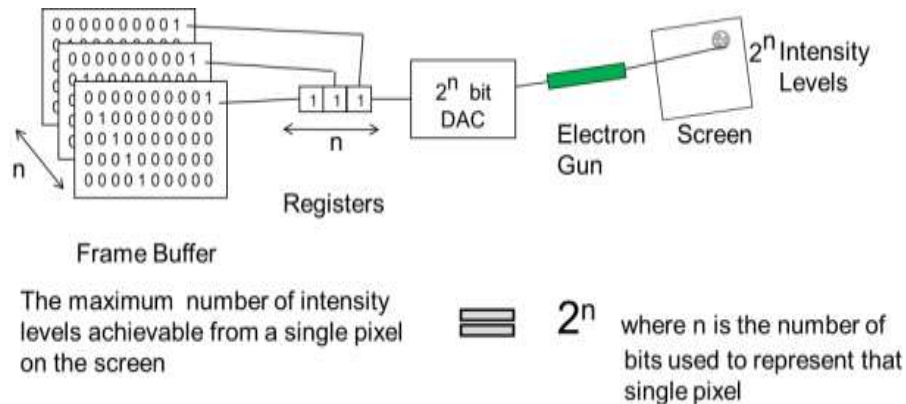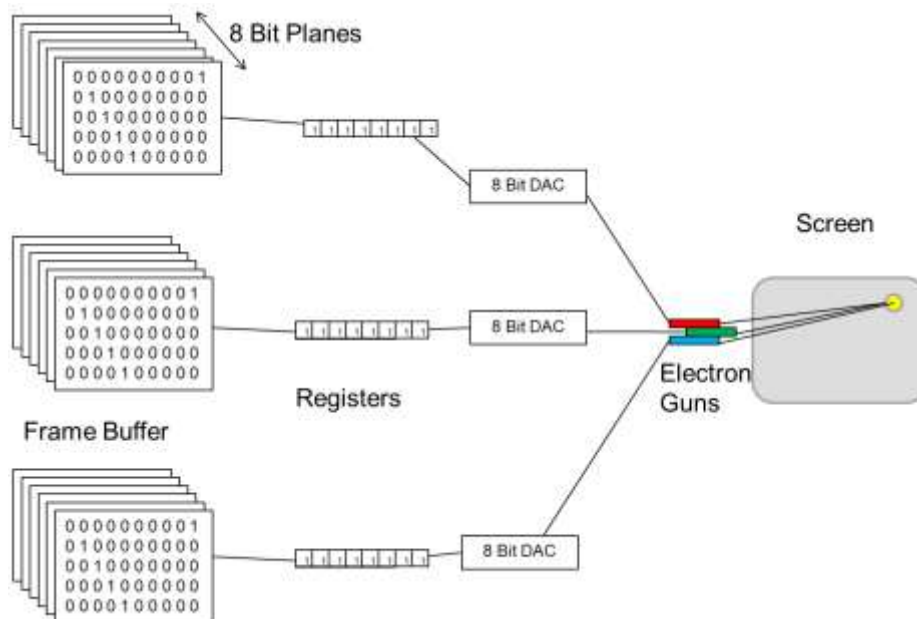# Digital to Analogue Converter (DAC)

It converts a digital input signal into an analog output signal

In case of a Raster display system, the frame buffer is a digital device and the screen is an analogue device

For display generating purpose, the digital to analogue converter accesses the bits in the frame buffers and converts it into analogue signal necessary to signal the electron gun or other components to glow the pixels on the screen

An 'n' bit DAC can generate 2^n voltage signals for the electron gun to excite the phosphors dots on the screen thus generating 2^n shades of that color (red, green or blue) on the screen

So if an 8 bit DAC is used for each of the three components (red, green or blue) then a total number of 24 bits are used to represent a single pixel on the screen comprised of red, green and blue phosphor dots which means that the DAC in total can produce $2^n = 16777216$ different voltage levels for the electron guns thus producing 16777216 different intensities out of a single pixel on the screen

Frame Buffer Organization

It is the contiguous memory allocation that is used to hold pixel intensity values of the image to be displayed on a computer screen

It maybe a part of system memory of a part of separate memory on the graphics cards

The size of the frame buffer depends upon the number of bits allocated per pixel

So if the total resolution of the scree is 640 x 480 and each pixel is allocated 1 single bit

Then the total size of the frame buffer is 640 x 480 = 307200 bits

If the total resolution of the scree is 640 x 480 and each pixel comprised of red, green and blue components represented by 8 bits for each components then each pixel is represented by 24 bits
Then the total size of the frame buffer is 640 x 480 x 12 bits

Video Controller Refresh Operation
A Video controller reads the intensity information for each pixel stored in the frame buffer and controls the intensity of the pixel on the screen