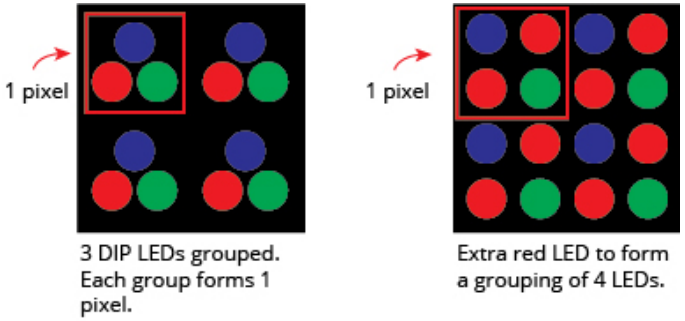
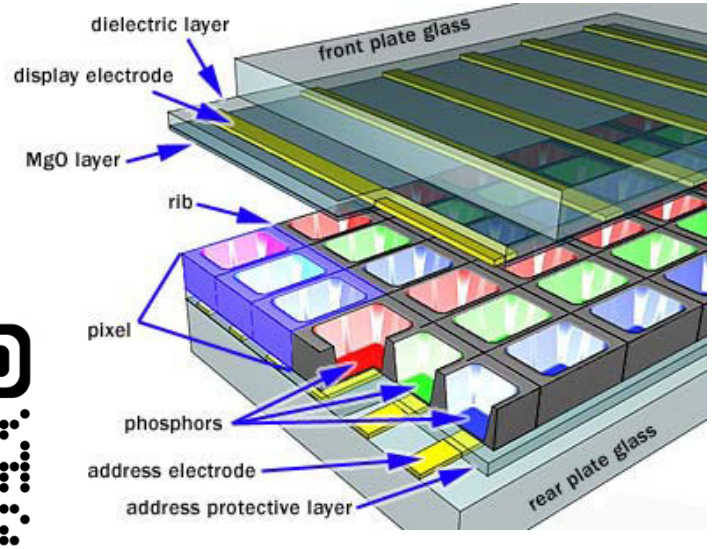
OUTPUT DEVICES

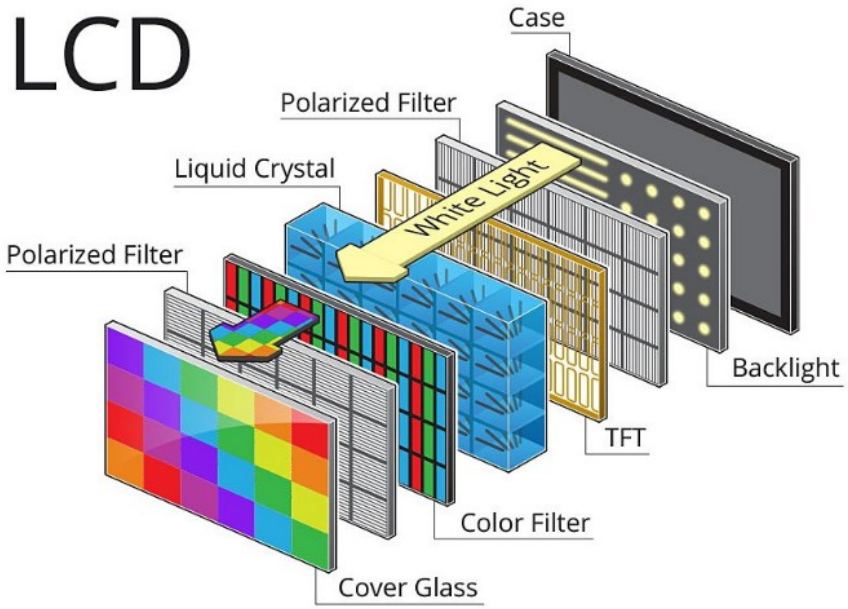


- LED screens
  - This type of screen tends to be used for large outdoor displays due to the brilliance of the colours produced
- How does it work?
  - An LED screen is made up of tiny light emitting diodes (LEDs). Each LED is either red, green or blue in colour.
  - By varying the electric current sent to each LED, its brightness can be controlled, producing a vast range of colours
  - https://www.youtube.com/watch?v=xAMhX3Drq14

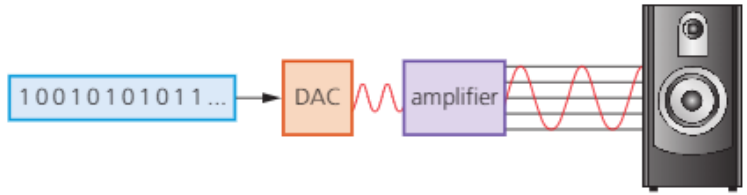


OUTPUT DEVICES

- LCD screens
  - LCD screens are made up of tiny liquid crystals
  - These tiny crystals make up an array of pixels that are affected by changes in applied electric fields
  - How this works is outside the scope of this book
  - Current technology of LCD screen use LED as a back-lit but old technology of LCD screens uses CCFL

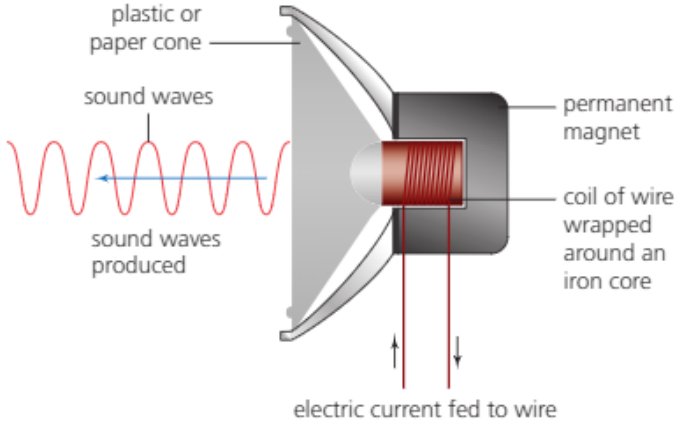


OUTPUT DEVICES



▲ **Figure 3.46** Digital to analogue conversion

- Speakers
  - The digital data is first passed through a digital to analogue converter (DAC) where it is changed into an electric current.
  - This is then passed through an amplifier (since the current generated by the DAC will be very small); this creates a current large enough to drive a loudspeaker.
  - This electric current is then fed to a loudspeaker where it is converted into sound.
- How does analogue signal vibrate the cone
  - Electric current flows through the coil that is wrap around a magnet will induce magnetic field and the iron core will be moved
  - The iron core vibrates the cone and create sound wave
  - https://youtu.be/6qjclXaE7gc?t=780



▲ **Figure 3.47** Diagram showing how a loudspeaker works