

graphic display



gray scale Black and white

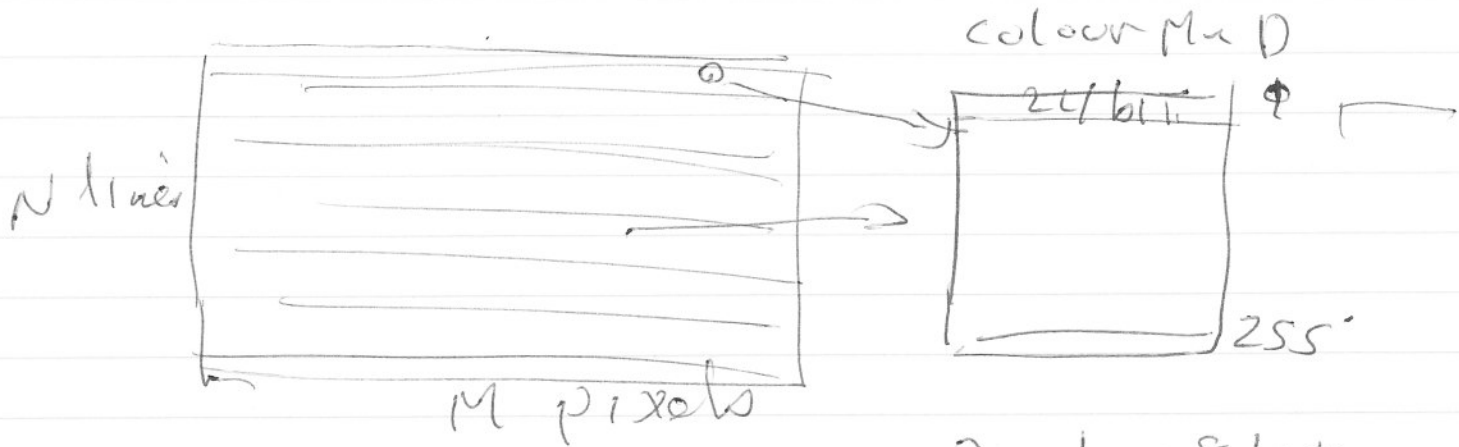
$$M = N = 512$$

$$\text{size} = 512 \times 512 \times 8 \text{ bit per pixel}$$

255 \rightarrow white
0 = black
you have 256 gray level

$$\begin{aligned} \text{Per Frame size} &= 512 \times 512 \times 1 \text{ B} \\ &= \frac{1}{2} \text{ K} \times \frac{1}{2} \text{ K} \times 1 \text{ B} = \frac{1}{4} \text{ MB} \end{aligned}$$

colour graphics display



colour:

24 bit

pixel = 24 bits

lines

Red = 8 bit

Green = 8 bit

Blue = 8 bit

$$= \underbrace{1280}_{\text{pixels}} \times \underbrace{1028}_{\text{lines}} \times 24 \text{ bits} \quad \text{Frame}$$

$$\text{cost} = 1.28 \times 1.028 \times 3 \text{ B} \approx 4 \text{ MB / Frame}$$

rate 60 Hz

60 Frame / second

$$\text{BW} = 4 \text{ MB} \times 60 / \text{sec} \\ \approx 240 \text{ MB / sec}$$

EXAMPLE

→ Assume SRAM of 1 word = 32 bit
= 4 B how fast do we need SRAM
to be able to support colour graphics

$$\text{Time} = \frac{4 \text{ B}}{240 \text{ MB / sec}} = \frac{4000 \times 10^{-9}}{240} \\ \approx 16 \text{ ns}$$