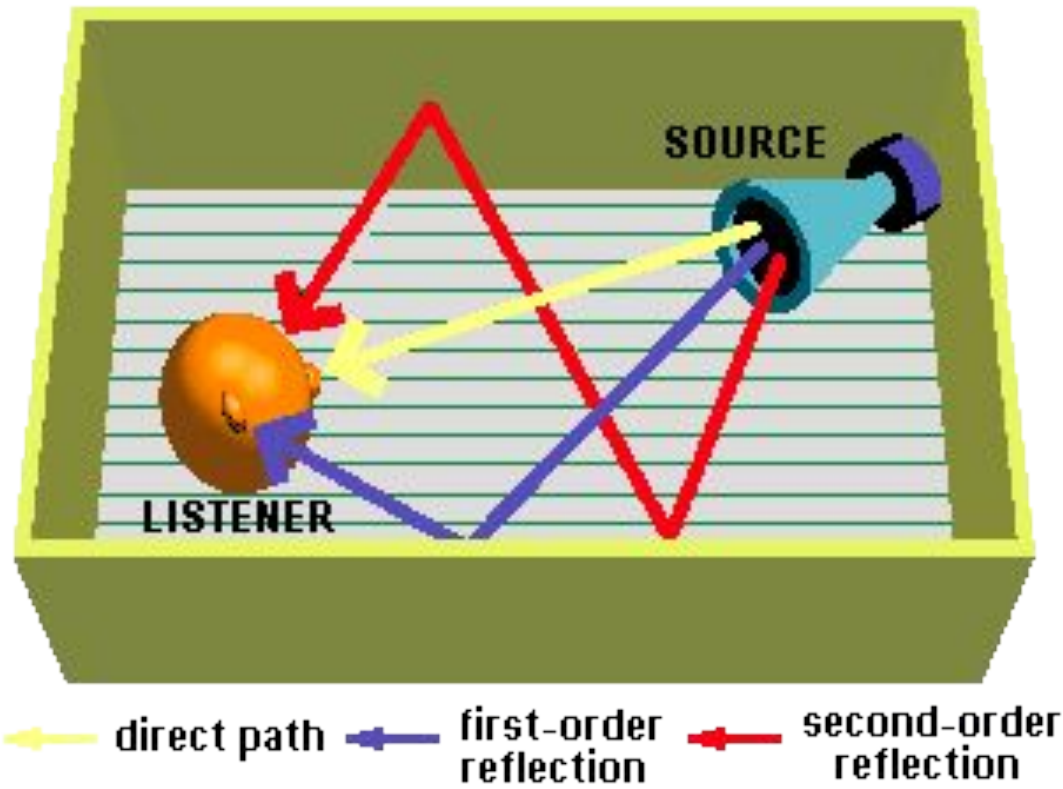
What is Sound card

- Sound card is a board (consisting of circuits) that enables the computer to manipulate and output sound

- Figure shows Creative Labs SB4740 Sound Blaster 16 PCI

Anatomy of sound card

- A digital signal processor (DSP) that handles most computations
- A digital to analog converter (DAC) for audio leaving the computer
- An analog-to-digital converter (ADC) for audio coming into the computer
- Read-only memory(ROM) or Flash memory for storing data
- Musical instrument digital interface (MIDI) for connecting to external music equipment
- Jacks for connecting speakers and microphones, as well as line in and line out
- A game port for connecting a joystick or game pad

Connectivity

Mic In jack

Line In jack

Analogue
Digital Out jack

CD Audio connector

CD SPDIF
connector

Telephone Answering Device connector

AUX connector

RCA SPDIF
In/Out

Optical SPDIF In/Out
connectors

RCA Auxiliary In jacks

Infrared Receiver

Headphones
jack

Headphones
volume control

Line In 2/
Mic In 2
jack

Line In 2/
Mic In 2
Selector

MIDI In/Out
connectors

Joystick/MIDI connector

Rear Out jack

Line Out jack

Audio Extension connector

Sound card may be connected to:

- Headphones
- Amplified speakers
- An analog input source
- Microphone
- Radio
- Tape deck
- CD player
- A digital input source
- Digital audiotape (DAT)
- CD-ROM drive
- An analog output device - tape deck
- A digital output device
- DAT
- CD recordable (CD-R)

Technologies used in sound card

Frequency Modulation:

The first widespread technology to be used in sound cards was Frequency Modulation, or FM, which was developed in the early 1970s by Dr John Chowning of Stanford University. FM synthesizers produce sound by generating a pure sine wave, known as a carrier, and mix it with a second waveform, known as a modulator

Advantage:

-it is in expensive to implement

Disadvantage:

-FM synthesis cannot quite duplicate real world sound

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Wavetable synthesis:

  Wave Table doesn't use carriers and modulators to create sound, but actual samples of real instruments. A sample is a digital representation of a waveform produced by an instrument and all the waveforms that are produced are stored in an electronic table ,hence it is name wave table synthesis.

Determination of Quality of Instrument

- The quality of the original recordings
- The frequency at which the samples were recorded
- The number of samples used to create each instrument
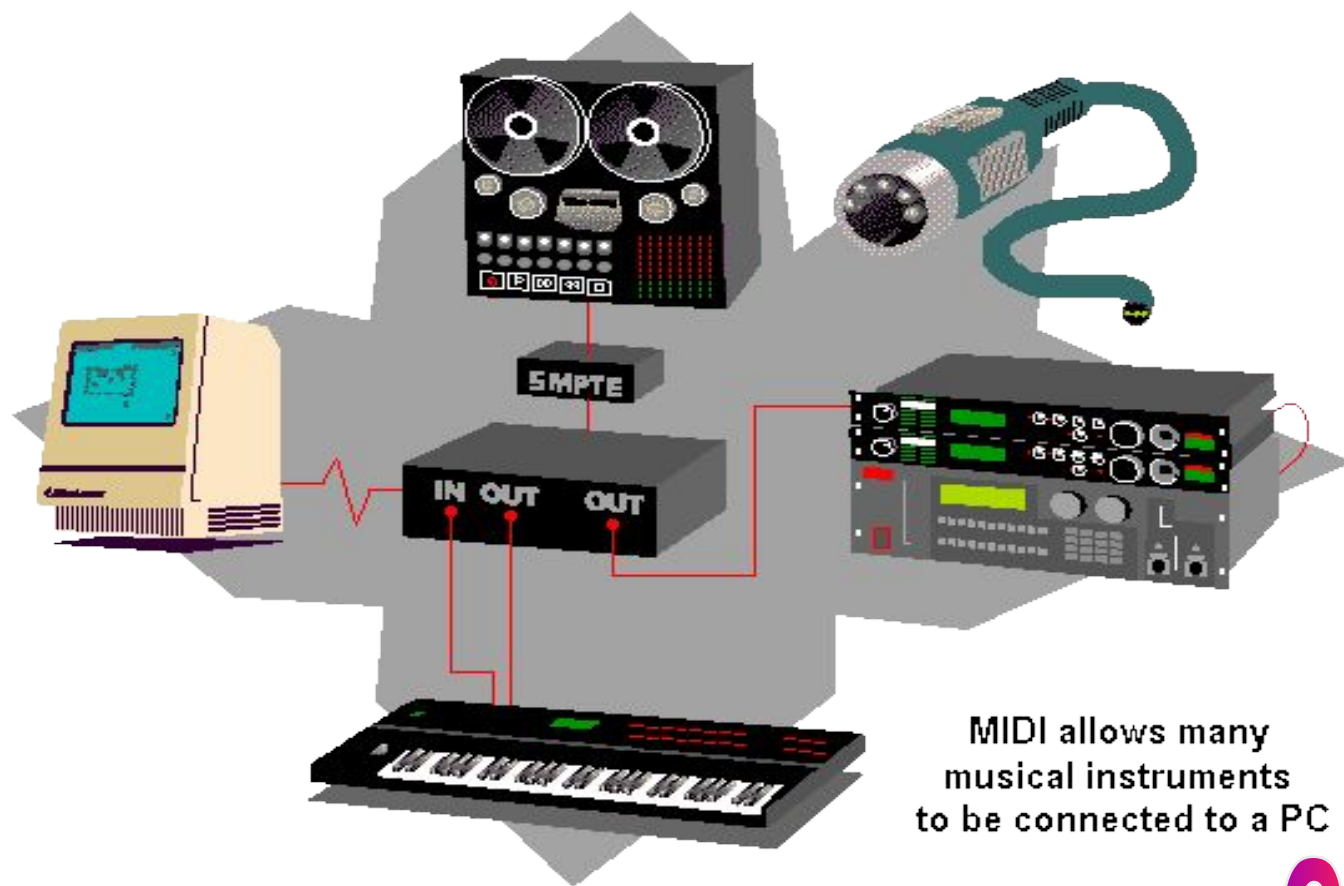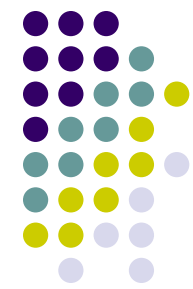- The compression methods used to store the samples.

MIDI:-

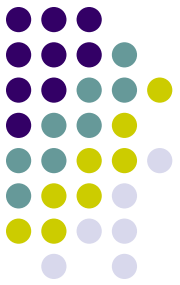MIDI is Musical Instrument Digital Interface.

Musicians often want to be able to control electronic instruments remotely or automatically.

Remote control is when a musician plays one musical instrument, and that instrument controls (one or more) other musical instruments.

MIDI allows many
musical instruments
to be connected to a PC

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Advantages of MIDI

- The advantages of MIDI :
- There are two main advantages of MIDI:
- - It's an easily edited/manipulated form of data, and
- - Also it's a compact form of data (i.e. produces relatively small data files).

Producing Sound :

- The sound card receives a continuous, analog-waveform input signal from the microphone jack. The analog signals received vary in both amplitude and frequency.

- Software in the computer selects which input(s) will be used, depending on whether the microphone sound is being mixed with a CD in the CD-ROM drive.

- The mixed, analog waveform signal is processed in real-time by an analog-to-digital converter (ADC) circuit chip, creating a binary (digital) output of 1s and 0s.

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- The digital output from the ADC flows into the DSP. The DSP is programmed by a set of instructions stored on another chip on the sound card. One of the functions of the DSP is to compress the now-digital data in order to save space.

- The output from the DSP is fed to the computer's data bus by way of connections on the sound card (or traces on the motherboard to and from the sound chipset).

- The digital data is processed by the computer's processor and routed to the hard-disk controller. It is then sent on to the hard-disk drive as a recorded wav file.

Selection Criteria

- Interface: Sound cards can connect to the system using either an ISA slot or a PCI slot. ISA slots are more commonly found on older machines; PCI is the trend for the future. Use whichever your system has room for.

- Resource Availability: Sound cards are notorious for using a large number of system resources: interrupt request lines (IRQs), direct memory access channels (DMAs) and I/O addresses. The fancier the card, the more likely it will require a lot of resources.

- SoundBlaster Compatibility: The SoundBlaster was one of the first sound cards and became a virtual standard in the PC world. Virtually all cards are compatible with at least one version of the SoundBlaster family, and this is something to make sure you have, especially for games.

Important Features:

- 3D Audio: 3D audio is a new technology that causes audio to basically "project" into three dimensions, causing the sound to feel like it is surrounding you. For certain gamers (and certain games) this can make the experience more impressive.

- Digital Audio Connection: As discussed in the section on optical drives, a cable normally connects the CD or DVD drive to the sound card to allow playing CD audio through the PC. This is an analog connection. Some drives and sound cards now support a digital connection that improves quality, assuming you have the capability on both pieces of hardware.

- "Sub-Woofer" Speakers: If you really want to "feel your bass", look for a set of speakers that includes a sub-woofer.
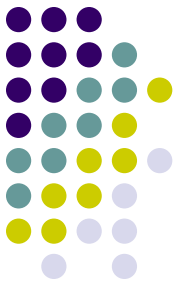
Troubleshooting Sound Card

One thing that a sound card is prone to is EMF. The electromagnetic signals from other components in the system itself can cause problems. The best way to cure this is move the sound card as far away from other components as possible.

Another note about sound cards sound blaster compatible) is they need three things to run correctly.

- IRQ (interrupt Request)
- Direct Memory Access (DMA**)**
- Memory Address

Thanks!!!!